Southern Testing
Environmental & Geotechnical

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# Phase I and II Site Investigation Report



Desk Studies | Risk Assessments | Site Investigations | Geotechnical | Contamination Investigations | Remediation Design and Validation

## Site: Proposed McDonalds Restaurant, Tesco Crescent Road, Wrexham

## Client: Glanville Group

## Report Date: 10th May 2019

## Project Reference: JN1246


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# SUMMARY

The site is located off Crescent Road, approximately 1km to the north-east of Wrexham Town Centre, extends to about 0.22 ha and comprises an operational car park bounded by fencing, with hedgerows and semi-mature trees. It is proposed to redevelop the site with a new single storey McDonalds, and associated soft landscaping, car park and access roads.

Geological records indicate that the site geology consists of Glaciofluvial Sheet Deposits (Secondary A aquifer) over Salop Formation (Secondary A Aquifer). The site is not located within a Source Protection Zone (SPZ).

A desk study was carried out and indicates that the site has a history as a field until the construction of the car park on site by 2003. The surrounding area has undergone significant development, including a large sand extraction pit along the north eastern boundary of the site. This represents a potential gas risk.

A single phase of intrusive investigation was undertaken comprising 8 No windowless sampler boreholes to a maximum depth of 5.00m bgl and a single soakage test.

The soils encountered comprised MADE GROUND (-0.5/1.9m) overlying medium-dense fine SAND (-5m+) with loose very clayey SAND bands [*only encountered within WLS1 & WLS2]*.

Groundwater was not encountered during the site investigation, or during the subsequent monitoring visits.

The sulphate content of the fill and natural soil analysed was found to fall within Class DS-1. The ACEC classification for the site is AC-1s.

Conventional soakaways are considered feasible for this site.

On the basis of the investigations carried out to date, pad and strip/trench foundations could be considered viable for the site. The majority of the site is underlain by made ground to a maximum depth of 1.9m bgl, which is in turn underlain by medium-dense SANDS; therefore, an allowable bearing pressure of 100kPa is applicable on the natural soil.

There is the potential for foundations to span differing strata; as such, light mesh reinforcement is recommended to mitigate potential settlement differentials.

Given the depth of made ground across the site a fully suspended, with vented sub-floor void will be required.

No contamination of concern was encountered in the trial holes or reported for the soils analysed. Basic Radon Protection Measures will need to be incorporated into the proposed building, along with basic gas protection measures.

The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

A formal remediation strategy and verification plan should be agreed with the regulatory authorities prior to commencement of any remedial works. This may simply be the implementation of a discovery strategy to deal with any more significant contamination that comes to light.

The site investigation was conducted and this report has been prepared for the sole internal use and reliance of Glanville Group. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

*The findings and opinions conveyed via this Site Investigation Report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd believes are reliable. Nevertheless, Southern Testing Laboratories Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.*

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| J Kelly | | C Ward |
| (Countersigned) | | (Signed) |

For and on behalf of Southern Testing Laboratories Limited

STL: JN1246
10 May 2019

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# A INTRODUCTION

## 1 Authority

Our authority for carrying out this work is contained within a completed project order form from Bestman Agu of Glanville's, dated 12th March 2019.

## 2 Location

The site is located off Crescent Road, approximately 1km to the north-east of Wrexham Town Centre. The approximate National Grid Reference of the site is SJ 341 504.

## 3 Proposed Construction

It is proposed to construct a new single-storey McDonald's restaurant, with associated areas of hard and soft landscaping, a car parking area and "Drive-Thru", as per the SCURR drawing number 7611-SA-XXXX-SK08 (dated January 2018).

For the purposes of the contamination risk assessment, the proposed development land use is classified as Commercial (CLEA model[1]/C4SL report[2]). The gas sensitivity of the site is therefore rated as Low (CIRIA C665[3]).

## 4 Object

This is a phase I desk study, walkover and phase II geotechnical and contamination (risk estimation and evaluation) investigation (Tier 1).

The object of the investigation was to assess foundation bearing conditions and other soil parameters relevant to the proposed development, and to assess the likely nature and extent of soil, groundwater and ground gas contamination on the site.

## 5 Scope

This report presents our desk study findings, exploratory hole logs and test results and our interpretation of these data.

As with any site there may be differences in soil conditions between exploratory hole positions.

This report is not an engineering design and the figures and calculations contained in the report should be used by the Engineer, taking note that variations will apply, according to variations in design loading, in techniques used, and in site conditions. Our figures therefore should not supersede the Engineer's design.

[1] Environment Agency Publication SC050021/SR3 'Updated technical background to the CLEA Model' (2009).
[2] SP1010 Development of Category 4 Screening Levels DEFRA (2014)
[3] CIRIA C665 (2006) Assessing risks posed by hazardous ground gases to buildings.

The findings and opinions conveyed via this Site Investigation Report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd believes are reliable. Nevertheless, Southern Testing Laboratories Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The site investigation was conducted and this report has been prepared for the sole internal use and reliance of Glanville Group. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report may not be appropriate to alternative development schemes. The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

# B DESK STUDY & WALKOVER SURVEY

## 6 Desk Study

A desk study has been carried out. Reference has been made to the following information sources.

- Geological Maps
- Hydrogeological/Groundwater Vulnerability maps
- Aerial Photographs
- Historical Ordnance Survey Maps
- Environmental Databases
- Discussions with Site Owner, Employees, Local Residents and Historians
- BRE Radon Atlas[4]

The environmental databases search report compiled for this desk study contains site-specific environmental data drawn from data sets that comprise publicly available information together with data from third parties, some of which is under review. Accordingly, Southern Testing Laboratories Limited does not warrant its accuracy, reliability or completeness.

The full report is included in Appendix E, a summary of the salient features is included in the following sections of this report.

### 6.1 Geology

The British Geological Survey Map No 121 (Wrexham) indicates that the site geology consists of Glaciofluvial Sheet Deposits overlying the Salop Formation.

[4] BR 211 (2007) 'Radon: guidance on protective measures for new buildings'

Glaciofluvial Sheet Deposits consist of material that has been transported, sorted and deposited by meltwater from a glacier or inland ice sheet. The meltwater collected in the ice and formed high velocity glacial rivers in tunnels and cracks leading out to the ice front. These rivers carried material ranging from clay particles to boulders. During transport in the glacial river, the particles were rounded and sorted.

The Salop Formation comprises red and red-brown mudstone, and red-brown (mostly sublitharenite) sandstone containing beds of pebbly sandstone and conglomerate itself containing Carboniferous limestone and chert clasts, and thin 'Spirobis' limestone beds and caliche in the lower part of the unit.

## 6.2 Hydrology and Hydrogeology

Data from the Environment Agency and other information relating to controlled waters is summarised below.

| Data | | Remarks | Possible Hazard to/from Site Y/N |
|---|---|---|---|
| Aquifer Designation | Superficial Deposits | Secondary A aquifer | Y |
| | Bedrock | Secondary A aquifer | Y |
| Groundwater Vulnerability | | Soils of a high leaching potential | Y |
| Abstractions | | None recorded within 900m of the site | N |
| Source Protection Zones | | The site is not located within a source protection zone. | N |
| Surface Water Features | | The nearest surface water feature recorded is the River Gwenfro, located approximately 429m to the south-west of the site, flowing from west to east. | N |
| Marine/Fluvial Flood Risk | | The site is not mapped within or adjacent to being at risk of flooding from rivers. | N |
| Surface Water Flood Risk | | The site is not mapped within or adjacent to being at risk of surface water flooding. | N |
| Discharge Consents | | 285m S – Sewerage Discharge | N |
| | | 323m SW – Unspecified | N |

Although the drift and bedrock have sensitive aquifer designations, both Secondary A Aquifers, the hydrogeological mapping suggests that groundwater is likely to be around 50m below the subject site; as such, the risk to groundwater, from both on and off-site sources of contamination, is considered negligible.

## 6.3 Historical Map Search

Copy extracts of historical Ordnance Survey plans dating from 1874 to present day were obtained and are presented in Appendix E together with a summary of the salient features.

In brief, at the time of earliest mapping the site comprised an area of agricultural land, across two fields. A small sand pit was located some 50m to the north-east, associated with a Borough Depot. There was a former sand pit located some 50m to the north-west and Victoria Flour Mills was located approximately 100m west of the site.

By 1912, the depot (now Holt Road Depot) to the north-east had expanded, along with the sand pit, which was now just off the north-eastern boundary; the site itself remained undeveloped.

The sand pit and depot had ceased operation by 1937, with the pit appearing to be partially backfilled. An abattoir had been established some 20m to the west of the site, along with a further sand pit some 70m to the south-east.

The housing estate to the east of the site had been constructed by 1959, on the site of the former sand pit. A depot had been constructed some 20m off the northern boundary of the site, with the abattoir expanding as well. A car park was evident approximately 100m east of the site. The site itself was still undeveloped at this time.

By 1989, the abattoir had been demolished, with the site still remaining vacant. The Tesco's had been constructed by 2003, with the site being turned into an overflow car park. A block of offices had also been constructed on the former abattoir site by this time.

The site has remained unaltered to present day.

## 6.4 Environmental Databases

| | Distance (m) | Direction | Details | Possible Hazard to site |
|---|---|---|---|---|
| Active Contemporary Trade Directory Entries | 178<br>188 | W<br>S | Tesco Petrol Filling Station<br>Printers | N<br>N |
| Current and Historical Landfills | 320 | SE | The Dunks No.2, operated 1960 to 1980, received inert, household, industrial, commercial and special waste | Y |
| Potentially Infilled Land (water) | 266 | SW | Unknown Filled Ground (pond, marsh, river, stream, dock, etc) | Y |
| Potentially Infilled Land (non-water) | 32<br>131 | NE<br>NW | Unknown Filled Ground (Pit, Quarry etc)<br>Unknown Filled Ground (Pit, Quarry etc) | Y<br>Y |
| Waste treatment site or disposal sites | 199 | W | Partco Autoparts Ltd – paint thinners and paint waste | N |
| Fuel Sites | 178 | W | Tesco Filling Station | Y |

| | | | | |
|---|---|---|---|---|
| Pollution Incidents (2 within 250m) | 241<br>245 | S<br>S | 1996, category 3 minor incident, foam / soap suds<br>1996, category 3 minor incident, oils/petrol | N<br>N |
| LA PPC | 125-167 | W or SW | Petrol Filling Stations | Y |
| IPC Part B Authorisations | -- | -- | None recorded within 1km of the site | N |
| Hazardous Substances Consents | -- | -- | None recorded within 600m of the site | N |
| Sensitive Land Use Designations | -- | -- | None recorded within 1km of the site | N |

A number of contamination risks to the site have been identified in the form of nearby potentially infilled ground adjacent to the site and the landfill to the south-west, both of which pose a gas risk, hence some gas monitoring will be undertaken.

Although the site was adjacent, or part of the grounds of a former abattoir, this has been closed 30 years and the subject area was developed with a car park around 15 years ago. As such, any biological risk, over time, is considered negligible.

The active Tesco fuelling station is not thought to pose a significant risk, due to its age and the likely depth of the groundwater; however, some limited testing of soil will be undertaken to assess the conceptual model.

## 6.5 Geological Hazards and Mining Activities

Data from various sources relating to potential geological hazards at the site are summarized below. The Hazard Potentials listed for the BGS data are as presented in the Envirocheck/Groundsure report, derived from various generic BGS sources, which are not considered as site-specific. It is important that this information is considered in context of the actual site topography, ground conditions encountered during future investigation, and development proposals.

| Data Source | Hazard | Hazard Potential to Site | Remarks |
|---|---|---|---|
| BGS | Potential for Collapsible Ground Stability Hazard | Y | Very low |
| | Potential for Compressible Ground Stability Hazard | N | Moderate 107m to the east |
| | Potential for Ground Dissolution Stability Hazard | N | |
| | Potential for Landslide Ground Stability Hazard | Y | Very low |
| | Potential for Running Sand Ground Stability Hazard | Y | Very low -Low 107m to the east |
| | Potential for Swelling or Shrinking Clay Ground Stability Hazard | N | Very low 107m to the east |
| | Shallow Mining Hazard | N | |
| ARUP | Mining Instability | N | |

| Data Source | Hazard | Hazard Potential to Site | Remarks |
|---|---|---|---|
| CSS/KURG* | Underground openings | N | |
| BGS | Recorded Mineral Site | Y | Beaconsfield Sand Pit, Ceased |

**Chelsea Spelaeological Society/ Kent Underground Research Group*

Although the site is located within a coal reporting area, it is not located within Development High Risk Area. Therefore, a coal risk assessment has not been undertaken at this stage, as the risk is deemed to be low.

### 6.6 Radon Risk

With reference to BRE guidance: the site is located within an intermediate probability radon area, meaning basic radon protection measures are required for the proposed construction.

## 7 Walkover Survey

A walkover survey was carried out on Tuesday 2nd April 2019 by Callum Ward, at which time the weather was cold and overcast, with occasional heavy showers / sleet.

### 7.1 General Description and Boundaries

The site occupies an area of approximately 0.22 Ha and comprises a section of the operational Tesco's car park, and soft landscaping. The site is bounded to the east by a residential housing estate, being bounded to the north by commercial properties, and on all other sides by further car park.

### 7.2 Topography

The site appears to be generally flat.

### 7.3 Vegetation

The majority of the site itself is generally void of vegetation, although there are a number of semi-mature to mature trees around the sites boundaries.

### 7.4 Buildings and Land Use on Site and Nearby

There are no buildings located within the site boundaries.

# C PRELIMINARY CONCEPTUAL MODEL

## 8 Introduction

In the context of this report, the conceptual model summarises the potential pollutant linkages identified for the site and forms the basis of the risk assessment for the site. The preliminary model comprises the potential sources of contamination, receptors that could be harmed and exposure pathways identified from the desk study and walkover survey. These potential linkages form the basis upon which the investigation is designed and reported.

## 9 Potential Sources of Contamination

The site comprised a field for a significant amount of time, although was possibly part of/adjacent to an abattoir site for about 60 years, until the construction of the existing Tesco Store; the site is now part of the car parking and soft landscaping of the Tesco store. The site is located within a predominantly commercial area with residential land uses in the immediate vicinity.

A number of potentially contaminative uses have been identified, both on site and in the locality.

Potential contaminants associated with these uses have been compiled from DoE industry profiles and our experience of such sites.

### 9.1 On Site Sources

| Source | Potential Contaminants |
|---|---|
| Made Ground/Car Park | Metals, PAHs, petroleum hydrocarbons, asbestos |
| Historic Farmland | Metals, PAHs, petroleum hydrocarbons, asbestos, herbicides & pesticides |

The site had a long history of agricultural before the construction of the car park. Therefore, the potential for on-site source of contamination comes from the former farmland, and the construction of the car park. The risk from the farming activities, given how long ago these took place and the subsequent development of the site as a car park, is considered negligible.

At this stage, given that the abattoir building was mapped off-site, this is included in the table below, rather than above.

## 9.2 Off Site Sources

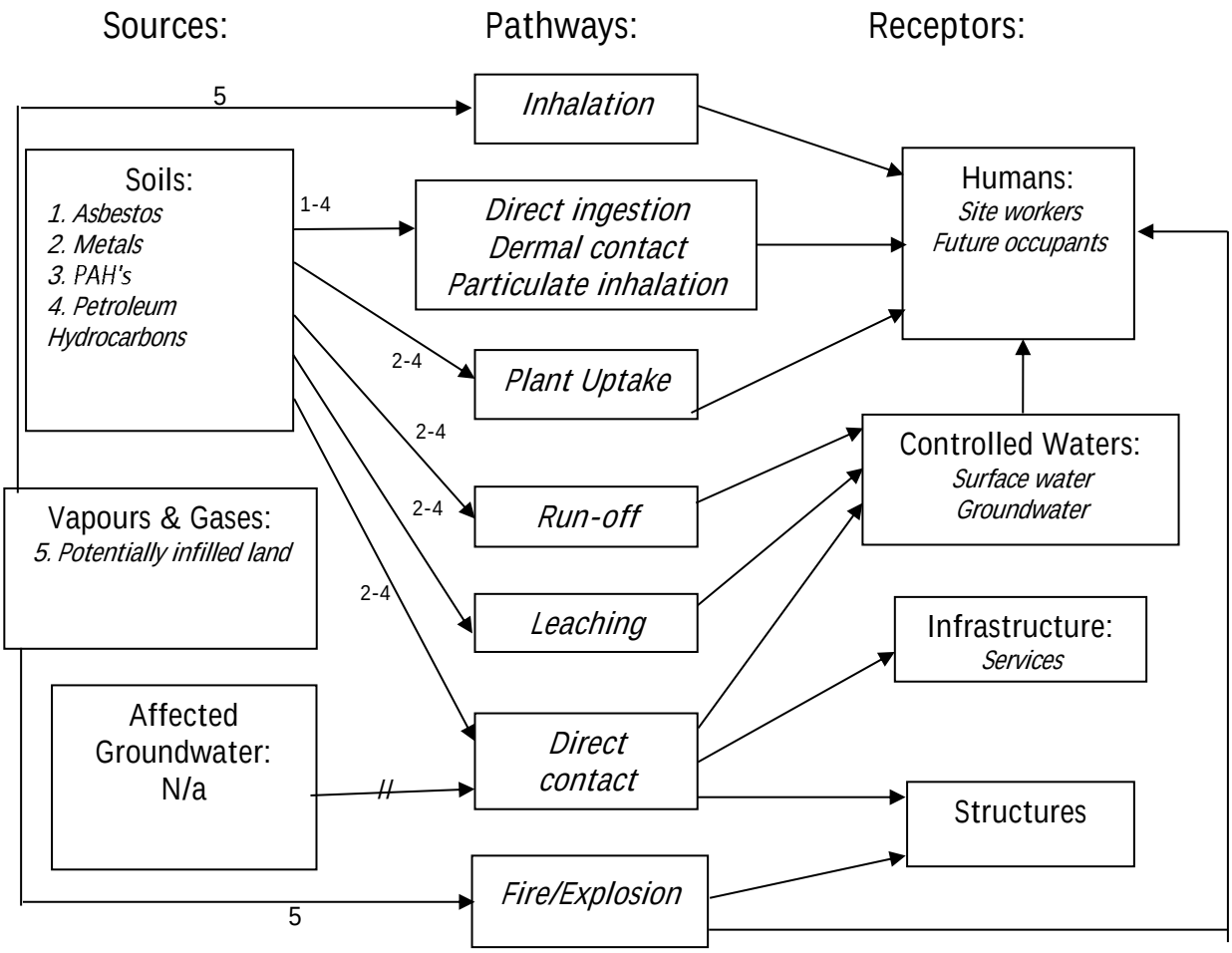
The site may be impacted by contamination migrating from beyond the site boundary. The following potential off-site sources have been identified.

| Source | Distance from Site Boundary | Direction | Potential Contaminants | Likely Hazard to Site |
|---|---|---|---|---|
| Former abattoir | 20m | W | Metals, Asbestos, PAHs, TPHs, Pathogens, Carcasses | Very Low |
| Former sand pit | 25m | NE | Ground gas | Low |
| Fuel station | 178m | W | Petroleum Hydrocarbons | Very Low |
| Historical Land Uses (depot/car park) | 30m | NW | Metals, Asbestos, PAHs, TPHs, petroleum hydrocarbons | Low |

The potentially backfilled sand pit to the north-east of the site poses the greatest off-site risk, as such, gas monitoring will be undertaken as part of the site investigation. The groundwater is mapped around 50m below the subject site, so the risk from the other off-site sources is considered very low.

## 10 Pollutant Linkages and Model Summary

The following diagram shows the potential pollutant linkages identified for the site and summarises the preliminary conceptual model:




// Denotes potential pollutant linkage not complete

# D SITE INVESTIGATION

## 11 Method

The strategy adopted for the intrusive investigation comprised the following:

- 8 No 1-5m deep windowless sampler boreholes
- 1 No Soakage tests

The exploratory hole locations are shown in Figure 1 in Appendix A.

## 12 Weather Conditions

The fieldwork was carried out from Tuesday 2nd to Wednesday 3rd April 2019, at which time the weather was cold and overcast, with occasional heavy showers / sleet.

## 13 Soils as Found

The soils encountered are described in detail on the attached exploratory hole logs (Appendix A), but in general comprised a covering of Made Ground over medium-dense SANDS with clayey SAND bands. A summary is given below.

| Depth | Soil Type | Description |
|---|---|---|
| GL – 0.5/1.9m | MADE GROUND | Dark brown / black sandy TOPSOIL with rootlets or Blacktop<br>Over<br>MOT Type 1 with geo-grid<br>Over<br>Dark grey silty gravelly CLAY with concrete and wood fragments or dark brown / black sandy gravelly CLAY with brick, ash, coal and clinker fragments.<br>Full depth not proven in some trial holes |
| -5.0m+ | SAND | Medium-dense red-brown fine SAND with a band of loose grey / red-brown very clayey SAND<br>*[clayey SAND bands only encountered within WLS1 & WLS2]* |

### 13.1 Visual and Olfactory Evidence of Contamination

No visual or olfactory evidence of contamination was encountered during the investigation. Made ground was, however, encountered at times, which is a potential source of a range of general contaminants.

## 14 Groundwater Strikes

Groundwater was not encountered during the investigation, to a maximum depth of 5m, will all trial pits dry upon completion. No groundwater has been encountered during the return monitoring visits. As discussed, mapping suggests that it is around 50m below the site.

# E FIELD TESTING AND SAMPLING

The following in-situ test and sampling methods were employed. Descriptions are given in Appendix B together with the test results.

- Geo-environmental Sampling
- Geotechnical Disturbed Sampling
- In-situ SPT Testing

# F GEOTECHNICAL LABORATORY TESTS

The following tests were carried out on selected samples. Test method references and results are given in Appendix C.

- pH & Water Soluble Sulphate
- PSD Wet Sieves
- Moisture Contents and Atterberg Limits

# G DISCUSSION OF GEOTECHNICAL TEST RESULTS AND RECOMMENDATIONS

## 15 Soil Characterisation

The majority of the soils encountered were granular in nature, therefore five particle size distribution (PSD) tests were undertaken from selected samples recovered from various depths. The granular deposits appear to be well graded fine to medium SAND, with a measured fines fraction of between 12-32%. Therefore this material can be regarded as non-shrinkable, and frost susceptible.

A single Atterberg Limit test was undertaken on a selected samples of the clayey SAND recovered. The Plasticity Index's recorded was 7%. Therefore, the underlying cohesive pockets can be considered to be of negligible volume change potential with respect to NHBC Chapter 4.2. On the basis of the above, no specific precautions in regard to swelling or shrinkage are required in this instance.

## 16 Groundwater Levels

Groundwater levels vary considerably from season to season and year to year, often rising close to the ground surface in wet or winter weather, and falling in periods of drought. Long-term monitoring from boreholes or standpipes is required to assess the ground water regime and this was not possible during the course of this site investigation.

Groundwater was not encountered during the investigation, or during subsequent monitoring visits, to a maximum depth of 5m and mapping suggests that it is a significant depth below the site.

## 17 Soakaways

Due to time and site constraints a single infiltration tests was carried out within WLS2, the location of which are shown on the appended site plan (Appendix A). The full results are appended with a summary and discussion provided below.

| Hole No. | Test depth | Estimated Soakage Rate | |
|---|---|---|---|
| | | $l/m^2/min$ | Average m/s |
| WLS2 | 4.0m | 2.23 | $3.72 \times 10^{-5}$ |

Typically, a minimum soakage rate of 0.1 $l/m^2/min$ is required for conventional soakaways to meet the BRE365 requirement of a soakaway half empty time of less than 24 hours. Based upon the results obtained, conventional chamber soakaways could be utilised on this site, although it is recommended that full-scale soakage testing is undertaken to confirm the rate.

## 18 Sulphates and Acidity

The water-soluble sulphate concentration and soil pH have been analysed in 5 samples of the soils recovered, at various depths. The samples recorded pH values in the range of 6.3-9.5, slightly acidic to alkaline. All samples reported a water-soluble sulphate concentration of <500mg/l.

The appropriate Design Sulphate Class is therefore DS-1 and, given lack of groundwater, the ACEC site classification is AC-1s.

## 19 Bearing Capacity

On the basis of the investigations carried out to date, pad and strip/trench foundations could be considered viable for the site. The majority of the site is underlain by made ground to a maximum depth of 1.9m bgl, which is in turn underlain by medium-dense SANDs and, therefore, an allowable bearing pressure of 100kPa is applicable.

There is the potential for foundations to span differing strata; as such, light mesh reinforcement is recommended to mitigate potential settlement differentials. Foundations should be deepened subject to deeper pockets of made ground.

Provisional allowances (extra-dig, over-break etc) are always recommended, and abnormal foundations cannot be ruled out entirely should deepening for made ground and existing service runs (BT ducts, water pipes and cables) that traverse the site be required; such disturbed ground should be 'bottomed out'.

## 20 Floor Slabs

Given the depth of made ground across the site a fully suspended slab, with vented sub-floor void, will be required, which also incorporates some basic radon and gas protection measures (see section 26).

## 21 Settlement

For foundations constructed as discussed above, and assuming site levels are to remain approximately as per existing, then settlements are anticipated to be <25mm.

## 22 Excavations and Trenching

Statutory support will be required in all excavations where men must work. The trial pits were generally stable in the short term. For all deeper excavations close lateral support will be required.

## 23 Road Construction

DCP CBR probes were attempted at several locations around the site, but refused at shallow depths due to the density of the sub-base material. However, due to the underlying strata being made ground, the recommended procedure for new road construction is to:-

1. Excavate to a depth of one metre along the line of the road.
2. Proof roll and compact the exposed formation, selectively removing any unsuitable material and treating any soft spots that are detected in the rolling operation, and backfilling same with suitable material.
3. Backfill with granular material, capping material or the like in a controlled manner to the underside of the proposed sub-base layer (500mm if the material is granular). The excavated spoil may be used for backfilling, subject to removal of unsuitable material, such as timber, metal-ware, soft clay, large masonry or concrete blocks etc. This granular material would need to be treated as frost susceptible.

If the road is to be adopted, then this method should be approved with the adopting authorities before implementation.

# H LAND QUALITY

## 24 Analytical Framework

There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.

The CLEA model[5] provides a methodology for quantitative assessment of the long term risks posed to human health by exposure to contaminated soils. Toxicological data is used to calculate a Soil Guideline Value (SGV) for an individual contaminant, based on the proposed site use; these represent minimal risk concentrations and may be used as screening values.

In the absence of any published SGVs for certain substances, Southern Testing have derived or adopted Tier 1 screening values for initial assessment of the soil, based on available current UK guidance including the LQM/CIEH[6] S4UL's and CL:AIRE[7] generic assessment criteria. In addition, in March 2014, DEFRA[8] published the results of a research programme to develop screening values to assist decision making under Part 2A of the Environmental Protection Act. Category 4 screening levels were published for 6 substances, with reference to human health risk only. This guidance includes revisions of the CLEA exposure parameters, presenting parameters for public open space land use scenarios, and also of the toxicological approach. The screening levels represent a low risk scenario, based on a 'Low Level of Toxicological Concern' rather than the 'Minimal Risk' of CLEA, and the analytical results of this investigation may be considered relative to these levels.

The values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based upon them. Their validity should be confirmed at the time of site development.

Site-specific assessments are undertaken wherever possible and/or applicable.

CLEA requires a statistical treatment of the test results to take into account the normal variations in concentration of potential contaminants in the soil and allow comparisons to be made with published guidance.

## 25 Site Investigation – Soil

### 25.1 Sampling Regime

The number of sample locations aimed to provide general coverage of the site.

[5] Environment Agency Publication SC050021/SR3 'Updated technical background to the CLEA Model' (2009).
[6] The LQM/CIEH S4ULs for Human Health Risk Assessment. (2014).
[7] The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment (2009).
[8] SP1010 Development of Category 4 Screening Levels foe Assessment of Land Affected by Contamination. DEFRA, 2014.

## 25.2 Testing

The potential for contamination by metals, PAHs, petroleum hydrocarbons and asbestos was identified in the preliminary conceptual model and observations made on site and, therefore, the following tests were selected.

| Test Suite | Number of Samples | Soil Tested |
|---|---|---|
| STC Suite 2 | 4 | Made Ground & Natural |
| STC Suite 3 | 4 | Made Ground |
| WAC Testing | 3 | Made Ground & Natural |

The test results are presented in full in Appendix D. A summary and discussion of the significance of the results and identified contamination sources is given below.

## 25.3 Test Results and Identified Contamination Sources

### 25.3.1 General Contaminants

The results of the key contaminant tests have been analysed in accordance with the CLEA methodology. The samples have been grouped into two populations comprising Made Ground and Natural Soil. For each parameter in each population the sample mean is calculated and compared to a Tier 1 screening value. If the sample mean exceeds the screening value, the soil may be regarded as contaminated and further assessment may be required. If neither the sample mean nor any single value exceeds the screening value, the soil may be regarded as not contaminated, though further confirmatory assessment may be required. Where any single parameter value exceeds the screening value but the sample mean does not, further statistical analysis may be applied to that parameter if the available data is suitable. Such analysis would include an assessment of the Normality of the distribution of the data, consideration of the presence of outliers, and the calculation of a UCL estimate of the mean.

Summary data is presented in the tables below and the laboratory analysis is included in Appendix D. The screening values and source notes are presented in Table 1 "Tier 1 Screening Values" at the front of Appendix D.

*Soil Type: Made Ground*

| Contaminants | Units | No of Samples Tested | Range | Sample Mean | Commercial / Industrial Tier 1 Screening Value |
|---|---|---|---|---|---|
| Arsenic (As) | mg/kg | 5 | 4.1-12 | 7.4 | 640 |
| Cadmium (Cd) | mg/kg | 5 | <0.2-2.3 | 0.62 | 190 |
| Total Chromium (Cr) | mg/kg | 5 | 9-15 | 11 | 8,600 |
| Hexavalent Chromium (CrVI) | mg/kg | 5 | <4 | 4.0 | 33 |
| Lead (Pb) | mg/kg | 5 | 48-87 | 67 | 2330 |
| Mercury (Hg) | mg/kg | 5 | <0.3 | 0.30 | 29 |
| Selenium (Se) | mg/kg | 5 | <1 | 1.0 | 12,000 |
| Nickel (Ni) | mg/kg | 5 | 12-21 | 15 | 980 |
| Copper (Cu) | mg/kg | 5 | 19-40 | 29 | 68,000 |
| Zinc (Zn) | mg/kg | 5 | 40-460 | 145 | 730,000 |
| Benzo[a]pyrene | mg/kg | 5 | <0.05-0.31 | 0.10 | 14 |
| Naphthalene | mg/kg | 5 | <0.05 | 0.05 | 77 |
| Total of 16 PAHs (USEPA) | mg/kg | 5 | <0.8-2.77 | 1.2 | / |
| Acidity (pH value) | Units | 5 | 6.7-9.5 | 7.5 | / |

The made ground samples analysed were free from significant levels of contamination. This concurs with the visual and olfactory evidence and general site history.

*Soil Type: Natural Soils*

| Contaminants | Units | No of Samples Tested | Range | Sample Mean | Commercial / Industrial Tier 1 Screening Value |
|---|---|---|---|---|---|
| Arsenic (As) | mg/kg | 3 | 3-5.5 | 4.2 | 640 |
| Cadmium (Cd) | mg/kg | 3 | <0.2 | 0.20 | 190 |
| Total Chromium (Cr) | mg/kg | 3 | 6.2-9.1 | 8.1 | 8,600 |
| Hexavalent Chromium (CrVI) | mg/kg | 3 | <4 | 4.0 | 33 |
| Lead (Pb) | mg/kg | 3 | 22-97 | 47 | 2330 |
| Mercury (Hg) | mg/kg | 3 | <0.3 | 0.30 | 29 |
| Selenium (Se) | mg/kg | 3 | <1-2 | 1.3 | 12,000 |
| Nickel (Ni) | mg/kg | 3 | 8.2-9.6 | 8.7 | 980 |
| Copper (Cu) | mg/kg | 3 | 12-240 | 91 | 68,000 |
| Zinc (Zn) | mg/kg | 3 | 26-34 | 29 | 730,000 |
| Benzo[a]pyrene | mg/kg | 3 | <0.05 | 0.05 | 14 |
| Naphthalene | mg/kg | 3 | <0.05 | 0.05 | 77 |
| Total of 16 PAHs (USEPA) | mg/kg | 3 | <0.8 | 0.80 | / |
| Acidity (pH value) | Units | 3 | 6.3-6.7 | 6.5 | / |

The underlying natural samples analysed were also free from significant levels of contamination. This concurs with the visual and olfactory evidence and the general site history.

### 25.3.2 Asbestos

No asbestos containing materials were detected in the samples analysed and none were observed in the exploratory holes. However, it should be noted that the exploratory holes are of small sized/the investigation was constrained by services and site access and the samples obtained may not reflect the full composition of the soils on the site. Therefore, there is always the potential for pockets of asbestos or for asbestos containing materials to be present, particularly where fill has been encountered, which have not been detected in the sampling.

It is also our experience that asbestos containing materials are quite often encountered in buried pockets. It is, therefore advised that a careful watch is kept in any areas of fill identified.

### 25.3.3 Petroleum Hydrocarbons

There was no visual or olfactory evidence of fuel contamination in the soils observed in the trial holes. As a precaution, to assess the conceptual model, selected samples were analysed for petroleum hydrocarbons. The concentrations of aromatic and aliphatic compounds were recorded below the laboratory detection limits in each sample tested. The concentrations of BTEX compounds were also recorded below the laboratory detection limits. This concurs with the observations made in the trial holes.

On this basis, no further action is required, other than implementation of a discovery strategy, to deal with any more significant contamination that is encountered.

## 26 Site Investigation – Gas

### 26.1 Gas Sources

Due to the presence of a historic sand pit (potentially backfilled) located along the north-eastern boundary of the site, and various potential off-site sources, a preliminary gas monitoring programme was put in place.

This type of source is characterised as being of Low generation potential, after Wilson and Haines (2005)[9].

### 26.2 Sampling Strategy

The number and spacing of the gas monitoring wells was aimed to provide general coverage beneath the proposed building. Wells were installed in three of the windowless sampler boreholes.

[9] Wilson, S and Haines, S. 2005. Site investigation and monitoring for ground gas assessment – back to basics. Land Contamination & Reclamation 13, 3, 211-222.

## 26.3 Monitoring Programme and Results

The sensitivity of the proposed development is rated as Low and, therefore, 6 gas readings were taken over a period of 6 weeks. The results of the monitoring programme are given in full in Appendix F and are summarised below.

| Borehole Gas Monitoring Results Summary | | | |
|---|---|---|---|
| Monitoring Well | WLS1 | WLS2 | WLS3 |
| Response Zone/Stratum | Natural | Natural | Natural |
| Evidence of contamination | -- | -- | -- |
| No. of monitoring events | 6 | 6 | 6 |
| Methane % range | <0.1-0.4 | <0.1-0.3 | <0.1-0.4 |
| Carbon Dioxide % range | <0.1-8.6 | 1.2-3.4 | 1.4-9.0 |
| Oxygen % range | 14.4-21.2 | 17.8-19.2 | 13.2-19.2 |
| Flow rate l/hr range | -0.1-0.3 | -0.1-0.1 | -0.1-0.1 |
| BH Pressure range mb | -0.9-7 | -1.1—0.5 | -1.1—0.5 |
| Water level mbgl | DRY | DRY | DRY |
| Atmospheric pressure during monitoring mb | 991-1018 | | |

The six monitoring visits were undertaken over a reasonable range of atmospheric pressures (991-1018mb). The levels of carbon dioxide measured, at times, exceeded 5%, whilst the results recorded for methane generally did not generally exceed 0.1%. Some limited flow was recorded during the last visit, although in general no flow was recorded.

## 26.4 Identified Gas Regime

The maximum flow rate measured of 0.4/hr has been assumed and used in the calculation, along with the maximum Carbon Dioxide reading of 9.0%. This yields a gas screening value (GSV) of 0.03 for the site.

This corresponds to Characteristic Situation 1 (CS1) of the modified Wilson and Card classification. However, given the consistently elevated carbon dioxide concentration being recorded, above 5%, the site should be categorised as a minimum of CS2. This probably requires 2.5 points based upon BS 8485: 2015 which should be used to design the appropriate protection measures within the development. Basic radon protection is also required.

## 27 Summary of Identified Contamination

On the basis of the investigation to date, no significant contamination has been identified in the soils analysed. This concurs with the observations made and the general site history.

Some basic gas and radon protection is required.

## 28 Risk Evaluation

The object of the risk evaluation is to assess the pollution linkages for specific contaminant groups considered in the conceptual model, identify any unacceptable risks and, therefore establish whether there is a need for further investigation and/or remedial action.

The risks are considered in the context of the specific development proposals for the site and, therefore, the conclusions may not be appropriate for alternative schemes.

### 28.1 Revised Conceptual Model

The preliminary site model has been refined in light of the findings of this investigation and is summarised below.

| *etals* | *Petroleum Hydrocarbons* | *PAHs* | *Land Gas* | *Asbestos* | PATHWAYS | RECEPTORS |
|---|---|---|---|---|---|---|
| N | N | N | n/a | N | Ingestion and inhalation of contaminated soil and dust | Human Health |
| N | N | N | n/a | N | Dermal contact with contaminated soil and dust | |
| n/a | N | N | Y | n/a | Inhalation of vapours or gases | |
| N | N | N | n/a | n/a | Uptake into edible fruit and vegetables | |
| N | N | N | n/a | n/a | Surface water run-off into surface water features | Water Environment |
| N | N | N | n/a | n/a | Migration through ground into surface water or groundwater | |
| n/a | N | N | n/a | n/a | Off-site migration of contaminated groundwater | |
| N | N | N | n/a | n/a | Vegetation on site growing in contaminated soil | Flora and Fauna |
| N | N | N | n/a | n/a | Aquatic life in affected waters | |
| N | N | N | n/a | n/a | Contact with contaminated soil | Building materials/ buried services |
| n/a | N | N | N | n/a | Fire or explosion | |

Key:

| | |
|---|---|
| Y | Pollutant linkage likely |
| N | Pollutant linkage not likely |
| P | Pollutant linkage possible |
| n/a | Pathway not applicable to contaminant |

## 28.2 Relevant Pollutant Linkages

The only Relevant Pollutant Linkages for which remedial action will be required have been identified in the revised conceptual model, are as follows.

| Contaminant/Source | Pathways | Receptors |
|---|---|---|
| Land Gas and Radon | Inhalation | Future Users |

The minor gas/radon risk can be mitigated by the installation of basic gas protection measures in the new build.

A discovery strategy will also need to be put in place, to mitigate the risk from any undetected contamination that might come to light during the development work.

# 29 Discussion and Conclusions

1. For areas of soft landscaping should be, a minimum of 200-300mm topsoil should be imported to provide a growing medium.

2. Any topsoil for the soft landscaped areas that is to be imported should be from a reliable source and certified clean; in addition, depending upon the source and local authority requirements, testing may also be required following importation.

3. The contractors should also be provided with the contamination results for their health and safety review.

4. Allow for Protecta-line water supply pipes at this stage.

5. Based upon the gas monitoring results the site falls within CS2. This corresponds to a gas protection score of 2.5, assuming a commercial/public building classification, and appropriate protection systems will need to allow for this (a mixture of ventilation and gas membrane).

6. Basic Radon protective measures will also be required.

7. As with any site, but particularly a site such as this where deep Made Ground has been encountered, areas of contamination not identified during site investigation works may come to light in the course of redevelopment, particularly around and under the buildings. Accordingly, a discovery strategy must be in place during the redevelopment to ensure that any hitherto unknown contamination is identified, such as any areas of track or fill, and dealt with in an appropriate manner. Depending on the nature of any such contamination, it may prove necessary to reassess the remedial strategy for the site.

A formal remediation strategy and verification plan may need to be agreed with the regulatory authorities prior to commencement of any remedial works. This should simply comprise the implementation of a discovery strategy and validation of any imported topsoil for soft landscaped areas.

### 30 General Guidance

Allowance should be made for experienced verification of any remedial works, if required (see above).

It may be that specific local requirements apply to this site, of which we are not aware at this time.

In general terms, the workforce and general public should be protected from contact with contaminated material. There is a range of relevant documents published by the Health and Safety Executive, and organisations such as CIRIA, and the BRE.

It should be noted that organic contaminants present in the soils could affect plastic underground service pipes (such as the types used by water and gas supply companies). Guidance should be sought from the relevant companies regarding any proposed plant in the affected area.

Many water supply companies now require higher specification pipe on contaminated sites, even following remediation.

## I WASTE DISPOSAL

### 31 Introduction

The Landfill Directive, introduced to the UK via the Landfill Regulations (England and Wales) 2002 aims to reduce reliance on landfill as a disposal option. The Regulations include updated Waste Acceptance Criteria (WAC) as limit values for waste destined to various classes of landfill.

The developer has a statutory responsibility under the Duty of Care Regulations of the Environmental Protection Act 1990 to ensure that contaminated soil and water is disposed of off-site to a suitably licensed waste management facility in a safe and approved manner.

To comply with the Duty of Care, all wastes taken off site, in solid or liquid form, must be handled by a registered waste carrier and be accompanied by a consignment note that describes the waste.

### 32 Preliminary Waste Classification and WAC Analysis

If arisings from the constructions works are intended for disposal, then there is a requirement to determine prior to disposal whether these would classify as:

- Hazardous
- Non hazardous

The current relevant waste legislation and technical guidance (WM3 1st edition 2015) on the assessment and classification of hazardous waste, sets out the requirement for classification and provides the basis for the methodology employed to ensure compliance with the regulations. This report sets out to fulfil the requirements of basic characterisation.

Waste classification indicates whether the material is hazardous or non-hazardous. If material is classified as non-hazardous, there is a choice of sending the material to a non-hazardous or an inert landfill (subject to meeting inert waste acceptance levels based on WAC analysis). Where the waste is classified as hazardous, WAC analysis will be required to demonstrate that the concentrations meet the acceptance levels for hazardous landfill or stable non-reactive hazardous (SNRH) landfill.

The List of Wastes (England) Regulations 2005 shows those wastes that are absolute entries (i.e. hazardous waste regardless of their concentration) and mirror entries (hazardous waste only if hazardous substances are present above the specified threshold concentrations).

Section 17 of the List of Wastes relates to Construction and Demolition Wastes (including Excavated Soil from Contaminated Sites, stones and dredging spoil). Contaminated soil is a "mirror entry", and is not automatically assigned a hazardous or non-hazardous nature.

Instead, an assessment of the composition of the soil is undertaken to determine the concentrations of hazardous substances, and the waste classified accordingly. The assessment of contaminated soil to determine whether it is hazardous waste is dependent on the presence of "hazardous substances" exceeding particular thresholds.

### 32.1 Results of the Preliminary Assessment

The waste classification assessment has been undertaken using the results of the chemical analyses on the samples analysed. The classification of the materials was conducted using the concentration of each identified substance attributed to its 'worst-case' compound (where relevant), as per Environment Agency (EA) document WM3 (2015) and The Classification, Labelling and Packaging of Substances and Mixtures Regulation 1272/2008 (CLP). The assessment was carried out using the HazWaste Online Toolkit together with Tables 3.1 and 3.2 of CLP Regulation. The details of the waste classification are presented in Appendix D.

The results of the chemical analysis carried out indicate that the recorded concentrations for PAHs, metals and TPH in the soils were generally low and no exceedances above any of the hazardous waste thresholds were recorded.

No visible pieces of asbestos or fibres were detected in any of the Made Ground soil samples. A summary of the assessment results is presented below:

| Sample ID | Material | Classification | EWC | Hazardous Properties |
|---|---|---|---|---|
| WLS1 @ 0.1m | Made Ground | Non-Hazardous | 17 05 04 | n/a |
| WLS1 @ 0.7m | Made Ground | Non-Hazardous | 17 05 04 | n/a |
| WLS1 @ 1.2m | Natural | Non-Hazardous | 17 05 04 | n/a |
| WLS2 @ 0.6m | Made Ground | Non-Hazardous | 17 05 04 | n/a |
| WLS2 @ 1.8m | Natural | Non-Hazardous | 17 05 04 | n/a |
| WLS3 @ 2.1m | Natural | Non-Hazardous | 17 05 04 | n/a |
| WLS5 @ 0.7m | Made Ground | Non-Hazardous | 17 05 04 | n/a |
| WLS4 @ 0.9m | Made Ground | Non-Hazardous | 17 05 04 | n/a |

Based on the results of the chemical analysis, the made ground and the natural soils are classified as Non-Hazardous with EWC code 17 05 04.

## 32.2 Results of Waste Acceptance Criteria (WAC) Analysis

Waste Acceptance Criteria Analysis was carried out on two made ground sample (WLS1 @ 0.7m and WLS4 @ 0.9m) and one natural samples (WLS1 @ 1.2m). The results of the WAC analysis are summarised below:

*Made Ground (WLS1 @ 0.7m and WLS4 @ 0.9m)*

The results of the WAC analysis carried out on the two made ground samples indicate that the recorded concentrations of parameters analysed generally meet the threshold values of INERT landfill acceptance criteria.

*Natural soil (WLS1 @ 1.2m)*

The results of the WAC analysis carried out on the single natural soil samples indicate that the recorded concentrations of parameters analysed generally meet the threshold values of INERT landfill acceptance criteria.

## 32.3 Recommendations

The chemical analyses undertaken in the course of this investigation have been used to carry out a preliminary waste classification of the materials on site. This report should be forwarded to waste receiving sites for their final decision. Additional testing and Waste Acceptance Criteria (WAC) testing may be needed for confirmation of the material's classification.

If more significant contamination is encountered during the construction works, this may affect the waste classification.

# APPENDIX A

Site Plans and Exploratory Hole Logs

# Key to Exploratory Hole Logs

## General

All soil & rock descriptions in general accordance with BS5930:2015 + A2:2010, BS EN ISO 14688 & BS EN ISO 14689
The Geology Code only entered where positive identification of the sampled strata has been made

## Sampling

| | |
|---|---|
| ES | Environmental Sample (taken in appropriate sampling container) |
| D | Disturbed Sample |
| B | Bulk Sample |
| LB | Large Bulk for Earthworks testing |
| C | Core Sample |
| U | Undisturbed Sample (number of blows indicated in results column) |
| SPTLS | SPT Liner Sampler |
| P | Piston Sample |
| W | Water Sample |

## Insitu Tests

| | |
|---|---|
| SPT | Standard Penetration Test in accordance with BS EN ISO 22476-3:2005+A1:2011 |
| SPT (C) | Cone Penetration Test in accordance with BS EN ISO 22476-3:2005+A1:2011 |
| PT | Penetration Test - STL documented equivalent SPT N Value |
| PPT | Perth Penetration Test - STL in house documented method (N Value) |
| UCS ( ⊥ ) | Unconfined Compressive Strength measure by hand penetrometer ($kN/m^2$) |
| IVN | Hand Vane (kPa) |
| PID | Photo Ionisation Detector Results (ppm) |
| MEXE | Mexecone CBR Result |

## Drilling Records

| | |
|---|---|
| Depth to standing water level | ▼ |
| Depth to water strike | ▽ |
| TCR | Total Core Recovery (%) |
| SCR | Solid Core Recovery (%) |
| RQD | Rock Quality Index (%) |
| FI | Fracture Index |

## Backfill Symbols

Arisings



Concrete



Blacktop



Bentonite Seal



Gravel Filter



Sand Filter



## Pipe Symbols

Plain Pipe



Slotted Pipe



Filter Tip



## Principal Soil Types

Topsoil



Made Ground



Clay



Silt



Sand



Gravel



Peat



## Principal Rock Types

Mudstone/Claystone



Siltstone



Sandstone

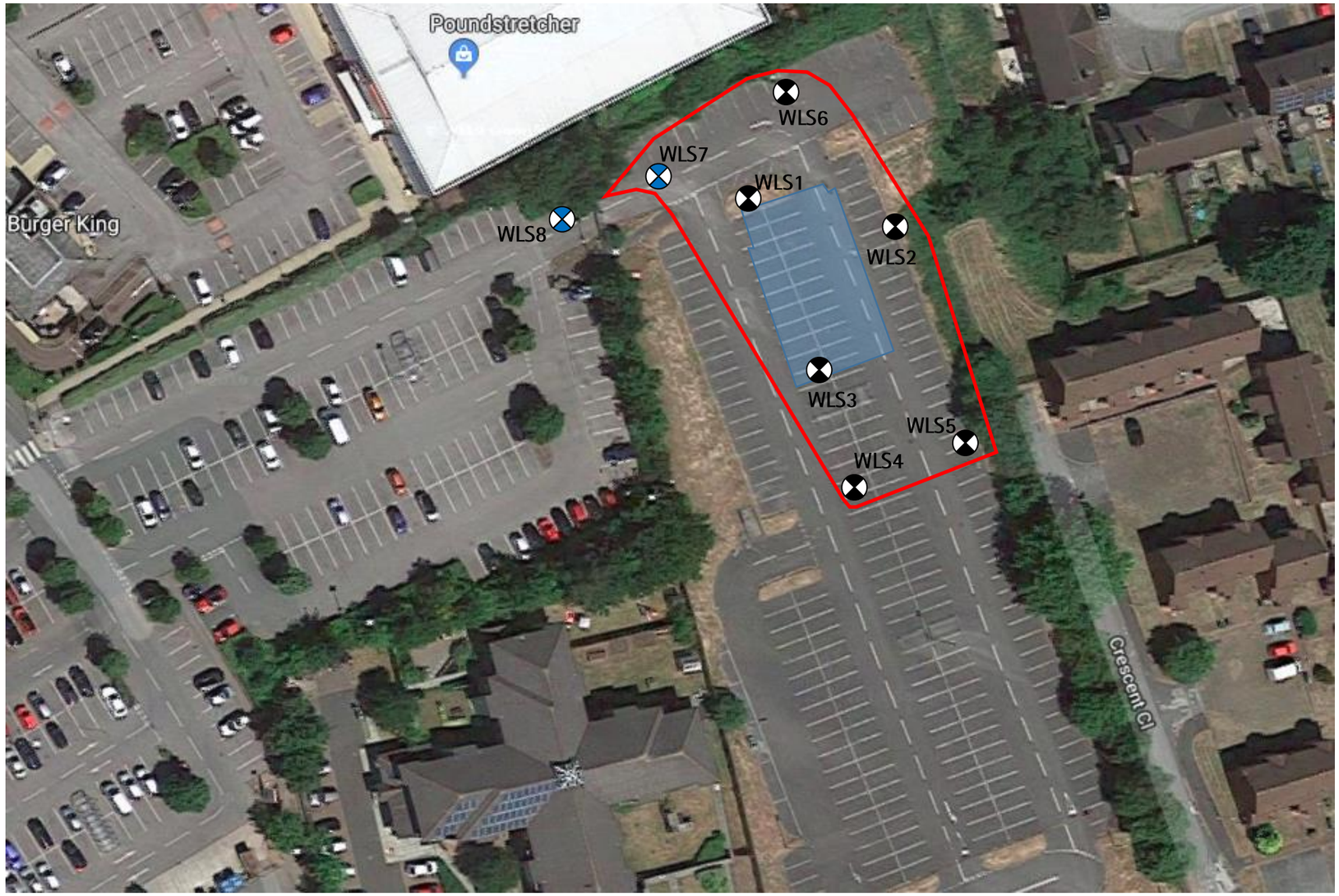


Limestone



Chalk






N

Proposed Building Location

Site Boundary

Windowless Sampler Borehole

Road Core and Windowless Sampler Borehole

NB: Positions of Boreholes and/or Trial Pits are only indicative unless dimensioned

| | | | |
|---|---|---|---|
| Site: McDonalds Wrexham | | STL:JN1246 | Fig No:1 |
| Date: 08 April 2019 | | Final Siteplan | |
| Southern Testing | Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA<br>ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN | ST Consult | |

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www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

| Start - End Date | Project ID: | Hole Type: | WLS1 |
|---|---|---|---|
| 02/04/2019 | JN1246 | WLS | Sheet 1 of 1 |

| Project Name: | Tescos Wrexham | Remarks: | Co-ordinates: | Level: | Logger: |
|---|---|---|---|---|---|
| | | | | | CW |
| Location: | Crescent Rd, Wrexham | | | | |
| Client: | Glanvilles | | | | |

| Well | Water Strikes | Samples and Insitu Testing: Depth (m bgl) | Type | Results | Level (m AOD) | Thickness (m) | Legend | Depth (m bgl) | Stratum Description |
|---|---|---|---|---|---|---|---|---|---|
| | | 0.10 | ES | | | (0.20) | | 0.20 | Dark brown / black gravelly sandy TOPSOIL with flint gravels and rootlets |
| | | | | | | (0.20) | | 0.40 | MADE GROUND comprising red-brown gravelly SAND with macadam fragments |
| | | | | | | (0.20) | | 0.60 | MADE GROUND comprising light grey sandy clayey GRAVEL |
| | | 0.70 | ES | | | | | | MADE GROUND comprising dark brown / black sandy gravelly CLAY with brick fragments, ash, coal and clinker |
| | | | | | | (0.50) | | | |
| | | 1.00 | SPT(S) | N=17 (3,4/5,4,4,4) | | | | 1.10 | |
| | | 1.20 | ES | | | | | | Medium-dense red-brown fine SAND |
| | | 1.30 - 1.40 | D | | | | | | |
| | | 2.00 | SPT(S) | N=11 (2,2/3,2,3,3) | | | | | |
| | | | | | | (2.50) | | | |
| | | 2.70 | D | | | | | | |
| | | 3.00 | SPT(S) | N=12 (1,2/3,3,3,3) | | | | | |
| | | 3.10 | D | | | | | | |
| | | | | | | | | 3.60 | Loose / medium-dense grey / red-brown very clayey SAND |
| | | | | | | (0.60) | | | |
| | | 4.00 | SPT(S) | N=7 (1,1/2,1,2,2) | | | | 4.20 | Medium-dense red-brown fine SAND |
| | | | | | | (0.80) | | | |
| | | | | | | | | 5.00 | End of Borehole at 5.00m |

| Hole Details | | Casing Details | | Waterstrike (m bgl) | | | | | | Standing/Chiselling (m bgl) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (m bgl) | Dia. (mm) | Depth (m bgl) | Dia. (mm) | Date | Depth Strike | Depth Casing | Depth Sealed | Rose to: | Time (mins) | From | To | Time | Remarks |
| | | | | | | | | | | | | | |

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| Start - End Date | Project ID: | Hole Type: | WLS2 |
|---|---|---|---|
| 02/04/2019 | JN1246 | WLS | Sheet 1 of 1 |

| Project Name: | Tescos Wrexham | Remarks: | Co-ordinates: | Level: | Logger: |
|---|---|---|---|---|---|
| | | | | | CW |
| Location: | Crescent Rd, Wrexham | | | | |
| Client: | Glanvilles | | | | |

| Well | Water Strikes | Samples and Insitu Testing: Depth (m bgl) | Type | Results | Level (m AOD) | Thickness (m) | Legend | Depth (m bgl) | Stratum Description |
|---|---|---|---|---|---|---|---|---|---|
| | | 0.20 | ES | | | (0.40) | | | Dark brown / black gravelly sandy TOPSOIL with flint gravels and rootlets |
| | | | | | | (0.10) | | 0.40 | MOT Type 1 with geo-grid |
| | | 0.60 | ES | | | | | 0.50 | MADE GROUND comprising dark grey silty gravelly CLAY with concrete fragments |
| | | 1.00 | SPT(S) | N=13 (1,3/4,3,3,3) | | (1.00) | | | |
| | | 1.80 | ES | | | | | 1.50 | Medium-dense red-brown fine SAND |
| | | 2.00 | SPT(S) | N=12 (4,3/3,3,3,3) | | | | | |
| | | 2.20 - 2.60 | D | | | (2.00) | | | |
| | | 3.00 | SPT(S) | N=8 (2,3/2,1,2,3) | | | | | |
| | | 3.50 - 3.70 | D | | | (0.40) | | 3.50 | Loose / medium-dense orange-brown very clayey SAND |
| | | 4.00 | SPT(S) | N=8 (1,1/1,2,2,3) | | (0.55) | | 3.90 | Medium-dense red-brown fine SAND |
| | | | | | | | | 4.45 | End of Borehole at 4.45m |

| Hole Details | | Casing Details | | Waterstrike (m bgl) | | | | | | Standing/Chiselling (m bgl) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (m bgl) | Dia. (mm) | Depth (m bgl) | Dia. (mm) | Date | Depth Strike | Depth Casing | Depth Sealed | Rose to: | Time (mins) | From | To | Time | Remarks |
| | | | | | | | | | | | | | |

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| Start - End Date | Project ID: | Hole Type: | WLS3 |
|---|---|---|---|
| 02/04/2019 | JN1246 | WLS | Sheet 1 of 1 |

| Project Name: | Tescos Wrexham | Remarks: | Co-ordinates: | Level: | Logger: |
|---|---|---|---|---|---|
| | | | | | CW |
| Location: | Crescent Rd, Wrexham | | | | |
| Client: | Glanvilles | | | | |

| Well | Water Strikes | Samples and Insitu Testing: Depth (m bgl) | Type | Results | Level (m AOD) | Thickness (m) | Legend | Depth (m bgl) | Stratum Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (0.10) | | 0.10 | Blacktop |
| | | | | | | | | | MOT Type 1 with geo-grid |
| | | | | | | (0.50) | | 0.60 | |
| | | 0.80 | ES | | | | | | MADE GROUND comprising dark grey silty gravelly CLAY with concrete & wood fragments |
| | | | | | | (1.30) | | 1.90 | |
| | | 2.00 | SPT(S) | N=13 (5,5/4,3,3,3) | | | | | Medium-dense red-brown fine SAND |
| | | 2.10 | ES | | | | | | |
| | | 2.50 - 2.80 | D | | | | | | |
| | | 3.00 | SPT(S) | N=14 (3,3/3,4,3,4) | | (2.55) | | | |
| | | 4.00 | SPT(S) | N=10 (1,1/2,2,3,3) | | | | 4.45 | End of Borehole at 4.45m |

1 2 3 4 5

| Hole Details | | Casing Details | | Waterstrike (m bgl) | | | | | | Standing/Chiselling (m bgl) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (m bgl) | Dia. (mm) | Depth (m bgl) | Dia. (mm) | Date | Depth Strike | Depth Casing | Depth Sealed | Rose to: | Time (mins) | From | To | Time | Remarks |
| | | | | | | | | | | | | | |

Southern Testing ST Consult

www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

| Start - End Date | Project ID: | Hole Type: | WLS4 |
|---|---|---|---|
| 03/04/2019 | JN1246 | WLS | Sheet 1 of 1 |

| Project Name: | Tescos Wrexham | Remarks: | Co-ordinates: | Level: | Logger: |
|---|---|---|---|---|---|
| | | | | | CW |
| Location: | Crescent Rd, Wrexham | | | | |
| Client: | Glanvilles | | | | |

| Well | Water Strikes | Samples and Insitu Testing: Depth (m bgl) | Type | Results | Level (m AOD) | Thickness (m) | Legend | Depth (m bgl) | Stratum Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (0.10) | | 0.10 | Blacktop |
| | | | | | | (0.20) | | | MOT Type 1 with geo-grid |
| | | | | | | | | 0.30 | |
| | | 0.90 | ES | | | (0.70) | | | MADE GROUND comprising dark brown SAND with scattered ash and brick fragments |
| | | | | | | | | 1.00 | End of Borehole at 1.00m |

1 2 3 4 5

| Hole Details | | Casing Details | | Waterstrike (m bgl) | | | | | | Standing/Chiselling (m bgl) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (m bgl) | Dia. (mm) | Depth (m bgl) | Dia. (mm) | Date | Depth Strike | Depth Casing | Depth Sealed | Rose to: | Time (mins) | From | To | Time | Remarks |
| | | | | | | | | | | | | | |

Southern Testing ST Consult

www.southerntesting.co.uk tel:01342 333100 www.stconsult.co.uk tel:01604 500020

| Start - End Date | Project ID: | Hole Type: | WLS5 |
|---|---|---|---|
| 03/04/2019 | JN1246 | WLS | Sheet 1 of 1 |

| Project Name: | Tescos Wrexham | Remarks: | Co-ordinates: | Level: | Logger: |
|---|---|---|---|---|---|
| | | | | | CW |
| Location: | Crescent Rd, Wrexham | | | | |
| Client: | Glanvilles | | | | |

| Well | Water Strikes | Samples and Insitu Testing: Depth (m bgl) | Type | Results | Level (m AOD) | Thickness (m) | Legend | Depth (m bgl) | Stratum Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (0.10) | | 0.10 | Blacktop |
| | | | | | | (0.30) | | | MOT Type 1 with geo-grid |
| | | | | | | | | 0.40 | |
| | | 0.70 | ES | | | (0.60) | | | MADE GROUND comprising dark brown SAND with scattered ash and brick fragments |
| | | | | | | | | 1.00 | End of Borehole at 1.00m |

| Hole Details | | Casing Details | | Waterstrike (m bgl) | | | | | | Standing/Chiselling (m bgl) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (m bgl) | Dia. (mm) | Depth (m bgl) | Dia. (mm) | Date | Depth Strike | Depth Casing | Depth Sealed | Rose to: | Time (mins) | From | To | Time | Remarks |
| | | | | | | | | | | | | | |

Southern Testing ST Consult

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| Start - End Date | Project ID: | Hole Type: | WLS6 |
|---|---|---|---|
| 03/04/2019 | JN1246 | WLS | Sheet 1 of 1 |

| Project Name: | Tescos Wrexham | Remarks: | Co-ordinates: | Level: | Logger: |
|---|---|---|---|---|---|
| | | | | | CW |
| Location: | Crescent Rd, Wrexham | | | | |
| Client: | Glanvilles | | | | |

| Well | Water Strikes | Samples and Insitu Testing: Depth (m bgl) | Type | Results | Level (m AOD) | Thickness (m) | Legend | Depth (m bgl) | Stratum Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (0.10) | | 0.10 | Blacktop |
| | | | | | | | | | MOT Type 1 with geo-grid |
| | | 0.50 | ES | | | (0.50) | | 0.60 | |
| | | | | | | | | | Medium-dense red-brown fine SAND |
| | | | | | | (0.40) | | 1.00 | End of Borehole at 1.00m |

1 2 3 4 5

| Hole Details | | Casing Details | | Waterstrike (m bgl) | | | | | | Standing/Chiselling (m bgl) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (m bgl) | Dia. (mm) | Depth (m bgl) | Dia. (mm) | Date | Depth Strike | Depth Casing | Depth Sealed | Rose to: | Time (mins) | From | To | Time | Remarks |
| | | | | | | | | | | | | | |

Southern Testing ST Consult

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| Start - End Date | Project ID: | Hole Type: | WLS7 |
|---|---|---|---|
| 03/04/2019 | JN1246 | WLS | Sheet 1 of 1 |

| Project Name: | Tescos Wrexham | Remarks: | Co-ordinates: | Level: | Logger: |
|---|---|---|---|---|---|
| | | | | | CW |
| Location: | Crescent Rd, Wrexham | | | | |
| Client: | Glanvilles | | | | |

| Well | Water Strikes | Samples and Insitu Testing: Depth (m bgl) | Type | Results | Level (m AOD) | Thickness (m) | Legend | Depth (m bgl) | Stratum Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (0.10) | | 0.10 | Blacktop |
| | | | | | | (0.40) | | | MOT Type 1 with geo-grid |
| | | | | | | | | 0.50 | Medium-dense red-brown fine SAND |
| | | | | | | (1.50) | | | |
| | | | | | | | | 2.00 | End of Borehole at 2.00m |

1 2 3 4 5

| Hole Details | | Casing Details | | Waterstrike (m bgl) | | | | | | Standing/Chiselling (m bgl) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (m bgl) | Dia. (mm) | Depth (m bgl) | Dia. (mm) | Date | Depth Strike | Depth Casing | Depth Sealed | Rose to: | Time (mins) | From | To | Time | Remarks |
| | | | | | | | | | | | | | |

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| Start - End Date | Project ID: | Hole Type: | WLS8 |
|---|---|---|---|
| 03/04/2019 | JN1246 | WLS | Sheet 1 of 1 |

| Project Name: | Tescos Wrexham | Remarks: | Co-ordinates: | Level: | Logger: |
|---|---|---|---|---|---|
| | | | | | CW |
| Location: | Crescent Rd, Wrexham | | | | |
| Client: | Glanvilles | | | | |

| Well | Water Strikes | Samples and Insitu Testing: Depth (m bgl) | Type | Results | Level (m AOD) | Thickness (m) | Legend | Depth (m bgl) | Stratum Description |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (0.10) | | 0.10 | Blacktop |
| | | | | | | | | | MOT Type 1 with geo-grid |
| | | | | | | (1.40) | | | |
| | | | | | | | | 1.50 | Medium-dense red-brown fine SAND |
| | | | | | | (0.50) | | | |
| | | | | | | | | 2.00 | End of Borehole at 2.00m |

1 2 3 4 5

| Hole Details | | Casing Details | | Waterstrike (m bgl) | | | | | | Standing/Chiselling (m bgl) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (m bgl) | Dia. (mm) | Depth (m bgl) | Dia. (mm) | Date | Depth Strike | Depth Casing | Depth Sealed | Rose to: | Time (mins) | From | To | Time | Remarks |
| | | | | | | | | | | | | | |

# APPENDIX B

## Field Sampling and in-situ Test Methods & Results

# Field Sampling and in-situ Test Methods

## Disturbed Samples

Disturbed samples were taken from the trial holes at intervals and stored in sealed glass jars and polythene bags, as appropriate.

## Undisturbed U100 Samples

Undisturbed U100 samples were taken in the clay soils at appropriate intervals. These samples are taken in a 100 mm diameter, 450 mm long, thin-walled steel tube, and are sealed with paraffin wax and tightly fitting end caps for transporting to the laboratory.

## Standard Penetration Test

The Standard Penetration (SPT) Test is specified in BS EN ISO 22476-3:2005+A1:2011. In this test, a 51mm diameter open-ended tube is driven into the ground by a 63.5 kg hammer falling freely through 760 mm. The tube is seated by driving to a penetration of 150mm, or by 25 standard blows, whichever occurs first. It is then driven for a maximum of a further 300mm and the number of blows is termed the penetration resistance (N). If 300mm penetration cannot be achieved in 50 blows (100 blows in soft rock), the test drive is terminated.

When testing in gravels, a conical end piece is attached to the tube. The test is then called an SPT(C).

This test provides an indirect method of assessing the properties of cohesionless soils, and the following table (after Terzaghi and Peck) gives the approximate condition:-

| Number Blows (N) | Density |
|---|---|
| 0 - 4 | Very Loose |
| 4 – 10 | Loose |
| 10 – 30 | Medium Dense |
| 30 – 50 | Dense |
| Over 50 | Very Dense |

## Clay

An approximate value for the shear strength of clay may be obtained using Stroud (1974), which paper indicates that the cohesive strength is a function of plasticity and SPT 'N' value. The relation is:

$C_u = f_i \times N$ kPa

$C_u$ = undrained shear strength

$f_i$ = factor related to plasticity index and ranging from 4 to more than 6

The SPT test is not generally accepted as giving a reliable indication of the strength of cohesive soils but it does give a guide; often the following table:-

| Number Blows (N) | Soil Strength |
|---|---|
| Less than 2 | Very Soft (Very Low Strength) |
| 2 – 5 | Soft (Low Strength) |
| 5 – 10 | Firm (Medium Strength) |
| 10 – 15 | Stiff (High Strength) |
| 15 – 30 | Very Stiff (Very High Strength) |

Perth Penetrometer Test

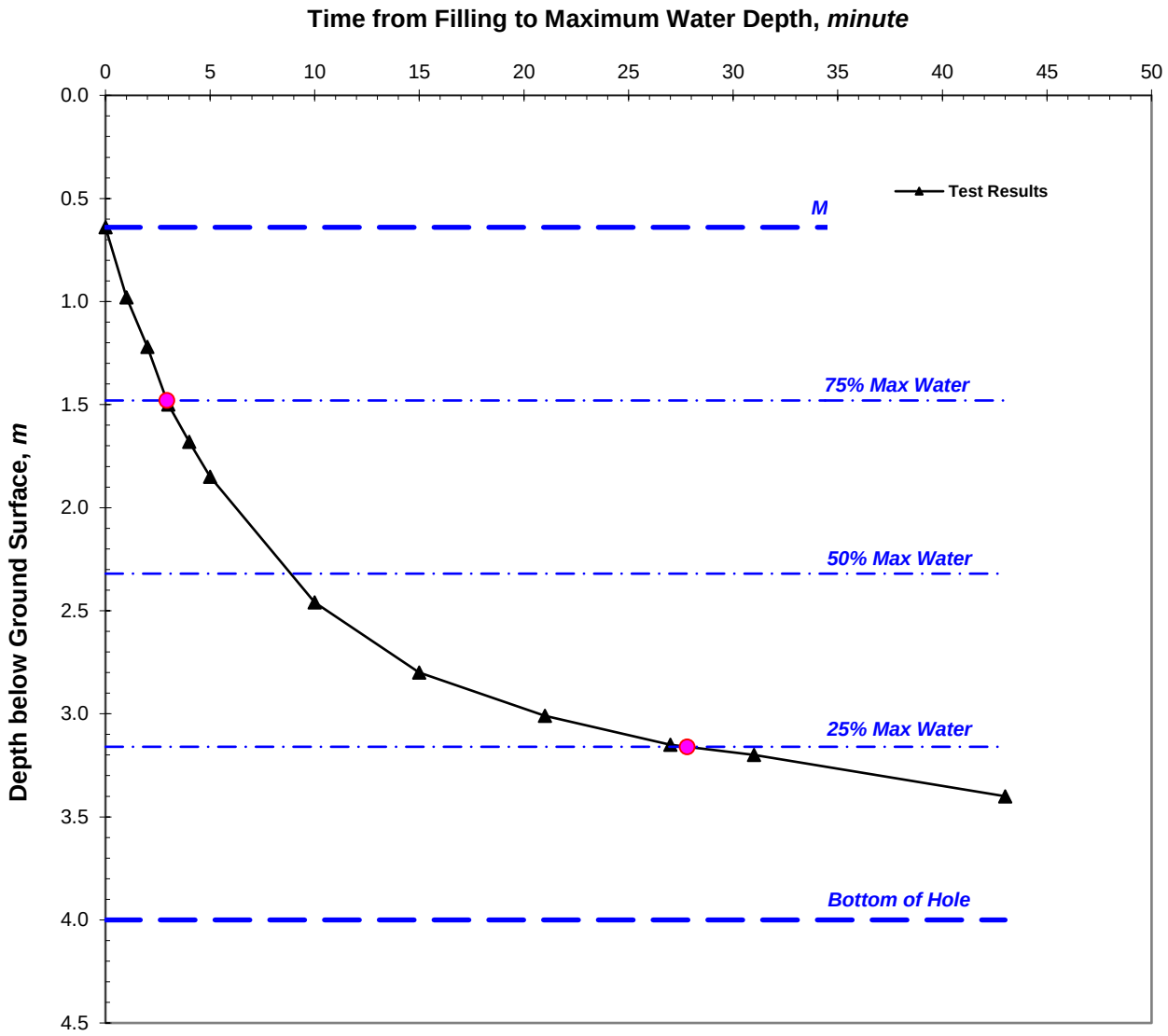
Perth Penetrometer tests were carried out. The Perth Penetrometer is a device used for measuring the relative density of sands. It consists of a 16 mm diameter hardened steel probe, which is driven into the soil by successive blows of a 9 kg weight, which freely falls over a distance of 600 mm. The number of blows required for each 50 mm of penetration is recorded, and the test is continued for a depth of 450 mm, according to soil type. Useful information can be obtained by carrying the test past the standard depth, and 2,000 mm and 3,000 mm extensions are used to probe the depth of loose fill or other soil, or to make an estimate of the strength of soils or rock in an auger hole or in the base of an unsupported test pit.

The energy input per square metre is roughly the same as the energy input from the Standard Penetration Test (SPT), and the blow counts recorded in sand are roughly the same as SPT blow counts (but this relationship does not hold for coarse soils). The SPT test is a similar type of test except that much heavier driving weights (63.5 kg) are used. The relative density relationship given for the SPT test is:

| Number of Blows (N) | Density |
|---|---|
| 0 - 4 | Very Loose |
| 4 - 10 | Loose |
| 10 - 30 | Medium Dense |
| 30 - 50 | Dense |
| Over 50 | Very Dense |

# Preliminary Falling-Head Soakage Test

**Test Hole No:** WLS2
**Test No:** Test No 1 (Initial)




| | | | |
|---|---|---|---|
| Diameter of Borehole, m | 0.900 | Depth to Water at Start of Test, *m* | 0.640 |
| Depth to End of Borehole Casing, m | | Max Water Dropdown during Test, *m* | 2.760 |
| Depth to Borehole Base, m | 4.000 | Total Soakage Test Time, *min* | 43.0 |
| Depth to Top of Permeable Soils, *m* | | Mean Internal Discharge Area, $m^2$ | 5.386 |
| Depth to Groundwater Surface, *m* | | Discharge Rate, *litre/min* | 17.189 |
| Depth to Top of Granular Fill, *m* | 0.500 | Soakage Rate, *litre/*$m^2$*/min* | **3.19** |
| Voids Assumed within Borehole, % | 40% | BRE Soil Infiltration Rate, *m/sec* | **5.32E-05** |

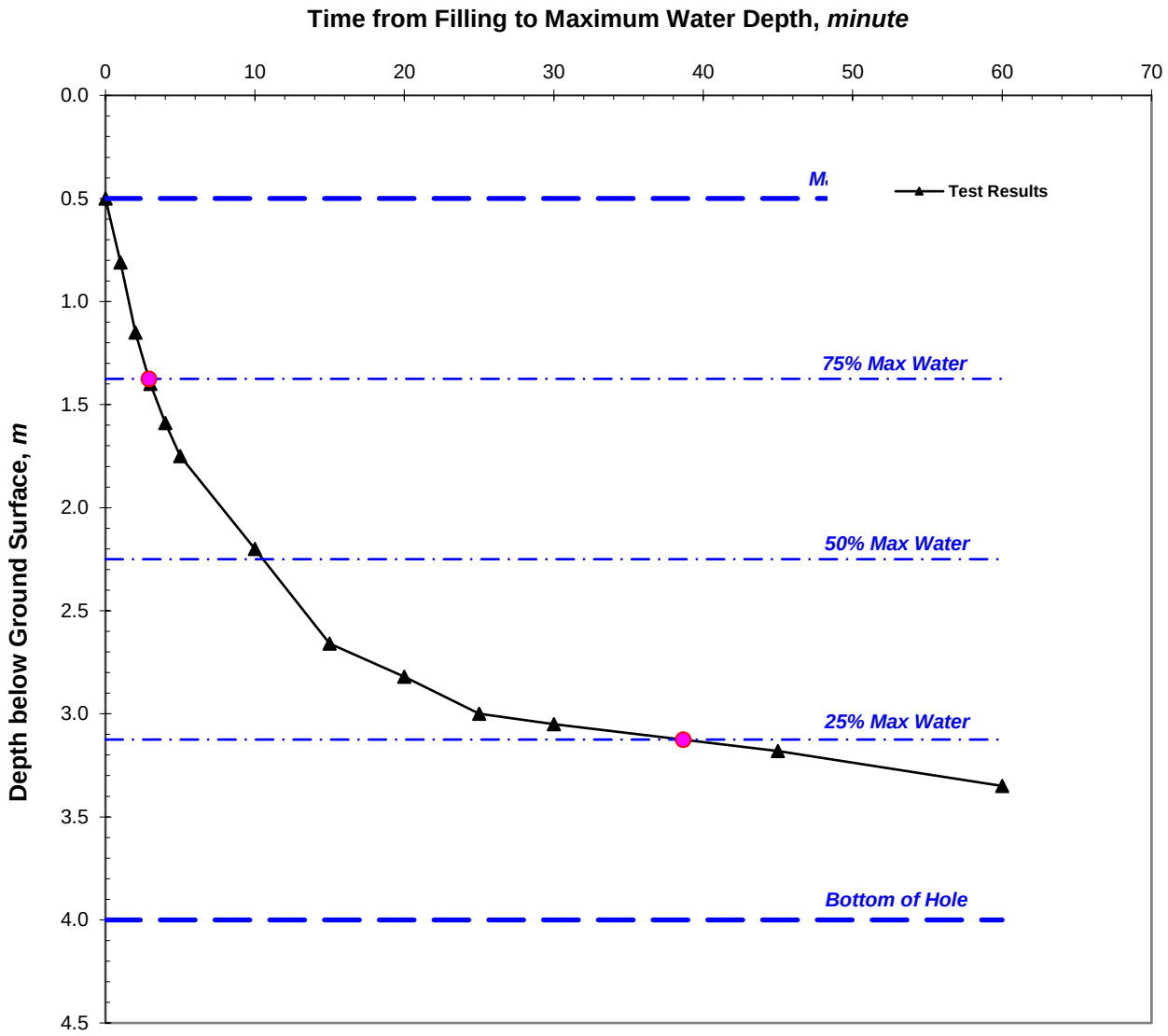
Comments:

*Pit was nearly emptied at finish of test.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Glanville Consultants Limited | **Job No:** | JN1246 | **Test Date:** | 03/Apr/2019 | | |
| **Site:** | Tesco, Wrexham | **Tested By:** | TC | **Engineer:** | CW | **Fig. S1** | |

# Preliminary Falling-Head Soakage Test

**Test Hole No:** WLS2
**Test No:** Test No 2 (Repeated)




| | | | |
|---|---|---|---|
| Diameter of Borehole, m | 0.900 | Depth to Water at Start of Test, *m* | 0.500 |
| Depth to End of Borehole Casing, m | | Max Water Dropdown during Test, *m* | 2.850 |
| Depth to Borehole Base, m | 4.000 | Total Soakage Test Time, *min* | 60.0 |
| Depth to Top of Permeable Soils, *m* | | Mean Internal Discharge Area, $m^2$ | 5.584 |
| Depth to Groundwater Surface, *m* | | Discharge Rate, *litre/min* | 12.455 |
| Depth to Top of Granular Fill, *m* | 0.500 | Soakage Rate, $litre/m^2/min$ | **2.23** |
| Voids Assumed within Borehole, % | 40% | BRE Soil Infiltration Rate, *m/sec* | **3.72E-05** |

Comments:

*Pit was nearly emptied at finish of test.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Glanville Consultants Limited | **Job No:** | JN1246 | **Test Date:** | 03/Apr/2019 | | |
| **Site:** | Tesco, Wrexham | **Tested By:** | TC | **Engineer:** | CW | **Fig. S2** | |

## Summary Sheet

# Results of Preliminary Falling-Head Soakage Tests

| | | | |
|---|---|---|---|
| **Site :** | Tesco, Wrexham | **Job No :** | JN1246 |
| **Client :** | Glanville Consultants Limited | **O S Reference :** | SJ 34150 50450 |
| **Tested By :** | TC | **Engineer:** CW | **Test Date :** 03/Apr/2019 |

| Hole No | Test No | Hole Depth *m* | Soakage Rate for Each Test *litre/m² /min* | Soakage Rate for Each Hole *litre/m² /min* | Soakage Rate for Each Hole *m/sec* | Water Level at Finish of Test | Remarks |
|---|---|---|---|---|---|---|---|
| WLS2 | No 1 | 4.00 | 3.19 | 2.23 | 3.72E-5 | Nearly empty pit. | |
| WLS2 | No 2 | 4.00 | 2.23 | | | Nearly empty pit. | |
| **Mean Value of All Calculated Soakage Rates :** | | | | **2.23** *litre/m² /min* | **3.72E-5** *m/sec* | | |

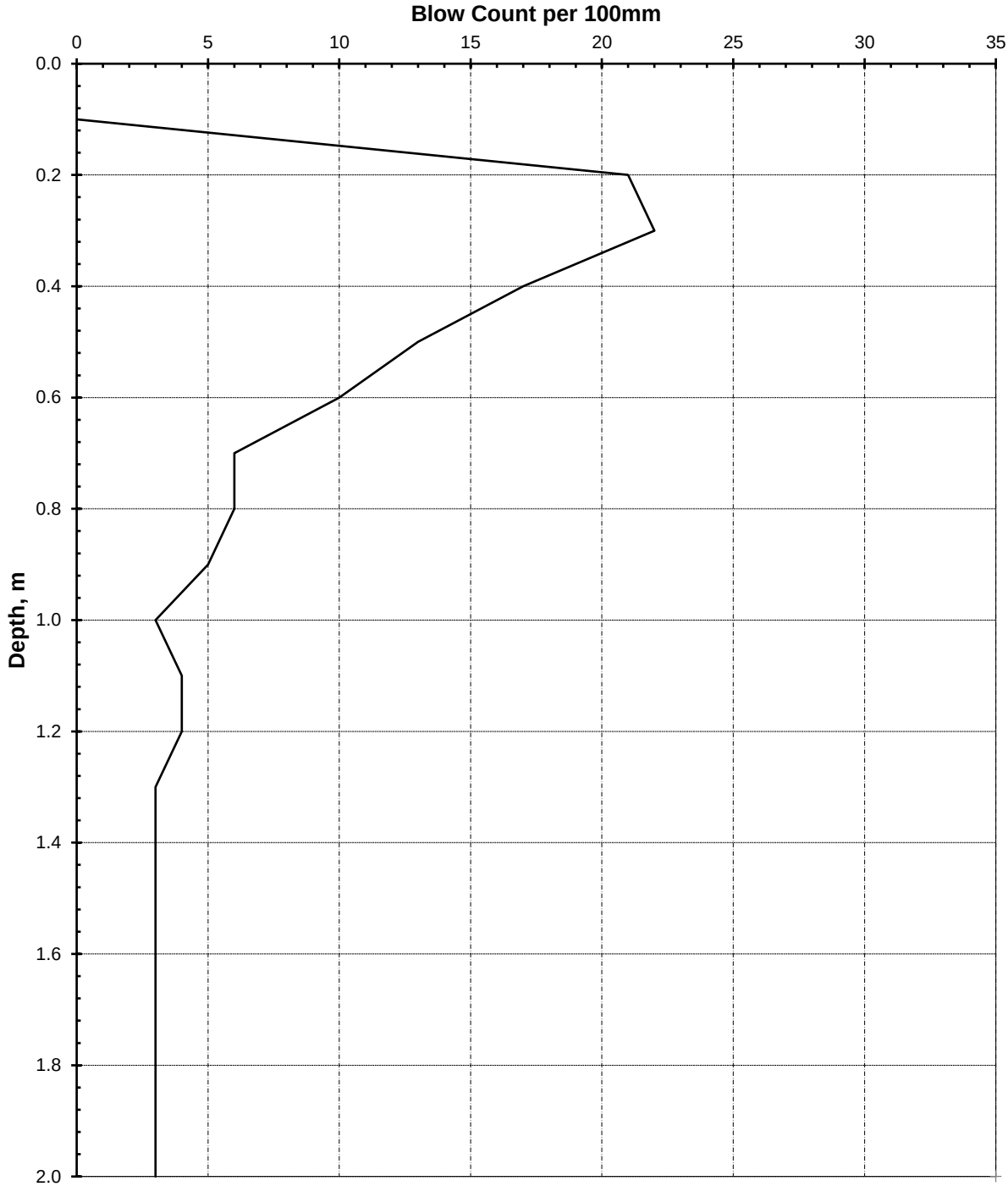
# Dynamic Penetration Tests

*in accordance with BS 1377 : Part 9 : 1990 : Clause 3*

**Test type:** DPSH Penetrometer **Mass:** 63.5kg **Drop:** 750mm **Cone diameter:** 50.5mm

## Probe No : WLS7

*(Normal Plot)*




*Note:*

| | | | | | |
|---|---|---|---|---|---|
| **Client:** | **Glanville Consultants Limited** | **Job No:** | JN1246 | | |
| **Site:** | **Tesco, Wrexham** | **Date:** | 03/04/2019 | **Fig.** | **2** |

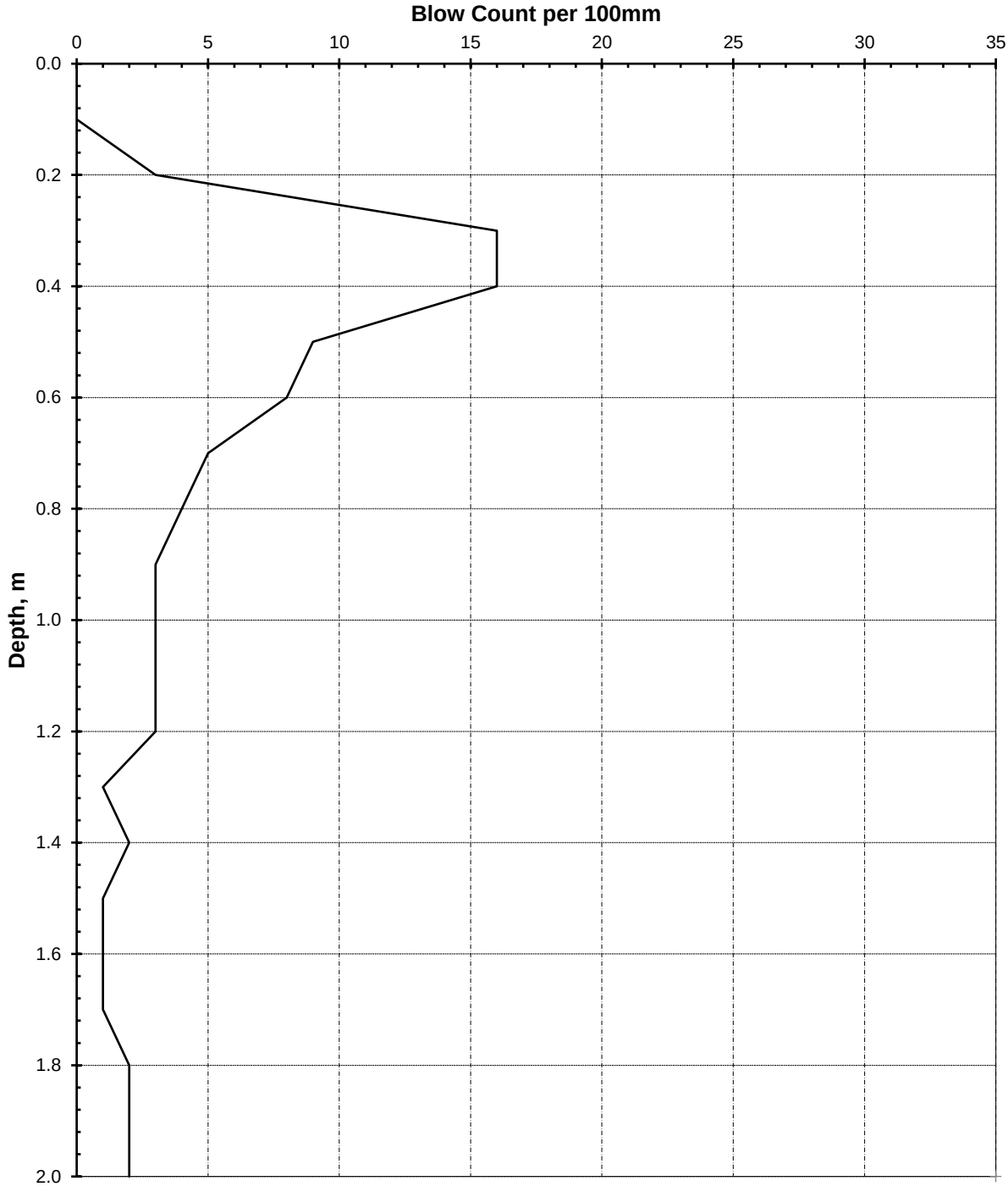
# Dynamic Penetration Tests

*in accordance with BS 1377 : Part 9 : 1990 : Clause 3*

**Test type:** DPSH Penetrometer **Mass:** 63.5kg **Drop:** 750mm **Cone diameter:** 50.5mm

## Probe No : WLS8

*(Normal Plot)*




*Note:*

| | | | | | |
|---|---|---|---|---|---|
| **Client:** | **Glanville Consultants Limited** | **Job No:** | JN1246 | | |
| **Site:** | **Tesco, Wrexham** | **Date:** | 03/04/2019 | **Fig.** | **3** |

# APPENDIX C

## Geotechnical Laboratory Test Methods & Results

Southern Testing

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8LU

ST Consult

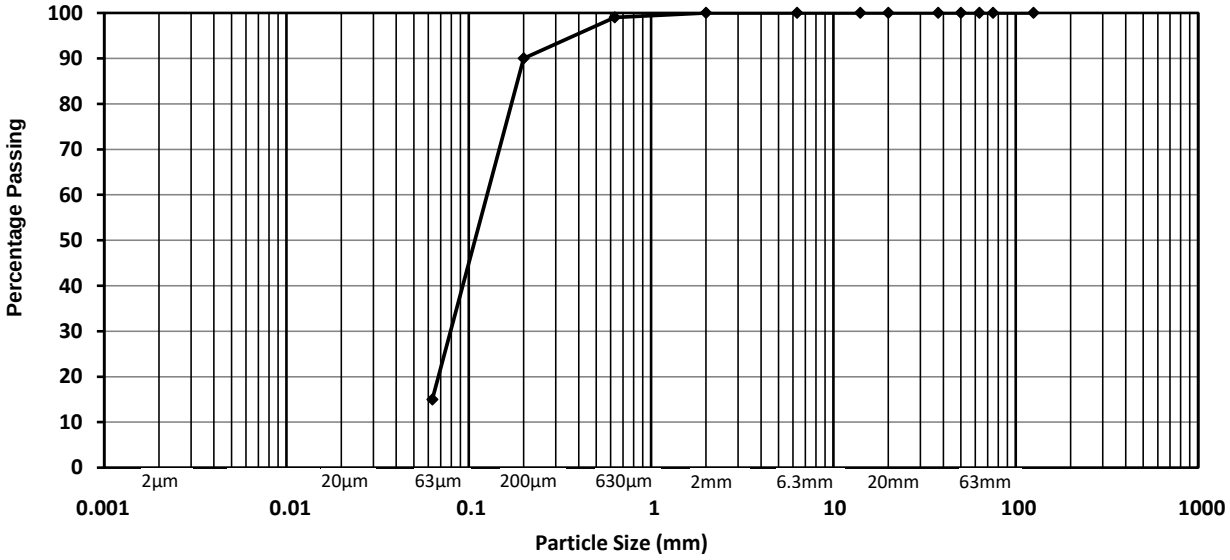
# Particle Size Distribution - Grading

| | | | | | |
|---|---|---|---|---|---|
| **Project Name** | **Tesco, Wrexham** | | | **Project No.** | **JN1246** |
| | | | | **Hole ID** | **WLS1** |
| **Client** | **Glanville Consultants Limited** | **Project Engineer** | **CW** | **Depth (m)** | **1.30** |
| | | | | **Sample Type** | Small Bag |
| | | | | **Date Issued** | **18-Apr-19** |
| | | | | **Tested By** | RL |
| | | | | **Checked By** | AM |

**Visual Description of Sample:**

Brown clayey/silty fine SAND.

## Particle Size Distribution Chart




| CLAY | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | COBBLES |
|---|---|---|---|---|---|---|---|---|---|---|
| | SILT | | | SAND | | | GRAVEL | | | |
| 15% | | | | 85% | | | 0% | | | 0% |

| Particle Size | % Passing |
|---|---|
| 125mm | 100 |
| 75mm | 100 |
| 63mm | 100 |
| 50mm | 100 |
| 37.5mm | 100 |
| 20mm | 100 |
| 14mm | 100 |
| 6.3mm | 100 |
| 2mm | 100 |
| 630µm | 99 |
| 200µm | 90 |
| 63µm | 15 |
| | |
| | |
| | |

| | |
|---|---|
| **Particle Density (Assumed)** | **2.65** Mg/m³ |

| | |
|---|---|
| **Coefficient of Uniformity D60/D10** | **>2.01** |

**Comment:**

**Test Method:**

Wet & Dry Grading BS1377-2: 1990 (2003)
cl. 9.2 & 9.3

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8LU

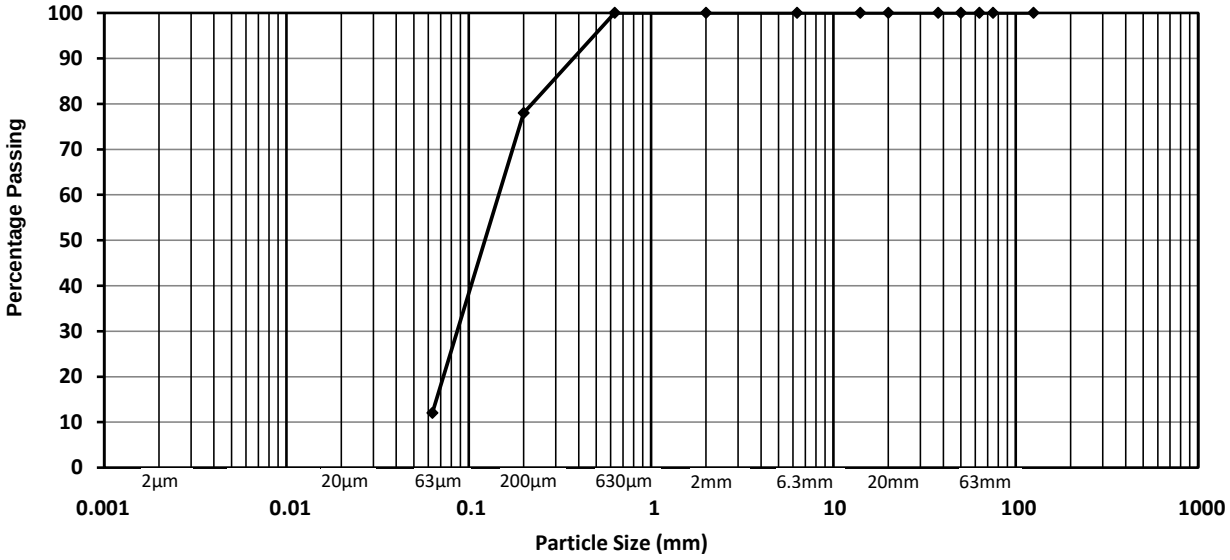
# Particle Size Distribution - Grading

| | | | | | |
|---|---|---|---|---|---|
| **Project Name** | **Tesco, Wrexham** | | | **Project No.** | **JN1246** |
| | | | | **Hole ID** | **WLS1** |
| **Client** | **Glanville Consultants Limited** | **Project Engineer** | **CW** | **Depth (m)** | **2.70** |
| | | | | **Sample Type** | Small Bag |
| | | | | **Date Issued** | **18-Apr-19** |
| | | | | **Tested By** | RL |
| | | | | **Checked By** | AM |

**Visual Description of Sample:**

Brown clayey/silty fine and medium SAND.

## Particle Size Distribution Chart




| CLAY | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | COBBLES |
|---|---|---|---|---|---|---|---|---|---|---|
| | SILT | | | SAND | | | GRAVEL | | | |
| 12% | | | | 88% | | | 0% | | | 0% |

| Particle Size | % Passing |
|---|---|
| 125mm | 100 |
| 75mm | 100 |
| 63mm | 100 |
| 50mm | 100 |
| 37.5mm | 100 |
| 20mm | 100 |
| 14mm | 100 |
| 6.3mm | 100 |
| 2mm | 100 |
| 630µm | 100 |
| 200µm | 78 |
| 63µm | 12 |
| | |
| | |
| | |

| | |
|---|---|
| **Particle Density (Assumed)** | **2.65** Mg/m³ |

| | |
|---|---|
| **Coefficient of Uniformity D60/D10** | **>2.31** |

**Comment:**

**Test Method:**

Wet & Dry Grading BS1377-2: 1990 (2003)
cl. 9.2 & 9.3

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8LU

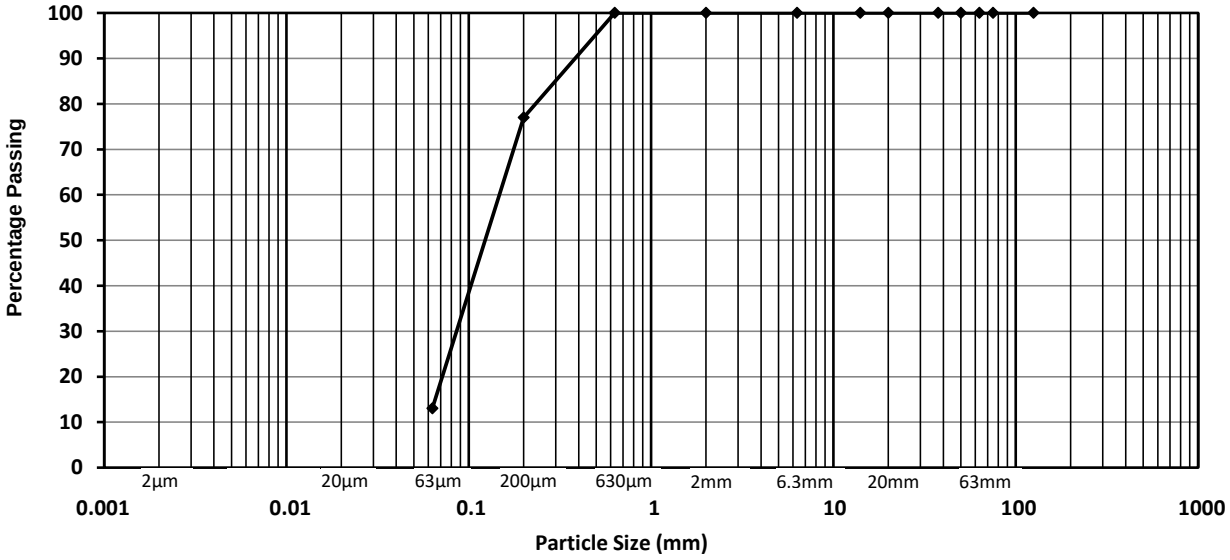
# Particle Size Distribution - Grading

| | | | | | |
|---|---|---|---|---|---|
| **Project Name** | **Tesco, Wrexham** | | | **Project No.** | **JN1246** |
| | | | | **Hole ID** | **WLS2** |
| **Client** | **Glanville Consultants Limited** | **Project Engineer** | **CW** | **Depth (m)** | **2.20** |
| | | | | **Sample Type** | Small Bag |
| | | | | **Date Issued** | **18-Apr-19** |
| | | | | **Tested By** | RL |
| | | | | **Checked By** | AM |

**Visual Description of Sample:**

Brown clayey/silty fine and medium SAND.

## Particle Size Distribution Chart




| CLAY | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | COBBLES |
|---|---|---|---|---|---|---|---|---|---|---|
| | SILT | | | SAND | | | GRAVEL | | | |
| 13% | | | | 87% | | | 0% | | | 0% |

| Particle Size | % Passing |
|---|---|
| 125mm | 100 |
| 75mm | 100 |
| 63mm | 100 |
| 50mm | 100 |
| 37.5mm | 100 |
| 20mm | 100 |
| 14mm | 100 |
| 6.3mm | 100 |
| 2mm | 100 |
| 630µm | 100 |
| 200µm | 77 |
| 63µm | 13 |
| | |
| | |
| | |

| | |
|---|---|
| **Particle Density (Assumed)** | **2.65** Mg/m³ |

| | |
|---|---|
| **Coefficient of Uniformity D60/D10** | **>2.32** |

**Comment:**

**Test Method:**

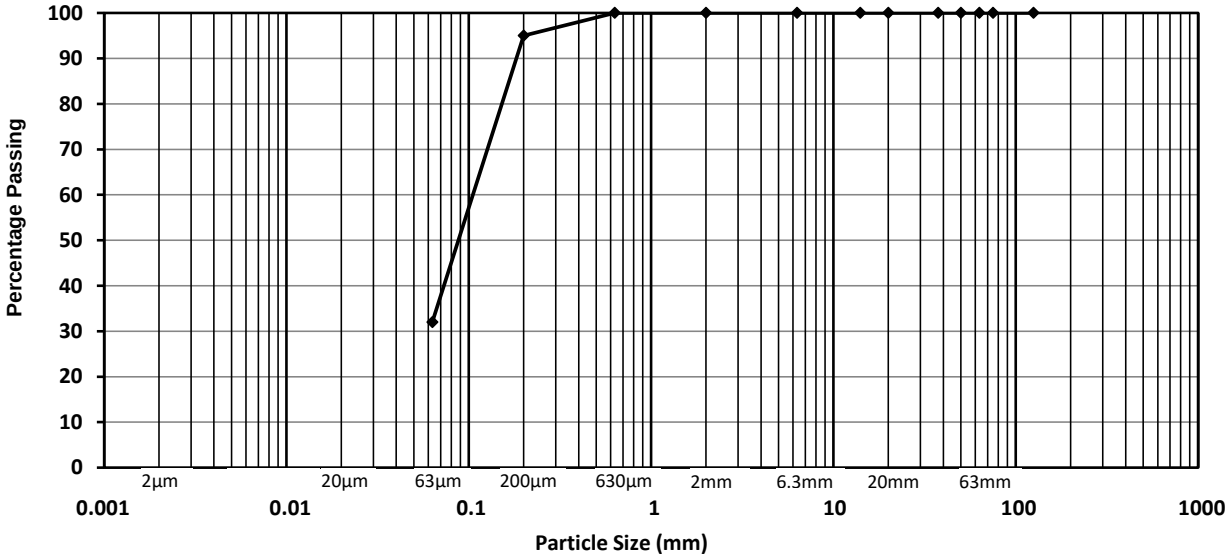
Wet & Dry Grading BS1377-2: 1990 (2003)
cl. 9.2 & 9.3

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8LU

# Particle Size Distribution - Grading

| | | | | | |
|---|---|---|---|---|---|
| **Project Name** | **Tesco, Wrexham** | | | **Project No.** | **JN1246** |
| | | | | **Hole ID** | **WLS2** |
| **Client** | **Glanville Consultants Limited** | **Project Engineer** | **CW** | **Depth (m)** | **3.50** |
| **Visual Description of Sample:** | | | | **Sample Type** | Small Bag |
| Brown very clayey/silty fine SAND. | | | | **Date Issued** | **18-Apr-19** |
| | | | | **Tested By** | RL |
| | | | | **Checked By** | AM |

## Particle Size Distribution Chart




| CLAY | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | COBBLES |
|---|---|---|---|---|---|---|---|---|---|---|
| | SILT | | | SAND | | | GRAVEL | | | |
| 32% | | | | 68% | | | 0% | | | 0% |

| Particle Size | % Passing |
|---|---|
| 125mm | 100 |
| 75mm | 100 |
| 63mm | 100 |
| 50mm | 100 |
| 37.5mm | 100 |
| 20mm | 100 |
| 14mm | 100 |
| 6.3mm | 100 |
| 2mm | 100 |
| 630µm | 100 |
| 200µm | 95 |
| 63µm | 32 |
| | |
| | |
| | |

| | |
|---|---|
| **Particle Density (Assumed)** | **2.65** Mg/m³ |
| **Coefficient of Uniformity D60/D10** | **>1.66** |

**Comment:**

**Test Method:**

Wet & Dry Grading BS1377-2: 1990 (2003)
cl. 9.2 & 9.3

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8LU

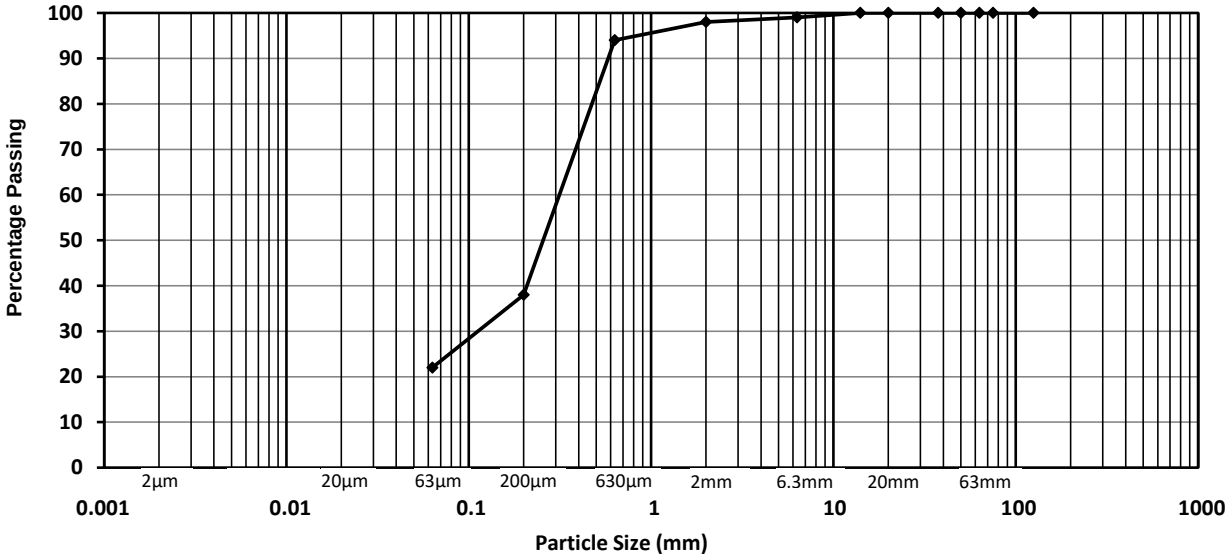
# Particle Size Distribution - Grading

| | | | | | |
|---|---|---|---|---|---|
| **Project Name** | **Tesco, Wrexham** | | | **Project No.** | **JN1246** |
| | | | | **Hole ID** | **WLS3** |
| **Client** | **Glanville Consultants Limited** | **Project Engineer** | **CW** | **Depth (m)** | **2.50** |
| | | | | **Sample Type** | Small Bag |
| | | | | **Date Issued** | **18-Apr-19** |
| | | | | **Tested By** | RL |
| | | | | **Checked By** | AM |

**Visual Description of Sample:**

Brown very clayey/silty slightly gravelly fine and medium SAND. Gravel consists of fine subangular to rounded flint and siltstone.

## Particle Size Distribution Chart




| CLAY | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | COBBLES |
|---|---|---|---|---|---|---|---|---|---|---|
| | SILT | | | SAND | | | GRAVEL | | | |
| 22% | | | | 75% | | | 2% | | | 0% |

| Particle Size | % Passing |
|---|---|
| 125mm | 100 |
| 75mm | 100 |
| 63mm | 100 |
| 50mm | 100 |
| 37.5mm | 100 |
| 20mm | 100 |
| 14mm | 100 |
| 6.3mm | 99 |
| 2mm | 98 |
| 630µm | 94 |
| 200µm | 38 |
| 63µm | 22 |
| | |
| | |
| | |

| | |
|---|---|
| **Particle Density (Assumed)** | **2.65** Mg/m³ |

| | |
|---|---|
| **Coefficient of Uniformity D60/D10** | **>4.96** |

**Comment:**

**Test Method:**

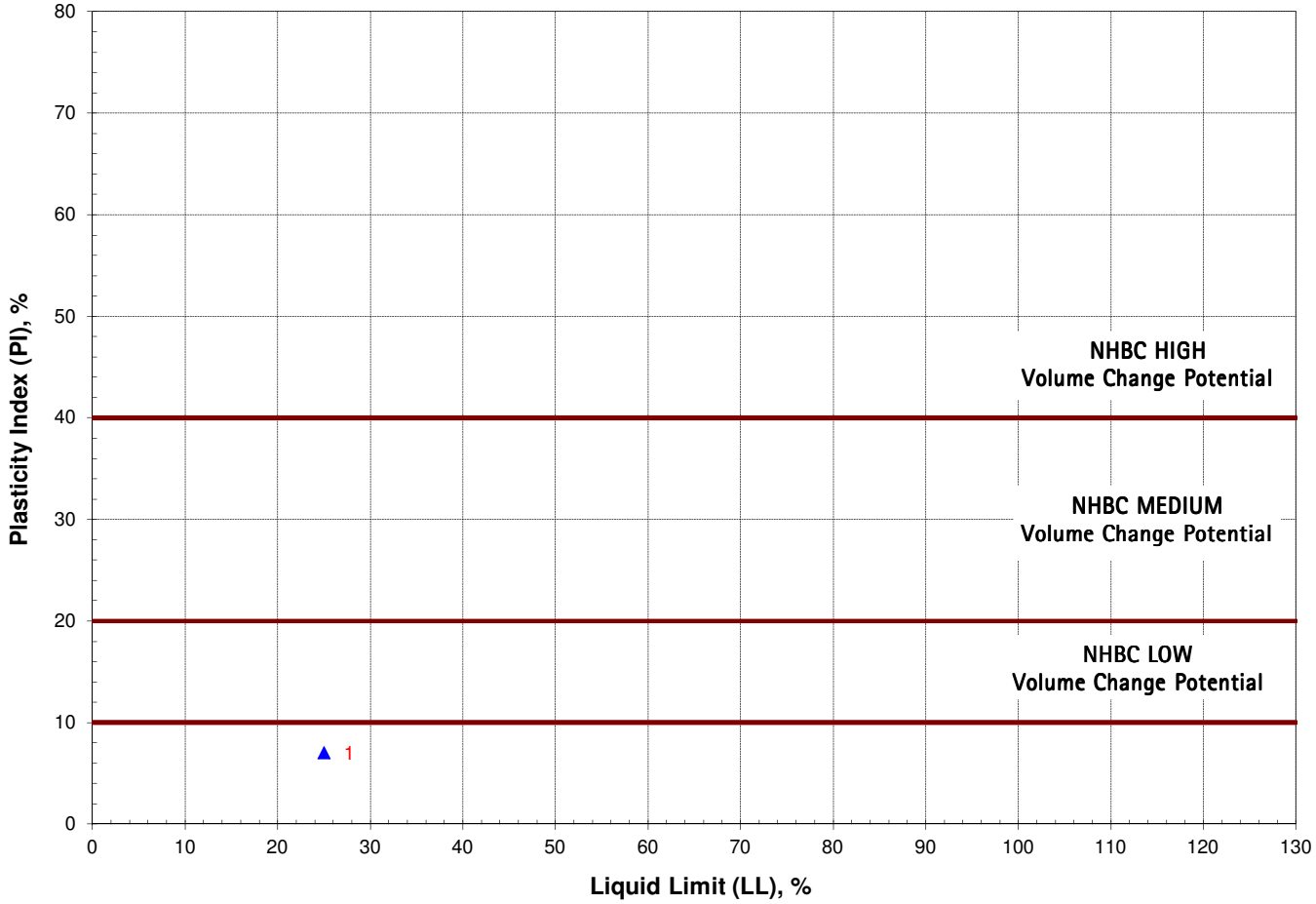
Wet & Dry Grading BS1377-2: 1990 (2003)
cl. 9.2 & 9.3

Southern Testing

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN

ST Consult

# Plot Relating Soil Plasticity to NHBC Classification for Volume Change Potential




**Sample List**

| | |
|---|---|
| 1 | WLS2@3.5m |

**Statistics**

| | |
|---|---|
| Liquid Limit | |
| Max | 25 |
| Min | 25 |
| Average | 25 |
| Plastic Limit | |
| Max | 18 |
| Min | 18 |
| Average | 18 |
| Plasticity Index | |
| Max | 7 |
| Min | 7 |
| Average | 7 |

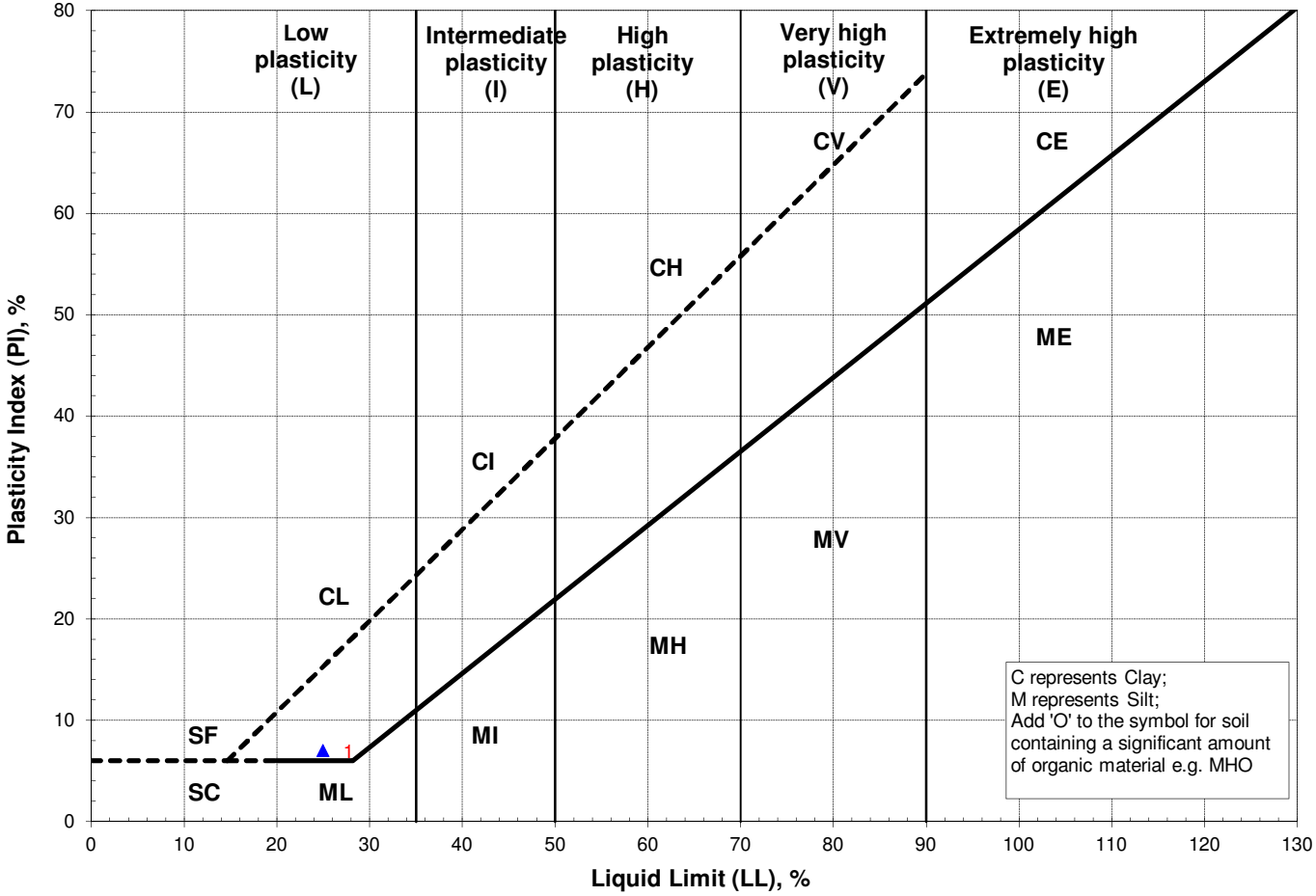
| | | | | | |
|---|---|---|---|---|---|
| **Project Name:** | *Tesco, Wrexham* | **Project No:** | *JN1246* | **Project Engineer:** | *CW* |
| **Client:** | *Glanville Consultants Limited* | **Date:** | *18/04/2019* | *Figure No. 3* | |

Southern Testing

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN

ST Consult

# Plasticity Chart for Atterberg Limit Test Results




**Sample List**

| | |
|---|---|
| 1 | WLS2@3.5m |

**Statistics**

| | |
|---|---|
| **Liquid Limit** | |
| Max | 25 |
| Min | 25 |
| Average | 25 |
| **Plastic Limit** | |
| Max | 18 |
| Min | 18 |
| Average | 18 |
| **Plasticity Index** | |
| Max | 7 |
| Min | 7 |
| Average | 7 |

| | | | | | |
|---|---|---|---|---|---|
| **Project Name:** | *Tesco, Wrexham* | **Project No:** | *JN1246* | **Project Engineer:** | *CW* |
| **Client:** | *Glanville Consultants Limited* | **Date:** | *18/04/2019* | | *Figure No. 2* |

# Atterberg Limits Test Result Summary Sheet

*Test carried out in accordance with BS 1377-2:1990(2003) cl. 3.2, 4.2, 4.3, 5.3 & 5.4*

**Project No :** *JN1246* **Checked By :** *AM* **Date:** *18-Apr-2019*

**Project Name :** *Tesco, Wrexham*

**Client :** *Glanville Consultants Limited*

| Plot No | TH No. | Depth (m) | Moisture Content (%) | Liquid Limit (%) | Plastic Limit (%) | Plasticity Index (%) | Class-ification | % Passing 425µm (%) | Visual Description |
|---|---|---|---|---|---|---|---|---|---|
| 1 | *WLS2* | *3.50* | *21.7* | *25* | *18* | *7* | *CL* | *100* | *Brown very clayey/silty fine SAND.* |

# APPENDIX D

## Contamination Laboratory Test Results

# Table 1 - Tier 1 Screening Values

| Contaminant | Units | Proposed Land Use | | | | | |
|---|---|---|---|---|---|---|---|
| | | Residential with homegrown produce consumption | Residential without homegrown produce consumption | Open Space* (Residential) | Open Space* (Park) | Allotments | Commercial / Industrial |
| Arsenic (As) [2] | mg/kg | 37 | 40 | 79 | 170 | 43 | 640 |
| Cadmium (Cd) [2] | mg/kg | 11 | 85 | 120 | 555 | 1.9 | 190 |
| Trivalent Chromium (CrIII) [2] | mg/kg | 910 | 910 | 1,500 | 33,000 | 18,000 | 8600 |
| Hexavalent Chromium (CrVI) [2] | mg/kg | 6 | 6 | 7.7 | 220 | 1.8 | 33 |
| Lead (Pb) [3] | mg/kg | 200 | 310 | 630 | 1300 | 80 | 2330 |
| Mercury (Hg) [1,2,7] | mg/kg | 7.6-11 | 9.2-15 | 40 | 68-71 | 6.0 | 29-320 |
| Selenium (Se) [2] | mg/kg | 250 | 430 | 1,100 | 1,800 | 88 | 12,000 |
| Nickel (Ni) [2,4] | mg/kg | 180 | 180 | 230 | 3,400 | 230 | 980 |
| Copper (Cu) [2,4] | mg/kg | 2,400 | 7,100 | 12,000 | 44,000 | 520 | 68,000 |
| Zinc (Zn) [2,4] | mg/kg | 3,700 | 40,000 | 81,000 | 170,000 | 620 | 730,000 |
| Phenol [1,2] | mg/kg | 120-380 | 440-1200 | 440-1300 | 440-1300 | 23-83 | 440-1300 |
| Benzo[a]pyrene [1,5] | mg/kg | 1.7-2.4 | 2.6 | 4.9 | 10 | 0.67-2.7 | 36 |
| Naphthalene [1,2] | mg/kg | 2.3-13 | 2.3-13 | 77-430$^{+}$ | 77-430$^{+}$ | 4.1-24 | 77-430$^{+}$ |
| Total Cyanide (CN) [6] | mg/kg | / | / | / | / | / | / |
| Free Cyanide [6] | mg/kg | / | / | / | / | / | / |
| Complex Cyanides [6] | mg/kg | / | / | / | / | / | / |
| Thiocyanate [6] | mg/kg | / | / | / | / | / | / |

Notes:

* Open Space levels calculated on the basis of the exposure modelling developed in the C4SL research.

+ Screening values constrained to saturation limit. Higher values may be acceptable on a site specific basis.

[1] Where ranges of values are given for organic contaminants the screening value is dependant on the Soil $^{+}$Organic Matter.

[2] LQM/CIEH S4UL (2014). Copyright Land Quality Management Ltd reproduced with permission; Publication Number S4UL 3116. All rights reserved.

[3] C4SL (DEFRA 2014).

[4] Copper, Zinc and Nickel may have phototoxic effects at the given concentrations. Alternative criteria should be adopted for importation of Topsoil or other soils for cultivation. BS3882:2007 and BS8601:2013 suggest values of 200 to 300mg/kg for Zn, 100 to 200mg/kg for Cu, and 60 to 110mg/kg for Ni, for topsoil and subsoil, depending on pH.

[5] Based on the Surrogate Marker approach and modelled using the modified exposure parameters of C4SL but retaining 'minimal risk' HCV.

[6] Screening criteria derived on a site specific basis if test results indicate.

[7] S4UL for Methyl Mercury, higher concentrations may be tolerable if inorganic mercury is the only species present. Lower concentrations apply for elemental Mercury.

These screening values are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

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# Analytical Report Number : 19-36738

| | | | |
|---|---|---|---|
| **Project / Site name:** | Tesco's Wrexham | **Samples received on:** | 09/04/2019 |
| **Your job number:** | JN1246 | **Samples instructed on:** | 09/04/2019 |
| **Your order number:** | | **Analysis completed by:** | 18/04/2019 |
| **Report Issue Number:** | 1 | **Report issued on:** | 18/04/2019 |
| **Samples Analysed:** | 9 soil samples | | |

**Signed:**

Dr Claire Stone
Quality Manager
**For & on behalf of i2 Analytical Ltd.**

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

| | |
|---|---|
| soils | - 4 weeks from reporting |
| leachates | - 2 weeks from reporting |
| waters | - 2 weeks from reporting |
| asbestos | - 6 months from reporting |

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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 19-36738**

**Project / Site name: Tesco's Wrexham**

| **Lab Sample Number** | | | | 1197220 | 1197221 | 1197222 | 1197223 | 1197224 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | WLS1 | WLS1 | WLS1 | WLS2 | WLS2 |
| **Sample Number** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Depth (m)** | | | | 0.10 | 0.70 | 1.20 | 0.60 | 1.80 |
| **Date Sampled** | | | | Deviating | Deviating | Deviating | Deviating | Deviating |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Moisture Content | % | N/A | NONE | 6.3 | 12 | 4.4 | 10 | 10 |
| Total mass of sample received | kg | 0.001 | NONE | 1.2 | 1.1 | 0.96 | 1.2 | 1.2 |
| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected | Not-detected | Not-detected | Not-detected |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 9.5 | 7.0 | 6.4 | 7.0 | 6.3 |
| Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent) | g/l | 0.00125 | MCERTS | - | - | 0.0090 | - | 0.016 |
| Organic Matter | % | 0.1 | MCERTS | 3.4 | 3.8 | 0.4 | 2.0 | 1.3 |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Fluorene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Phenanthrene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.24 | < 0.05 | < 0.05 | < 0.05 |
| Anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.54 | < 0.05 | < 0.05 | < 0.05 |
| Pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.49 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.30 | < 0.05 | < 0.05 | < 0.05 |
| Chrysene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.33 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.40 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.16 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.31 | < 0.05 | < 0.05 | < 0.05 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | < 0.80 | 2.77 | < 0.80 | < 0.80 | < 0.80 |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number: 19-36738**

**Project / Site name: Tesco's Wrexham**

| Lab Sample Number | | | | 1197220 | 1197221 | 1197222 | 1197223 | 1197224 |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | WLS1 | WLS1 | WLS1 | WLS2 | WLS2 |
| **Sample Number** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Depth (m)** | | | | 0.10 | 0.70 | 1.20 | 0.60 | 1.80 |
| **Date Sampled** | | | | Deviating | Deviating | Deviating | Deviating | Deviating |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 4.1 | 12 | 3.0 | 6.8 | 5.5 |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | 0.2 | < 0.2 | < 0.2 | 2.3 | < 0.2 |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | < 4.0 | < 4.0 | < 4.0 | < 4.0 |
| Chromium (III) | mg/kg | 1 | NONE | 10 | 15 | 6.2 | 9.0 | 9.1 |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 11 | 16 | 6.4 | 9.5 | 9.3 |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 21 | 40 | 12 | 19 | 20 |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 48 | 87 | 22 | 66 | 97 |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 13 | 21 | 8.3 | 12 | 8.2 |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 92 | 68 | 26 | 460 | 27 |
| **Monoaromatics & Oxygenates** | | | | | | | | |
| Benzene | ug/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | - | - |
| Toluene | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | - | - |
| Ethylbenzene | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | - | - |
| p & m-xylene | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | - | - |
| o-xylene | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | - | - |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | - | - |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH-CWG - Aliphatic >EC5 - EC6 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | - | - |
| TPH-CWG - Aliphatic >EC6 - EC8 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | - | - |
| TPH-CWG - Aliphatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | - | - |
| TPH-CWG - Aliphatic >EC10 - EC12 | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | - | - |
| TPH-CWG - Aliphatic >EC12 - EC16 | mg/kg | 2 | MCERTS | < 2.0 | < 2.0 | < 2.0 | - | - |
| TPH-CWG - Aliphatic >EC16 - EC21 | mg/kg | 8 | MCERTS | < 8.0 | < 8.0 | < 8.0 | - | - |
| TPH-CWG - Aliphatic >EC21 - EC35 | mg/kg | 8 | MCERTS | < 8.0 | < 8.0 | < 8.0 | - | - |
| **TPH-CWG - Aliphatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | - | - |
| TPH-CWG - Aromatic >EC5 - EC7 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | - | - |
| TPH-CWG - Aromatic >EC7 - EC8 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | - | - |
| TPH-CWG - Aromatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | - | - |
| TPH-CWG - Aromatic >EC10 - EC12 | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | - | - |
| TPH-CWG - Aromatic >EC12 - EC16 | mg/kg | 2 | MCERTS | < 2.0 | < 2.0 | < 2.0 | - | - |
| TPH-CWG - Aromatic >EC16 - EC21 | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | - | - |
| TPH-CWG - Aromatic >EC21 - EC35 | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | - | - |
| **TPH-CWG - Aromatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | < 10 | < 10 | < 10 | - | - |



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**Analytical Report Number: 19-36738**

**Project / Site name: Tesco's Wrexham**

| **Lab Sample Number** | | | | 1197225 | 1197226 | 1197227 | 1197228 | |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | WLS3 | WLS6 | WLS5 | WLS4 | |
| **Sample Number** | | | | None Supplied | None Supplied | None Supplied | None Supplied | |
| **Depth (m)** | | | | 2.10 | 0.50 | 0.70 | 0.90 | |
| **Date Sampled** | | | | Deviating | Deviating | Deviating | Deviating | |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| Stone Content | % | 0.1 | NONE | < 0.1 | < 0.1 | < 0.1 | < 0.1 | |
| Moisture Content | % | N/A | NONE | 9.6 | 10 | 12 | 11 | |
| Total mass of sample received | kg | 0.001 | NONE | 0.69 | 1.3 | 1.1 | 1.1 | |
| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | - | Not-detected | Not-detected | |
| **General Inorganics** | | | | | | | | |
| pH - Automated | pH Units | N/A | MCERTS | 6.7 | 7.3 | 7.1 | 6.7 | |
| Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent) | g/l | 0.00125 | MCERTS | 0.027 | 0.18 | - | 0.027 | |
| Organic Matter | % | 0.1 | MCERTS | 0.4 | - | 1.6 | 3.5 | |
| **Speciated PAHs** | | | | | | | | |
| Naphthalene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Acenaphthylene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Acenaphthene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Fluorene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Phenanthrene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Benzo(a)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Chrysene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Benzo(b)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Benzo(k)fluoranthene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Benzo(a)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Dibenz(a,h)anthracene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| Benzo(ghi)perylene | mg/kg | 0.05 | MCERTS | < 0.05 | - | < 0.05 | < 0.05 | |
| **Total PAH** | | | | | | | | |
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | < 0.80 | - | < 0.80 | < 0.80 | |



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**Analytical Report Number: 19-36738**

**Project / Site name: Tesco's Wrexham**

| Lab Sample Number | | | | 1197225 | 1197226 | 1197227 | 1197228 | |
|---|---|---|---|---|---|---|---|---|
| **Sample Reference** | | | | WLS3 | WLS6 | WLS5 | WLS4 | |
| **Sample Number** | | | | None Supplied | None Supplied | None Supplied | None Supplied | |
| **Depth (m)** | | | | 2.10 | 0.50 | 0.70 | 0.90 | |
| **Date Sampled** | | | | Deviating | Deviating | Deviating | Deviating | |
| **Time Taken** | | | | None Supplied | None Supplied | None Supplied | None Supplied | |
| **Analytical Parameter (Soil Analysis)** | **Units** | **Limit of detection** | **Accreditation Status** | | | | | |
| **Heavy Metals / Metalloids** | | | | | | | | |
| Arsenic (aqua regia extractable) | mg/kg | 1 | MCERTS | 4.2 | - | 4.1 | 9.8 | |
| Cadmium (aqua regia extractable) | mg/kg | 0.2 | MCERTS | < 0.2 | - | < 0.2 | 0.2 | |
| Chromium (hexavalent) | mg/kg | 4 | MCERTS | < 4.0 | - | < 4.0 | < 4.0 | |
| Chromium (III) | mg/kg | 1 | NONE | 9.1 | - | 11 | 12 | |
| Chromium (aqua regia extractable) | mg/kg | 1 | MCERTS | 9.2 | - | 11 | 13 | |
| Copper (aqua regia extractable) | mg/kg | 1 | MCERTS | 240 | - | 30 | 36 | |
| Lead (aqua regia extractable) | mg/kg | 1 | MCERTS | 22 | - | 50 | 86 | |
| Mercury (aqua regia extractable) | mg/kg | 0.3 | MCERTS | < 0.3 | - | < 0.3 | < 0.3 | |
| Nickel (aqua regia extractable) | mg/kg | 1 | MCERTS | 9.6 | - | 14 | 13 | |
| Selenium (aqua regia extractable) | mg/kg | 1 | MCERTS | 2.0 | - | < 1.0 | < 1.0 | |
| Zinc (aqua regia extractable) | mg/kg | 1 | MCERTS | 34 | - | 40 | 63 | |
| **Monoaromatics & Oxygenates** | | | | | | | | |
| Benzene | ug/kg | 1 | MCERTS | - | - | - | < 1.0 | |
| Toluene | µg/kg | 1 | MCERTS | - | - | - | < 1.0 | |
| Ethylbenzene | µg/kg | 1 | MCERTS | - | - | - | < 1.0 | |
| p & m-xylene | µg/kg | 1 | MCERTS | - | - | - | < 1.0 | |
| o-xylene | µg/kg | 1 | MCERTS | - | - | - | < 1.0 | |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | - | - | - | < 1.0 | |
| **Petroleum Hydrocarbons** | | | | | | | | |
| TPH-CWG - Aliphatic >EC5 - EC6 | mg/kg | 0.001 | MCERTS | - | - | - | < 0.001 | |
| TPH-CWG - Aliphatic >EC6 - EC8 | mg/kg | 0.001 | MCERTS | - | - | - | < 0.001 | |
| TPH-CWG - Aliphatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | - | < 0.001 | |
| TPH-CWG - Aliphatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | - | < 1.0 | |
| TPH-CWG - Aliphatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | - | < 2.0 | |
| TPH-CWG - Aliphatic >EC16 - EC21 | mg/kg | 8 | MCERTS | - | - | - | < 8.0 | |
| TPH-CWG - Aliphatic >EC21 - EC35 | mg/kg | 8 | MCERTS | - | - | - | < 8.0 | |
| **TPH-CWG - Aliphatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | - | < 10 | |
| TPH-CWG - Aromatic >EC5 - EC7 | mg/kg | 0.001 | MCERTS | - | - | - | < 0.001 | |
| TPH-CWG - Aromatic >EC7 - EC8 | mg/kg | 0.001 | MCERTS | - | - | - | < 0.001 | |
| TPH-CWG - Aromatic >EC8 - EC10 | mg/kg | 0.001 | MCERTS | - | - | - | < 0.001 | |
| TPH-CWG - Aromatic >EC10 - EC12 | mg/kg | 1 | MCERTS | - | - | - | < 1.0 | |
| TPH-CWG - Aromatic >EC12 - EC16 | mg/kg | 2 | MCERTS | - | - | - | < 2.0 | |
| TPH-CWG - Aromatic >EC16 - EC21 | mg/kg | 10 | MCERTS | - | - | - | < 10 | |
| TPH-CWG - Aromatic >EC21 - EC35 | mg/kg | 10 | MCERTS | - | - | - | < 10 | |
| **TPH-CWG - Aromatic (EC5 - EC35)** | mg/kg | 10 | MCERTS | - | - | - | < 10 | |



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**Analytical Report Number : 19-36738**

**Project / Site name: Tesco's Wrexham**

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description * |
|---|---|---|---|---|
| 1197220 | WLS1 | None Supplied | 0.10 | Brown loam and sand with gravel and vegetation. |
| 1197221 | WLS1 | None Supplied | 0.70 | Brown loam and sand with brick and gravel |
| 1197222 | WLS1 | None Supplied | 1.20 | Light brown sand. |
| 1197223 | WLS2 | None Supplied | 0.60 | Grey loam and sand with gravel. |
| 1197224 | WLS2 | None Supplied | 1.80 | Brown sand. |
| 1197225 | WLS3 | None Supplied | 2.10 | Brown sand. |
| 1197226 | WLS6 | None Supplied | 0.50 | Brown loam and sand with gravel. |
| 1197227 | WLS5 | None Supplied | 0.70 | Brown clay and sand with gravel. |
| 1197228 | WLS4 | None Supplied | 0.90 | Brown clay and sand with gravel. |



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**Analytical Report Number : 19-36738**

**Project / Site name: Tesco's Wrexham**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|
| Asbestos identification in soil | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques. | In house method based on HSG 248 | A001-PL | D | ISO 17025 |
| BTEX and MTBE in soil (Monoaromatics) | Determination of BTEX in soil by headspace GC-MS. | In-house method based on USEPA8260 | L073B-PL | W | MCERTS |
| Cr (III) in soil | In-house method by calculation from total Cr and Cr VI. | In-house method by calculation | L080-PL | W | NONE |
| Hexavalent chromium in soil | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry. | In-house method | L080-PL | W | MCERTS |
| Metals in soil by ICP-OES | Determination of metals in soil by aqua-regia digestion followed by ICP-OES. | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil. | L038-PL | D | MCERTS |
| Moisture Content | Moisture content, determined gravimetrically. | In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests | L019-UK/PL | W | NONE |
| Organic matter (Automated) in soil | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate. | BS1377 Part 3, 1990, Chemical and Electrochemical Tests"" | L009-PL | D | MCERTS |
| pH in soil (automated) | Determination of pH in soil by addition of water followed by automated electrometric measurement. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests | L099-PL | D | MCERTS |
| Speciated EPA-16 PAHs in soil | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. | In-house method based on USEPA 8270 | L064-PL | D | MCERTS |
| Stones content of soil | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight. | In-house method based on British Standard Methods and MCERTS requirements. | L019-UK/PL | D | NONE |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES. | L038-PL | D | MCERTS |
| TPHCWG (Soil) | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID. | In-house method with silica gel split/clean up. | L088/76-PL | W | MCERTS |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**
**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**
**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.**


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| Sample ID | Other_ID | Sample Type | Job | Sample Number | Sample Deviation Code | test_name | test_ref | Test Deviation code |
|---|---|---|---|---|---|---|---|---|
| WLS1 | | S | 19-36738 | 1197220 | a | | | |
| WLS1 | | S | 19-36738 | 1197221 | a | | | |
| WLS1 | | S | 19-36738 | 1197222 | a | | | |
| WLS2 | | S | 19-36738 | 1197223 | a | | | |
| WLS2 | | S | 19-36738 | 1197224 | a | | | |
| WLS3 | | S | 19-36738 | 1197225 | a | | | |
| WLS4 | | S | 19-36738 | 1197228 | a | | | |
| WLS5 | | S | 19-36738 | 1197227 | a | | | |
| WLS6 | | S | 19-36738 | 1197226 | a | | | |



Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

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# Analytical Report Number : 19-36741

| | | | |
|---|---|---|---|
| **Project / Site name:** | Tesco's Wrexham | **Samples received on:** | 09/04/2019 |
| **Your job number:** | JN1246 | **Samples instructed on:** | 09/04/2019 |
| **Your order number:** | | **Analysis completed by:** | 18/04/2019 |
| **Report Issue Number:** | 1 | **Report issued on:** | 18/04/2019 |
| **Samples Analysed:** | 3 wac multi samples | | |

**Signed:**

Dr Claire Stone
Quality Manager
**For & on behalf of i2 Analytical Ltd.**

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

| | |
|---|---|
| soils | - 4 weeks from reporting |
| leachates | - 2 weeks from reporting |
| waters | - 2 weeks from reporting |
| asbestos | - 6 months from reporting |

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## Waste Acceptance Criteria Analytical Results

| **Report No:** | **19-36741** | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | **Client:** | **STCONSULT** | |
| **Location** | **Tesco's Wrexham** | | | | | | |
| **Lab Reference (Sample Number)** | 1197247 | | | | **Landfill Waste Acceptance Criteria Limits** | | |
| **Sampling Date** | | | | | Inert Waste Landfill | Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill | Hazardous Waste Landfill |
| **Sample ID** | WLS1 | | | | | | |
| **Depth (m)** | 0.70 | | | | | | |
| **Solid Waste Analysis** | | | | | | | |
| TOC (%)** | 1.7 | | | | 3% | 5% | 6% |
| Loss on Ignition (%) ** | 4.9 | | | | -- | -- | 10% |
| BTEX (µg/kg) ** | < 10 | | | | 6000 | -- | -- |
| Sum of PCBs (mg/kg) ** | < 0.30 | | | | 1 | -- | -- |
| Mineral Oil (mg/kg) # | < 10 | | | | 500 | -- | -- |
| Total PAH (WAC-17) (mg/kg) | 2.8 | | | | 100 | -- | -- |
| pH (units)** | 7.3 | | | | -- | >6 | -- |
| Acid Neutralisation Capacity (mol / kg) | 4.5 | | | | -- | To be evaluated | To be evaluated |
| **Eluate Analysis** | 2:1 | 8:1 | | Cumulative 10:1 | Limit values for compliance leaching test | | |
| (BS EN 12457 - 3 preparation utilising end over end leaching procedure) | mg/l | mg/l | | mg/kg | using BS EN 12457-3 at L/S 10 l/kg (mg/kg) | | |
| Arsenic * | 0.010 | < 0.010 | | 0.059 | 0.5 | 2 | 25 |
| Barium * | 0.018 | 0.011 | | 0.11 | 20 | 100 | 300 |
| Cadmium * | < 0.0005 | < 0.0005 | | < 0.0020 | 0.04 | 1 | 5 |
| Chromium * | 0.0020 | 0.0020 | | 0.020 | 0.5 | 10 | 70 |
| Copper * | 0.045 | 0.027 | | 0.28 | 2 | 50 | 100 |
| Mercury * | < 0.0015 | < 0.0015 | | < 0.010 | 0.01 | 0.2 | 2 |
| Molybdenum * | 0.029 | 0.012 | | 0.13 | 0.5 | 10 | 30 |
| Nickel * | 0.0061 | 0.0034 | | 0.036 | 0.4 | 10 | 40 |
| Lead * | 0.015 | 0.011 | | 0.11 | 0.5 | 10 | 50 |
| Antimony * | < 0.0050 | < 0.0050 | | 0.045 | 0.06 | 0.7 | 5 |
| Selenium * | < 0.010 | < 0.010 | | < 0.040 | 0.1 | 0.5 | 7 |
| Zinc * | 0.0099 | 0.0097 | | 0.098 | 4 | 50 | 200 |
| Chloride * | 10 | < 4.0 | | 23 | 800 | 4000 | 25000 |
| Fluoride | 0.54 | 0.41 | | 4.2 | 10 | 150 | 500 |
| Sulphate * | 25 | 6.9 | | 83 | 1000 | 20000 | 50000 |
| TDS* | 75 | 31 | | 340 | 4000 | 60000 | 100000 |
| Phenol Index (Monohydric Phenols) * | < 0.13 | < 0.13 | | < 0.50 | 1 | - | - |
| DOC | 48 | 18 | | 200 | 500 | 800 | 1000 |
| **Leach Test Information** | | | | | | | |
| Stone Content (%) | < 0.1 | | | | | | |
| Sample Mass (kg) | 1.1 | | | | | | |
| Dry Matter (%) | 88 | | | | | | |
| Moisture (%) | 12 | | | | | | |
| **Stage 1** | | | | | | | |
| Volume Eluate L2 (litres) | 0.33 | | | | | | |
| Filtered Eluate VE1 (litres) | 0.13 | | | | | | |

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.



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## Waste Acceptance Criteria Analytical Results

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Report No:** | **19-36741** | | | | | | |
| | | | | | **Client:** | **STCONSULT** | |
| **Location** | **Tesco's Wrexham** | | | | | | |
| **Lab Reference (Sample Number)** | 1197248 | | | | **Landfill Waste Acceptance Criteria Limits** | | |
| **Sampling Date** | | | | | Inert Waste Landfill | Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill | Hazardous Waste Landfill |
| **Sample ID** | WLS1 | | | | | | |
| **Depth (m)** | 1.20 | | | | | | |
| **Solid Waste Analysis** | | | | | | | |
| TOC (%)** | 0.2 | | | | 3% | 5% | 6% |
| Loss on Ignition (%) ** | 0.8 | | | | -- | -- | 10% |
| BTEX (µg/kg) ** | < 10 | | | | 6000 | -- | -- |
| Sum of PCBs (mg/kg) ** | < 0.30 | | | | 1 | -- | -- |
| Mineral Oil (mg/kg) # | < 10 | | | | 500 | -- | -- |
| Total PAH (WAC-17) (mg/kg) | < 0.9 | | | | 100 | -- | -- |
| pH (units)** | 7.2 | | | | -- | >6 | -- |
| Acid Neutralisation Capacity (mol / kg) | 1.0 | | | | -- | To be evaluated | To be evaluated |
| **Eluate Analysis** | 2:1 | 8:1 | | Cumulative 10:1 | Limit values for compliance leaching test | | |
| (BS EN 12457 - 3 preparation utilising end over end leaching procedure) | mg/l | mg/l | | mg/kg | using BS EN 12457-3 at L/S 10 l/kg (mg/kg) | | |
| Arsenic * | < 0.010 | < 0.010 | | < 0.050 | 0.5 | 2 | 25 |
| Barium * | 0.0057 | < 0.0050 | | < 0.020 | 20 | 100 | 300 |
| Cadmium * | < 0.0005 | < 0.0005 | | < 0.0020 | 0.04 | 1 | 5 |
| Chromium * | 0.0014 | < 0.0010 | | < 0.0050 | 0.5 | 10 | 70 |
| Copper * | 0.0058 | < 0.0030 | | 0.024 | 2 | 50 | 100 |
| Mercury * | < 0.0015 | < 0.0015 | | < 0.010 | 0.01 | 0.2 | 2 |
| Molybdenum * | < 0.0030 | < 0.0030 | | < 0.020 | 0.5 | 10 | 30 |
| Nickel * | < 0.0010 | < 0.0010 | | < 0.0050 | 0.4 | 10 | 40 |
| Lead * | 0.0092 | < 0.0050 | | < 0.020 | 0.5 | 10 | 50 |
| Antimony * | < 0.0050 | < 0.0050 | | < 0.020 | 0.06 | 0.7 | 5 |
| Selenium * | < 0.010 | < 0.010 | | < 0.040 | 0.1 | 0.5 | 7 |
| Zinc * | 0.0061 | < 0.0010 | | < 0.020 | 4 | 50 | 200 |
| Chloride * | 6.4 | < 4.0 | | 19 | 800 | 4000 | 25000 |
| Fluoride | 0.065 | 0.054 | | 0.55 | 10 | 150 | 500 |
| Sulphate * | 5.5 | 1.4 | | 20 | 1000 | 20000 | 50000 |
| TDS* | 33 | 10 | | 130 | 4000 | 60000 | 100000 |
| Phenol Index (Monhydric Phenols) * | < 0.13 | < 0.13 | | < 0.50 | 1 | - | - |
| DOC | 6.1 | 4.8 | | 50 | 500 | 800 | 1000 |
| **Leach Test Information** | | | | | | | |
| Stone Content (%) | < 0.1 | | | | | | |
| Sample Mass (kg) | 0.96 | | | | | | |
| Dry Matter (%) | 96 | | | | | | |
| Moisture (%) | 4.4 | | | | | | |
| **Stage 1** | | | | | | | |
| Volume Eluate L2 (litres) | 0.34 | | | | | | |
| Filtered Eluate VE1 (litres) | 0.24 | | | | | | |

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

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** = MCERTS accrediited

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## Waste Acceptance Criteria Analytical Results

| **Report No:** | **19-36741** | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | **Client:** | **STCONSULT** | |
| **Location** | **Tesco's Wrexham** | | | | | | |
| **Lab Reference (Sample Number)** | 1197249 | | | | **Landfill Waste Acceptance Criteria Limits** | | |
| **Sampling Date** | | | | | Inert Waste Landfill | Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill | Hazardous Waste Landfill |
| **Sample ID** | WLS4 | | | | | | |
| **Depth (m)** | 0.90 | | | | | | |
| **Solid Waste Analysis** | | | | | | | |
| TOC (%)** | 1.5 | | | | 3% | 5% | 6% |
| Loss on Ignition (%) ** | 4.8 | | | | -- | -- | 10% |
| BTEX (µg/kg) ** | < 10 | | | | 6000 | -- | -- |
| Sum of PCBs (mg/kg) ** | < 0.30 | | | | 1 | -- | -- |
| Mineral Oil (mg/kg) # | < 10 | | | | 500 | -- | -- |
| Total PAH (WAC-17) (mg/kg) | < 0.9 | | | | 100 | -- | -- |
| pH (units)** | 6.2 | | | | -- | >6 | -- |
| Acid Neutralisation Capacity (mol / kg) | -6.7 | | | | -- | To be evaluated | To be evaluated |
| **Eluate Analysis** | 2:1 | 8:1 | | Cumulative 10:1 | Limit values for compliance leaching test | | |
| (BS EN 12457 - 3 preparation utilising end over end leaching procedure) | mg/l | mg/l | | mg/kg | using BS EN 12457-3 at L/S 10 l/kg (mg/kg) | | |
| Arsenic * | 0.013 | < 0.010 | | 0.091 | 0.5 | 2 | 25 |
| Barium * | 0.019 | 0.0082 | | 0.091 | 20 | 100 | 300 |
| Cadmium * | < 0.0005 | < 0.0005 | | < 0.0020 | 0.04 | 1 | 5 |
| Chromium * | 0.0016 | < 0.0010 | | 0.0099 | 0.5 | 10 | 70 |
| Copper * | 0.043 | 0.020 | | 0.22 | 2 | 50 | 100 |
| Mercury * | < 0.0015 | < 0.0015 | | < 0.010 | 0.01 | 0.2 | 2 |
| Molybdenum * | 0.013 | 0.0063 | | 0.069 | 0.5 | 10 | 30 |
| Nickel * | 0.0050 | 0.0022 | | 0.024 | 0.4 | 10 | 40 |
| Lead * | 0.017 | 0.0084 | | 0.092 | 0.5 | 10 | 50 |
| Antimony * | < 0.0050 | < 0.0050 | | < 0.020 | 0.06 | 0.7 | 5 |
| Selenium * | < 0.010 | < 0.010 | | < 0.040 | 0.1 | 0.5 | 7 |
| Zinc * | 0.014 | 0.0052 | | 0.059 | 4 | 50 | 200 |
| Chloride * | 9.0 | < 4.0 | | 23 | 800 | 4000 | 25000 |
| Fluoride | 0.54 | 0.48 | | 4.8 | 10 | 150 | 500 |
| Sulphate * | 11 | 6.1 | | 64 | 1000 | 20000 | 50000 |
| TDS* | 59 | 24 | | 270 | 4000 | 60000 | 100000 |
| Phenol Index (Monhydric Phenols) * | < 0.13 | < 0.13 | | < 0.50 | 1 | - | - |
| DOC | 40 | 16 | | 180 | 500 | 800 | 1000 |
| **Leach Test Information** | | | | | | | |
| Stone Content (%) | < 0.1 | | | | | | |
| Sample Mass (kg) | 1.1 | | | | | | |
| Dry Matter (%) | 89 | | | | | | |
| Moisture (%) | 11 | | | | | | |
| **Stage 1** | | | | | | | |
| Volume Eluate L2 (litres) | 0.33 | | | | | | |
| Filtered Eluate VE1 (litres) | 0.15 | | | | | | |

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

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**Analytical Report Number : 19-36741**

**Project / Site name: Tesco's Wrexham**

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description * |
|---|---|---|---|---|
| 1197247 | WLS1 | None Supplied | 0.70 | Brown loam and sand with brick and gravel |
| 1197248 | WLS1 | None Supplied | 1.20 | Light brown sand. |
| 1197249 | WLS4 | None Supplied | 0.90 | Brown clay and sand with gravel. |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number : 19-36741**

**Project / Site name: Tesco's Wrexham**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|
| Acid neutralisation capacity of soil | Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe. | In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance | L046-PL | W | NONE |
| BTEX (Sum of BTEX compounds) in soil | Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited | In-house method based on USEPA8260 | L073B-PL | W | MCERTS |
| Chloride in WAC leachate (BS EN 12457-3 Prep) | Determination of Chloride colorimetrically by discrete analyser. | In house based on MEWAM Method ISBN 0117516260. | L082-PL | W | ISO 17025 |
| DOC in WAC leachate (BS EN 12457-3 Prep) | Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser. | In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed. | L037-PL | W | NONE |
| Fluoride in WAC leachate (BS EN 12457-3 Prep) | Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode. | In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed. | L033-PL | W | ISO 17025 |
| Loss on ignition of soil @ 450oC | Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests | L047-PL | D | MCERTS |
| Metals in WAC leachate (BS EN 12457-3 Prep) | Determination of metals in leachate by acidification followed by ICP-OES. | In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed. | L039-PL | W | ISO 17025 |
| Mineral Oil in Soil C10 - C40 | Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS. | In-house method based on USEPA 8270 | L076-PL | D | NONE |
| Moisture Content | Moisture content, determined gravimetrically. | In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests | L019-UK/PL | W | NONE |
| PCB's by GC-MS in soil | Determination of PCB by extraction with acetone and hexane followed by GC-MS. | In-house method based on USEPA 8082 | L027-PL | D | MCERTS |
| pH in soil | Determination of pH in soil by addition of water followed by electrometric measurement. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests | L005-PL | W | MCERTS |
| Phenol Index in WAC leachate (BS EN 12457-3 Prep) | Determination of monohydric phenols in leachate by continuous flow analyser. | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL | W | ISO 17025 |
| Speciated WAC-17 PAHs in soil | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. | In-house method based on USEPA 8270. MCERTS accredited except Coronene. | L064-PL | D | MCERTS |
| Stones content of soil | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight. | In-house method based on British Standard Methods and MCERTS requirements. | L019-UK/PL | D | NONE |
| Sulphate in WAC leachate (BS EN 12457-3 Prep) | Determination of sulphate in leachate by acidification followed by ICP-OES. | In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed. | L039-PL | W | ISO 17025 |
| TDS in WAC leachate (BS EN 12457-3 Prep) | Determination of total dissolved solids in leachate by electrometric measurement. | In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed. | L031-PL | W | NONE |
| Total organic carbon in soil | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate. | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests | L023-PL | D | MCERTS |



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The results included within the report are representative of the samples submitted for analysis.

**Analytical Report Number : 19-36741**

**Project / Site name: Tesco's Wrexham**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|---|---|---|---|---|---|

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**
**For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.**
**Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.**


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The results included within the report are representative of the samples submitted for analysis.

| Sample ID | Other_ID | Sample Type | Job | Sample Number | Sample Deviation Code | test_name | test_ref | Test Deviation code |
|---|---|---|---|---|---|---|---|---|
| WLS1 | | M | 19-36741 | 1197247 | a | | | |
| WLS1 | | M | 19-36741 | 1197248 | a | | | |
| WLS4 | | M | 19-36741 | 1197249 | a | | | |



Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

# Waste Classification Report

XEXBX-BMSLN-62A2L

## Job name

JN1246 Wrexham

## Description/Comments

## Project

## Site

## Related Documents

| # | Name | Description |
|---|---|---|
| None | | |

## Waste Stream Template

STC Waste Suite

## Classified by

Name:
**Callum Ward**
Date:
**07 May 2019 15:05 GMT**
Telephone:
**01604 500020**

Company:
**Southern Testing**
**Twigden Barns**
**Brixworth Road**
**Northampton**
**NN6 8LU**

## Report

Created by: Callum Ward
Created date: 07 May 2019 15:05 GMT

## Job summary


| # | Sample Name | Depth [m] | Classification Result | Hazard properties | Page |
|---|---|---|---|---|---|
| 1 | WLS1 | 0.10 | Non Hazardous | | 3 |
| 2 | WLS1[2] | 0.70 | Non Hazardous | | 5 |
| 3 | WLS1[3] | 1.20 | Non Hazardous | | 7 |
| 4 | WLS2 | 0.60 | Non Hazardous | | 9 |
| 5 | WLS2[2] | 1.80 | Non Hazardous | | 11 |
| 6 | WLS3 | 2.10 | Non Hazardous | | 13 |
| 7 | WLS5 | 0.70 | Non Hazardous | | 15 |
| 8 | WLS4 | 0.90 | Non Hazardous | | 17 |

| Appendices | Page |
|---|---|
| Appendix A: Classifier defined and non CLP determinands | 19 |

| Appendices | Page |
|---|---|
| Appendix B: Rationale for selection of metal species | 20 |
| Appendix C: Version | 21 |

## Classification of sample: WLS1

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**WLS1**
Sample Depth:
**0.10 m**
Moisture content:
**6.3%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 6.3% Dry Weight Moisture Correction applied (MC)

| # | Determinand | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|
| | CLP index number / EC Number / CAS Number | | | | | | | |
| 1 | arsenic { arsenic }<br>033-001-00-X / 231-148-6 / 7440-38-2 | | 4.1 mg/kg | | 3.857 mg/kg | 0.000386 % | ✓ | |
| 2 | cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }<br>048-001-00-5 | 1 | 0.2 mg/kg | | 0.188 mg/kg | 0.0000188 % | ✓ | |
| 3 | chromium in chromium(III) compounds { chromium(III) oxide }<br>215-160-9 / 1308-38-9 | | 10 mg/kg | 1.462 | 13.749 mg/kg | 0.00137 % | ✓ | |
| 4 | chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }<br>024-017-00-8 | | <4 mg/kg | 1.923 | <7.692 mg/kg | <0.000769 % | | <**LOD** |
| 5 | copper { copper sulphate }<br>029-004-00-0 / 231-847-6 / 7758-98-7 | | 21 mg/kg | 2.512 | 49.62 mg/kg | 0.00496 % | ✓ | |
| 6 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }<br>082-001-00-6 | 1 | 48 mg/kg | | 45.155 mg/kg | 0.00452 % | ✓ | |
| 7 | mercury { mercury }<br>080-001-00-0 / 231-106-7 / 7439-97-6 | | <0.3 mg/kg | | <0.3 mg/kg | <0.00003 % | | <**LOD** |
| 8 | nickel { nickel }<br>028-002-00-7 / 231-111-4 / 7440-02-0 | 7 | 13 mg/kg | | 12.23 mg/kg | 0.00122 % | ✓ | |
| 9 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }<br>034-002-00-8 | | <1 mg/kg | 2.554 | <2.554 mg/kg | <0.000255 % | | <**LOD** |
| 10 | zinc { zinc oxide }<br>030-013-00-7 / 215-222-5 / 1314-13-2 | | 92 mg/kg | 1.245 | 107.727 mg/kg | 0.0108 % | ✓ | |
| 11 | benzene<br>601-020-00-8 / 200-753-7 / 71-43-2 | | <1 mg/kg | | <1 mg/kg | <0.0001 % | | <**LOD** |

| # | | Determinand | | | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CLP index number | EC Number | CAS Number | | | | | | | | | |
| 12 | | toluene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-021-00-3 | 203-625-9 | 108-88-3 | | | | | | | | | |
| 13 | ● | ethylbenzene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-023-00-4 | 202-849-4 | 100-41-4 | | | | | | | | | |
| 14 | | xylene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-022-00-9 | 202-422-2 [1]<br>203-396-5 [2]<br>203-576-3 [3]<br>215-535-7 [4] | 95-47-6 [1]<br>106-42-3 [2]<br>108-38-3 [3]<br>1330-20-7 [4] | | | | | | | | | |
| 15 | | tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 603-181-00-X | 216-653-1 | 1634-04-4 | | | | | | | | | |
| 16 | ● | TPH (C6 to C40) petroleum group | | | | <20 | mg/kg | | <20 | mg/kg | <0.002 % | | <LOD |
| | | | | TPH | | | | | | | | | |
| 17 | | naphthalene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-052-00-2 | 202-049-5 | 91-20-3 | | | | | | | | | |
| 18 | ● | acenaphthylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-917-1 | 208-96-8 | | | | | | | | | |
| 19 | ● | acenaphthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-469-6 | 83-32-9 | | | | | | | | | |
| 20 | ● | fluorene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-695-5 | 86-73-7 | | | | | | | | | |
| 21 | ● | phenanthrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-581-5 | 85-01-8 | | | | | | | | | |
| 22 | ● | anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-371-1 | 120-12-7 | | | | | | | | | |
| 23 | ● | fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-912-4 | 206-44-0 | | | | | | | | | |
| 24 | ● | pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-927-3 | 129-00-0 | | | | | | | | | |
| 25 | | benzo[a]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-033-00-9 | 200-280-6 | 56-55-3 | | | | | | | | | |
| 26 | | chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-048-00-0 | 205-923-4 | 218-01-9 | | | | | | | | | |
| 27 | | benzo[b]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-034-00-4 | 205-911-9 | 205-99-2 | | | | | | | | | |
| 28 | | benzo[k]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-036-00-5 | 205-916-6 | 207-08-9 | | | | | | | | | |
| 29 | | benzo[a]pyrene; benzo[def]chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-032-00-3 | 200-028-5 | 50-32-8 | | | | | | | | | |
| 30 | ● | indeno[123-cd]pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-893-2 | 193-39-5 | | | | | | | | | |
| 31 | | dibenz[a,h]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-041-00-2 | 200-181-8 | 53-70-3 | | | | | | | | | |
| 32 | ● | benzo[ghi]perylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-883-8 | 191-24-2 | | | | | | | | | |
| 33 | ● | PAHs (total) | | | | <0.8 | mg/kg | | <0.8 | mg/kg | <0.00008 % | | <LOD |
| | | | | | | | | | | Total: | 0.027 % | | |

Key

| | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| ● | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Classification of sample: WLS1[2]

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**WLS1[2]**
Sample Depth:
**0.70 m**
Moisture content:
**12%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 12% Dry Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | arsenic { arsenic } | 033-001-00-X | 231-148-6 | 7440-38-2 | | 12 | mg/kg | | 10.714 | mg/kg | 0.00107 % | ✓ | |
| 2 | cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } | 048-001-00-5 | | | 1 | <0.2 | mg/kg | | <0.2 | mg/kg | <0.00002 % | | <**LOD** |
| 3 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 15 | mg/kg | 1.462 | 19.574 | mg/kg | 0.00196 % | ✓ | |
| 4 | chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex } | 024-017-00-8 | | | | <4 | mg/kg | 1.923 | <7.692 | mg/kg | <0.000769 % | | <**LOD** |
| 5 | copper { copper sulphate } | 029-004-00-0 | 231-847-6 | 7758-98-7 | | 40 | mg/kg | 2.512 | 89.704 | mg/kg | 0.00897 % | ✓ | |
| 6 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 87 | mg/kg | | 77.679 | mg/kg | 0.00777 % | ✓ | |
| 7 | mercury { mercury } | 080-001-00-0 | 231-106-7 | 7439-97-6 | | <0.3 | mg/kg | | <0.3 | mg/kg | <0.00003 % | | <**LOD** |
| 8 | nickel { nickel } | 028-002-00-7 | 231-111-4 | 7440-02-0 | 7 | 21 | mg/kg | | 18.75 | mg/kg | 0.00188 % | ✓ | |
| 9 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 | mg/kg | 2.554 | <2.554 | mg/kg | <0.000255 % | | <**LOD** |
| 10 | zinc { zinc oxide } | 030-013-00-7 | 215-222-5 | 1314-13-2 | | 68 | mg/kg | 1.245 | 75.572 | mg/kg | 0.00756 % | ✓ | |
| 11 | benzene | 601-020-00-8 | 200-753-7 | 71-43-2 | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <**LOD** |

| # | | Determinand | | | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CLP index number | EC Number | CAS Number | | | | | | | | | |
| 12 | | toluene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-021-00-3 | 203-625-9 | 108-88-3 | | | | | | | | | |
| 13 | ● | ethylbenzene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-023-00-4 | 202-849-4 | 100-41-4 | | | | | | | | | |
| 14 | | xylene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-022-00-9 | 202-422-2 [1]<br>203-396-5 [2]<br>203-576-3 [3]<br>215-535-7 [4] | 95-47-6 [1]<br>106-42-3 [2]<br>108-38-3 [3]<br>1330-20-7 [4] | | | | | | | | | |
| 15 | | tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 603-181-00-X | 216-653-1 | 1634-04-4 | | | | | | | | | |
| 16 | ● | TPH (C6 to C40) petroleum group | | | | <20 | mg/kg | | <20 | mg/kg | <0.002 % | | <LOD |
| | | | | TPH | | | | | | | | | |
| 17 | | naphthalene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-052-00-2 | 202-049-5 | 91-20-3 | | | | | | | | | |
| 18 | ● | acenaphthylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-917-1 | 208-96-8 | | | | | | | | | |
| 19 | ● | acenaphthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-469-6 | 83-32-9 | | | | | | | | | |
| 20 | ● | fluorene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-695-5 | 86-73-7 | | | | | | | | | |
| 21 | ● | phenanthrene | | | | 0.24 | mg/kg | | 0.214 | mg/kg | 0.0000214 % | ✓ | |
| | | | 201-581-5 | 85-01-8 | | | | | | | | | |
| 22 | ● | anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-371-1 | 120-12-7 | | | | | | | | | |
| 23 | ● | fluoranthene | | | | 0.54 | mg/kg | | 0.482 | mg/kg | 0.0000482 % | ✓ | |
| | | | 205-912-4 | 206-44-0 | | | | | | | | | |
| 24 | ● | pyrene | | | | 0.49 | mg/kg | | 0.438 | mg/kg | 0.0000438 % | ✓ | |
| | | | 204-927-3 | 129-00-0 | | | | | | | | | |
| 25 | | benzo[a]anthracene | | | | 0.3 | mg/kg | | 0.268 | mg/kg | 0.0000268 % | ✓ | |
| | | 601-033-00-9 | 200-280-6 | 56-55-3 | | | | | | | | | |
| 26 | | chrysene | | | | 0.33 | mg/kg | | 0.295 | mg/kg | 0.0000295 % | ✓ | |
| | | 601-048-00-0 | 205-923-4 | 218-01-9 | | | | | | | | | |
| 27 | | benzo[b]fluoranthene | | | | 0.4 | mg/kg | | 0.357 | mg/kg | 0.0000357 % | ✓ | |
| | | 601-034-00-4 | 205-911-9 | 205-99-2 | | | | | | | | | |
| 28 | | benzo[k]fluoranthene | | | | 0.16 | mg/kg | | 0.143 | mg/kg | 0.0000143 % | ✓ | |
| | | 601-036-00-5 | 205-916-6 | 207-08-9 | | | | | | | | | |
| 29 | | benzo[a]pyrene; benzo[def]chrysene | | | | 0.31 | mg/kg | | 0.277 | mg/kg | 0.0000277 % | ✓ | |
| | | 601-032-00-3 | 200-028-5 | 50-32-8 | | | | | | | | | |
| 30 | ● | indeno[123-cd]pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-893-2 | 193-39-5 | | | | | | | | | |
| 31 | | dibenz[a,h]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-041-00-2 | 200-181-8 | 53-70-3 | | | | | | | | | |
| 32 | ● | benzo[ghi]perylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-883-8 | 191-24-2 | | | | | | | | | |
| 33 | ● | PAHs (total) | | | | 2.77 | mg/kg | | 2.473 | mg/kg | 0.000247 % | ✓ | |
| | | | | | | | | | | Total: | 0.0333 % | | |

Key

| | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| ● | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Classification of sample: WLS1[3]

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**WLS1[3]**
Sample Depth:
**1.20 m**
Moisture content:
**4.4%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 4.4% Dry Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | arsenic { arsenic } | 033-001-00-X | 231-148-6 | 7440-38-2 | | 3 mg/kg | | 2.874 mg/kg | 0.000287 % | ✓ | |
| 2 | cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } | 048-001-00-5 | | | 1 | <0.2 mg/kg | | <0.2 mg/kg | <0.00002 % | | <**LOD** |
| 3 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 6.2 mg/kg | 1.462 | 8.68 mg/kg | 0.000868 % | ✓ | |
| 4 | chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex } | 024-017-00-8 | | | | <4 mg/kg | 1.923 | <7.692 mg/kg | <0.000769 % | | <**LOD** |
| 5 | copper { copper sulphate } | 029-004-00-0 | 231-847-6 | 7758-98-7 | | 12 mg/kg | 2.512 | 28.87 mg/kg | 0.00289 % | ✓ | |
| 6 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 22 mg/kg | | 21.073 mg/kg | 0.00211 % | ✓ | |
| 7 | mercury { mercury } | 080-001-00-0 | 231-106-7 | 7439-97-6 | | <0.3 mg/kg | | <0.3 mg/kg | <0.00003 % | | <**LOD** |
| 8 | nickel { nickel } | 028-002-00-7 | 231-111-4 | 7440-02-0 | 7 | 8.3 mg/kg | | 7.95 mg/kg | 0.000795 % | ✓ | |
| 9 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 mg/kg | 2.554 | <2.554 mg/kg | <0.000255 % | | <**LOD** |
| 10 | zinc { zinc oxide } | 030-013-00-7 | 215-222-5 | 1314-13-2 | | 26 mg/kg | 1.245 | 30.999 mg/kg | 0.0031 % | ✓ | |
| 11 | benzene | 601-020-00-8 | 200-753-7 | 71-43-2 | | <1 mg/kg | | <1 mg/kg | <0.0001 % | | <**LOD** |

| # | | Determinand | | | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CLP index number | EC Number | CAS Number | | | | | | | | | |
| 12 | | toluene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-021-00-3 | 203-625-9 | 108-88-3 | | | | | | | | | |
| 13 | ● | ethylbenzene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-023-00-4 | 202-849-4 | 100-41-4 | | | | | | | | | |
| 14 | | xylene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-022-00-9 | 202-422-2 [1]<br>203-396-5 [2]<br>203-576-3 [3]<br>215-535-7 [4] | 95-47-6 [1]<br>106-42-3 [2]<br>108-38-3 [3]<br>1330-20-7 [4] | | | | | | | | | |
| 15 | | tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 603-181-00-X | 216-653-1 | 1634-04-4 | | | | | | | | | |
| 16 | ● | TPH (C6 to C40) petroleum group | | | | <20 | mg/kg | | <20 | mg/kg | <0.002 % | | <LOD |
| | | | | TPH | | | | | | | | | |
| 17 | | naphthalene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-052-00-2 | 202-049-5 | 91-20-3 | | | | | | | | | |
| 18 | ● | acenaphthylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-917-1 | 208-96-8 | | | | | | | | | |
| 19 | ● | acenaphthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-469-6 | 83-32-9 | | | | | | | | | |
| 20 | ● | fluorene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-695-5 | 86-73-7 | | | | | | | | | |
| 21 | ● | phenanthrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-581-5 | 85-01-8 | | | | | | | | | |
| 22 | ● | anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-371-1 | 120-12-7 | | | | | | | | | |
| 23 | ● | fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-912-4 | 206-44-0 | | | | | | | | | |
| 24 | ● | pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-927-3 | 129-00-0 | | | | | | | | | |
| 25 | | benzo[a]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-033-00-9 | 200-280-6 | 56-55-3 | | | | | | | | | |
| 26 | | chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-048-00-0 | 205-923-4 | 218-01-9 | | | | | | | | | |
| 27 | | benzo[b]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-034-00-4 | 205-911-9 | 205-99-2 | | | | | | | | | |
| 28 | | benzo[k]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-036-00-5 | 205-916-6 | 207-08-9 | | | | | | | | | |
| 29 | | benzo[a]pyrene; benzo[def]chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-032-00-3 | 200-028-5 | 50-32-8 | | | | | | | | | |
| 30 | ● | indeno[123-cd]pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-893-2 | 193-39-5 | | | | | | | | | |
| 31 | | dibenz[a,h]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-041-00-2 | 200-181-8 | 53-70-3 | | | | | | | | | |
| 32 | ● | benzo[ghi]perylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-883-8 | 191-24-2 | | | | | | | | | |
| 33 | ● | PAHs (total) | | | | <0.8 | mg/kg | | <0.8 | mg/kg | <0.00008 % | | <LOD |
| | | | | | | | | | | Total: | 0.0138 % | | |

Key

| | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| ● | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Classification of sample: WLS2

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**WLS2**
Sample Depth:
**0.60 m**
Moisture content:
**10%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 10% Dry Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | arsenic { arsenic } | 033-001-00-X | 231-148-6 | 7440-38-2 | | 6.8 mg/kg | | 6.182 mg/kg | 0.000618 % | ✓ | |
| 2 | cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } | 048-001-00-5 | | | 1 | 2.3 mg/kg | | 2.091 mg/kg | 0.000209 % | ✓ | |
| 3 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 9 mg/kg | 1.462 | 11.958 mg/kg | 0.0012 % | ✓ | |
| 4 | chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex } | 024-017-00-8 | | | | <4 mg/kg | 1.923 | <7.692 mg/kg | <0.000769 % | | <**LOD** |
| 5 | copper { copper sulphate } | 029-004-00-0 | 231-847-6 | 7758-98-7 | | 19 mg/kg | 2.512 | 43.384 mg/kg | 0.00434 % | ✓ | |
| 6 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 66 mg/kg | | 60 mg/kg | 0.006 % | ✓ | |
| 7 | mercury { mercury } | 080-001-00-0 | 231-106-7 | 7439-97-6 | | <0.3 mg/kg | | <0.3 mg/kg | <0.00003 % | | <**LOD** |
| 8 | nickel { nickel } | 028-002-00-7 | 231-111-4 | 7440-02-0 | 7 | 12 mg/kg | | 10.909 mg/kg | 0.00109 % | ✓ | |
| 9 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 mg/kg | 2.554 | <2.554 mg/kg | <0.000255 % | | <**LOD** |
| 10 | zinc { zinc oxide } | 030-013-00-7 | 215-222-5 | 1314-13-2 | | 460 mg/kg | 1.245 | 520.517 mg/kg | 0.0521 % | ✓ | |
| 11 | naphthalene | 601-052-00-2 | 202-049-5 | 91-20-3 | | <0.05 mg/kg | | <0.05 mg/kg | <0.000005 % | | <**LOD** |

| # | | Determinand | | | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CLP index number | EC Number | CAS Number | | | | | | | | | |
| 12 | | acenaphthylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-917-1 | 208-96-8 | | | | | | | | | |
| 13 | | acenaphthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-469-6 | 83-32-9 | | | | | | | | | |
| 14 | | fluorene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-695-5 | 86-73-7 | | | | | | | | | |
| 15 | | phenanthrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-581-5 | 85-01-8 | | | | | | | | | |
| 16 | | anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-371-1 | 120-12-7 | | | | | | | | | |
| 17 | | fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-912-4 | 206-44-0 | | | | | | | | | |
| 18 | | pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-927-3 | 129-00-0 | | | | | | | | | |
| 19 | | benzo[a]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-033-00-9 | 200-280-6 | 56-55-3 | | | | | | | | | |
| 20 | | chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-048-00-0 | 205-923-4 | 218-01-9 | | | | | | | | | |
| 21 | | benzo[b]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-034-00-4 | 205-911-9 | 205-99-2 | | | | | | | | | |
| 22 | | benzo[k]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-036-00-5 | 205-916-6 | 207-08-9 | | | | | | | | | |
| 23 | | benzo[a]pyrene; benzo[def]chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-032-00-3 | 200-028-5 | 50-32-8 | | | | | | | | | |
| 24 | | indeno[123-cd]pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-893-2 | 193-39-5 | | | | | | | | | |
| 25 | | dibenz[a,h]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-041-00-2 | 200-181-8 | 53-70-3 | | | | | | | | | |
| 26 | | benzo[ghi]perylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-883-8 | 191-24-2 | | | | | | | | | |
| 27 | | PAHs (total) | | | | <0.8 | mg/kg | | <0.8 | mg/kg | <0.00008 % | | <LOD |
| | | | | | | | | | | | | | |
| | | | | | | | | | | Total: | 0.0667 % | | |

Key

| | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Classification of sample: WLS2[2]

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**WLS2[2]**
Sample Depth:
**1.80 m**
Moisture content:
**10%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 10% Dry Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | arsenic { arsenic } | 033-001-00-X | 231-148-6 | 7440-38-2 | | 5.5 mg/kg | | 5 mg/kg | 0.0005 % | ✓ | |
| 2 | cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } | 048-001-00-5 | | | 1 | <0.2 mg/kg | | <0.2 mg/kg | <0.00002 % | | <**LOD** |
| 3 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 9.1 mg/kg | 1.462 | 12.091 mg/kg | 0.00121 % | ✓ | |
| 4 | chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex } | 024-017-00-8 | | | | <4 mg/kg | 1.923 | <7.692 mg/kg | <0.000769 % | | <**LOD** |
| 5 | copper { copper sulphate } | 029-004-00-0 | 231-847-6 | 7758-98-7 | | 20 mg/kg | 2.512 | 45.667 mg/kg | 0.00457 % | ✓ | |
| 6 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 97 mg/kg | | 88.182 mg/kg | 0.00882 % | ✓ | |
| 7 | mercury { mercury } | 080-001-00-0 | 231-106-7 | 7439-97-6 | | <0.3 mg/kg | | <0.3 mg/kg | <0.00003 % | | <**LOD** |
| 8 | nickel { nickel } | 028-002-00-7 | 231-111-4 | 7440-02-0 | 7 | 8.2 mg/kg | | 7.455 mg/kg | 0.000745 % | ✓ | |
| 9 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 mg/kg | 2.554 | <2.554 mg/kg | <0.000255 % | | <**LOD** |
| 10 | zinc { zinc oxide } | 030-013-00-7 | 215-222-5 | 1314-13-2 | | 27 mg/kg | 1.245 | 30.552 mg/kg | 0.00306 % | ✓ | |
| 11 | naphthalene | 601-052-00-2 | 202-049-5 | 91-20-3 | | <0.05 mg/kg | | <0.05 mg/kg | <0.000005 % | | <**LOD** |

| # | | Determinand | | | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CLP index number | EC Number | CAS Number | | | | | | | | | |
| 12 | ● | acenaphthylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-917-1 | 208-96-8 | | | | | | | | | |
| 13 | ● | acenaphthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-469-6 | 83-32-9 | | | | | | | | | |
| 14 | ● | fluorene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-695-5 | 86-73-7 | | | | | | | | | |
| 15 | ● | phenanthrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-581-5 | 85-01-8 | | | | | | | | | |
| 16 | ● | anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-371-1 | 120-12-7 | | | | | | | | | |
| 17 | ● | fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-912-4 | 206-44-0 | | | | | | | | | |
| 18 | ● | pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-927-3 | 129-00-0 | | | | | | | | | |
| 19 | | benzo[a]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-033-00-9 | 200-280-6 | 56-55-3 | | | | | | | | | |
| 20 | | chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-048-00-0 | 205-923-4 | 218-01-9 | | | | | | | | | |
| 21 | | benzo[b]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-034-00-4 | 205-911-9 | 205-99-2 | | | | | | | | | |
| 22 | | benzo[k]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-036-00-5 | 205-916-6 | 207-08-9 | | | | | | | | | |
| 23 | | benzo[a]pyrene; benzo[def]chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-032-00-3 | 200-028-5 | 50-32-8 | | | | | | | | | |
| 24 | ● | indeno[123-cd]pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-893-2 | 193-39-5 | | | | | | | | | |
| 25 | | dibenz[a,h]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-041-00-2 | 200-181-8 | 53-70-3 | | | | | | | | | |
| 26 | ● | benzo[ghi]perylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-883-8 | 191-24-2 | | | | | | | | | |
| 27 | ● | PAHs (total) | | | | <0.8 | mg/kg | | <0.8 | mg/kg | <0.00008 % | | <LOD |
| | | | | | | | | | | Total: | 0.0201 % | | |

Key

| | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| ● | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Classification of sample: WLS3

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**WLS3**
Sample Depth:
**2.10 m**
Moisture content:
**9.6%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 9.6% Dry Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | arsenic { arsenic } | 033-001-00-X | 231-148-6 | 7440-38-2 | | 4.2 mg/kg | | 3.832 mg/kg | 0.000383 % | ✓ | |
| 2 | cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } | 048-001-00-5 | | | 1 | <0.2 mg/kg | | <0.2 mg/kg | <0.00002 % | | <**LOD** |
| 3 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 9.1 mg/kg | 1.462 | 12.135 mg/kg | 0.00121 % | ✓ | |
| 4 | chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex } | 024-017-00-8 | | | | <4 mg/kg | 1.923 | <7.692 mg/kg | <0.000769 % | | <**LOD** |
| 5 | copper { copper sulphate } | 029-004-00-0 | 231-847-6 | 7758-98-7 | | 240 mg/kg | 2.512 | 550.008 mg/kg | 0.055 % | ✓ | |
| 6 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 22 mg/kg | | 20.073 mg/kg | 0.00201 % | ✓ | |
| 7 | mercury { mercury } | 080-001-00-0 | 231-106-7 | 7439-97-6 | | <0.3 mg/kg | | <0.3 mg/kg | <0.00003 % | | <**LOD** |
| 8 | nickel { nickel } | 028-002-00-7 | 231-111-4 | 7440-02-0 | 7 | 9.6 mg/kg | | 8.759 mg/kg | 0.000876 % | ✓ | |
| 9 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | 2 mg/kg | 2.554 | 4.66 mg/kg | 0.000466 % | ✓ | |
| 10 | zinc { zinc oxide } | 030-013-00-7 | 215-222-5 | 1314-13-2 | | 34 mg/kg | 1.245 | 38.613 mg/kg | 0.00386 % | ✓ | |
| 11 | naphthalene | 601-052-00-2 | 202-049-5 | 91-20-3 | | <0.05 mg/kg | | <0.05 mg/kg | <0.000005 % | | <**LOD** |

| # | | Determinand | | | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CLP index number | EC Number | CAS Number | | | | | | | | | |
| 12 | ● | acenaphthylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-917-1 | 208-96-8 | | | | | | | | | |
| 13 | ● | acenaphthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-469-6 | 83-32-9 | | | | | | | | | |
| 14 | ● | fluorene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-695-5 | 86-73-7 | | | | | | | | | |
| 15 | ● | phenanthrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-581-5 | 85-01-8 | | | | | | | | | |
| 16 | ● | anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-371-1 | 120-12-7 | | | | | | | | | |
| 17 | ● | fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-912-4 | 206-44-0 | | | | | | | | | |
| 18 | ● | pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-927-3 | 129-00-0 | | | | | | | | | |
| 19 | | benzo[a]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-033-00-9 | 200-280-6 | 56-55-3 | | | | | | | | | |
| 20 | | chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-048-00-0 | 205-923-4 | 218-01-9 | | | | | | | | | |
| 21 | | benzo[b]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-034-00-4 | 205-911-9 | 205-99-2 | | | | | | | | | |
| 22 | | benzo[k]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-036-00-5 | 205-916-6 | 207-08-9 | | | | | | | | | |
| 23 | | benzo[a]pyrene; benzo[def]chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-032-00-3 | 200-028-5 | 50-32-8 | | | | | | | | | |
| 24 | ● | indeno[123-cd]pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-893-2 | 193-39-5 | | | | | | | | | |
| 25 | | dibenz[a,h]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-041-00-2 | 200-181-8 | 53-70-3 | | | | | | | | | |
| 26 | ● | benzo[ghi]perylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-883-8 | 191-24-2 | | | | | | | | | |
| 27 | ● | PAHs (total) | | | | <0.8 | mg/kg | | <0.8 | mg/kg | <0.00008 % | | <LOD |
| | | | | | | | | | | Total: | 0.0648 % | | |

Key

| | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| ● | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Classification of sample: WLS5

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**WLS5**
Sample Depth:
**0.70 m**
Moisture content:
**12%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 12% Dry Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | arsenic { arsenic } | 033-001-00-X | 231-148-6 | 7440-38-2 | | 4.1 mg/kg | | 3.661 mg/kg | 0.000366 % | ✓ | |
| 2 | cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } | 048-001-00-5 | | | 1 | <0.2 mg/kg | | <0.2 mg/kg | <0.00002 % | | <**LOD** |
| 3 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 11 mg/kg | 1.462 | 14.355 mg/kg | 0.00144 % | ✓ | |
| 4 | chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex } | 024-017-00-8 | | | | <4 mg/kg | 1.923 | <7.692 mg/kg | <0.000769 % | | <**LOD** |
| 5 | copper { copper sulphate } | 029-004-00-0 | 231-847-6 | 7758-98-7 | | 30 mg/kg | 2.512 | 67.278 mg/kg | 0.00673 % | ✓ | |
| 6 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 50 mg/kg | | 44.643 mg/kg | 0.00446 % | ✓ | |
| 7 | mercury { mercury } | 080-001-00-0 | 231-106-7 | 7439-97-6 | | <0.3 mg/kg | | <0.3 mg/kg | <0.00003 % | | <**LOD** |
| 8 | nickel { nickel } | 028-002-00-7 | 231-111-4 | 7440-02-0 | 7 | 14 mg/kg | | 12.5 mg/kg | 0.00125 % | ✓ | |
| 9 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 mg/kg | 2.554 | <2.554 mg/kg | <0.000255 % | | <**LOD** |
| 10 | zinc { zinc oxide } | 030-013-00-7 | 215-222-5 | 1314-13-2 | | 40 mg/kg | 1.245 | 44.454 mg/kg | 0.00445 % | ✓ | |
| 11 | naphthalene | 601-052-00-2 | 202-049-5 | 91-20-3 | | <0.05 mg/kg | | <0.05 mg/kg | <0.000005 % | | <**LOD** |

| # | | Determinand | | | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CLP index number | EC Number | CAS Number | | | | | | | | | |
| 12 | ● | acenaphthylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-917-1 | 208-96-8 | | | | | | | | | |
| 13 | ● | acenaphthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-469-6 | 83-32-9 | | | | | | | | | |
| 14 | ● | fluorene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-695-5 | 86-73-7 | | | | | | | | | |
| 15 | ● | phenanthrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-581-5 | 85-01-8 | | | | | | | | | |
| 16 | ● | anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-371-1 | 120-12-7 | | | | | | | | | |
| 17 | ● | fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-912-4 | 206-44-0 | | | | | | | | | |
| 18 | ● | pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-927-3 | 129-00-0 | | | | | | | | | |
| 19 | | benzo[a]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-033-00-9 | 200-280-6 | 56-55-3 | | | | | | | | | |
| 20 | | chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-048-00-0 | 205-923-4 | 218-01-9 | | | | | | | | | |
| 21 | | benzo[b]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-034-00-4 | 205-911-9 | 205-99-2 | | | | | | | | | |
| 22 | | benzo[k]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-036-00-5 | 205-916-6 | 207-08-9 | | | | | | | | | |
| 23 | | benzo[a]pyrene; benzo[def]chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-032-00-3 | 200-028-5 | 50-32-8 | | | | | | | | | |
| 24 | ● | indeno[123-cd]pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-893-2 | 193-39-5 | | | | | | | | | |
| 25 | | dibenz[a,h]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-041-00-2 | 200-181-8 | 53-70-3 | | | | | | | | | |
| 26 | ● | benzo[ghi]perylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-883-8 | 191-24-2 | | | | | | | | | |
| 27 | ● | PAHs (total) | | | | <0.8 | mg/kg | | <0.8 | mg/kg | <0.00008 % | | <LOD |
| | | | | | | | | | | Total: | 0.0199 % | | |

Key

| | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| ● | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Classification of sample: WLS4

**Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

## Sample details

Sample Name:
**WLS4**
Sample Depth:
**0.90 m**
Moisture content:
**11%**
(dry weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

## Hazard properties

None identified

## Determinands

Moisture content: 11% Dry Weight Moisture Correction applied (MC)

| # | Determinand | CLP index number | EC Number | CAS Number | CLP Note | User entered data | Conv. Factor | Compound conc. | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | arsenic { arsenic } | 033-001-00-X | 231-148-6 | 7440-38-2 | | 9.8 mg/kg | | 8.829 mg/kg | 0.000883 % | ✓ | |
| 2 | cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } | 048-001-00-5 | | | 1 | 0.2 mg/kg | | 0.18 mg/kg | 0.000018 % | ✓ | |
| 3 | chromium in chromium(III) compounds { chromium(III) oxide } | | 215-160-9 | 1308-38-9 | | 12 mg/kg | 1.462 | 15.801 mg/kg | 0.00158 % | ✓ | |
| 4 | chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex } | 024-017-00-8 | | | | <4 mg/kg | 1.923 | <7.692 mg/kg | <0.000769 % | | <**LOD** |
| 5 | copper { copper sulphate } | 029-004-00-0 | 231-847-6 | 7758-98-7 | | 36 mg/kg | 2.512 | 81.461 mg/kg | 0.00815 % | ✓ | |
| 6 | lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } | 082-001-00-6 | | | 1 | 86 mg/kg | | 77.477 mg/kg | 0.00775 % | ✓ | |
| 7 | mercury { mercury } | 080-001-00-0 | 231-106-7 | 7439-97-6 | | <0.3 mg/kg | | <0.3 mg/kg | <0.00003 % | | <**LOD** |
| 8 | nickel { nickel } | 028-002-00-7 | 231-111-4 | 7440-02-0 | 7 | 13 mg/kg | | 11.712 mg/kg | 0.00117 % | ✓ | |
| 9 | selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } | 034-002-00-8 | | | | <1 mg/kg | 2.554 | <2.554 mg/kg | <0.000255 % | | <**LOD** |
| 10 | zinc { zinc oxide } | 030-013-00-7 | 215-222-5 | 1314-13-2 | | 63 mg/kg | 1.245 | 70.646 mg/kg | 0.00706 % | ✓ | |
| 11 | benzene | 601-020-00-8 | 200-753-7 | 71-43-2 | | <1 mg/kg | | <1 mg/kg | <0.0001 % | | <**LOD** |

| # | | Determinand | | | CLP Note | User entered data | | Conv. Factor | Compound conc. | | Classification value | MC Applied | Conc. Not Used |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CLP index number | EC Number | CAS Number | | | | | | | | | |
| 12 | | toluene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-021-00-3 | 203-625-9 | 108-88-3 | | | | | | | | | |
| 13 | ● | ethylbenzene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-023-00-4 | 202-849-4 | 100-41-4 | | | | | | | | | |
| 14 | | xylene | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 601-022-00-9 | 202-422-2 [1]<br>203-396-5 [2]<br>203-576-3 [3]<br>215-535-7 [4] | 95-47-6 [1]<br>106-42-3 [2]<br>108-38-3 [3]<br>1330-20-7 [4] | | | | | | | | | |
| 15 | | tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane | | | | <1 | mg/kg | | <1 | mg/kg | <0.0001 % | | <LOD |
| | | 603-181-00-X | 216-653-1 | 1634-04-4 | | | | | | | | | |
| 16 | ● | TPH (C6 to C40) petroleum group | | | | <20 | mg/kg | | <20 | mg/kg | <0.002 % | | <LOD |
| | | | | TPH | | | | | | | | | |
| 17 | | naphthalene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-052-00-2 | 202-049-5 | 91-20-3 | | | | | | | | | |
| 18 | ● | acenaphthylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-917-1 | 208-96-8 | | | | | | | | | |
| 19 | ● | acenaphthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-469-6 | 83-32-9 | | | | | | | | | |
| 20 | ● | fluorene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-695-5 | 86-73-7 | | | | | | | | | |
| 21 | ● | phenanthrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 201-581-5 | 85-01-8 | | | | | | | | | |
| 22 | ● | anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-371-1 | 120-12-7 | | | | | | | | | |
| 23 | ● | fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-912-4 | 206-44-0 | | | | | | | | | |
| 24 | ● | pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 204-927-3 | 129-00-0 | | | | | | | | | |
| 25 | | benzo[a]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-033-00-9 | 200-280-6 | 56-55-3 | | | | | | | | | |
| 26 | | chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-048-00-0 | 205-923-4 | 218-01-9 | | | | | | | | | |
| 27 | | benzo[b]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-034-00-4 | 205-911-9 | 205-99-2 | | | | | | | | | |
| 28 | | benzo[k]fluoranthene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-036-00-5 | 205-916-6 | 207-08-9 | | | | | | | | | |
| 29 | | benzo[a]pyrene; benzo[def]chrysene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-032-00-3 | 200-028-5 | 50-32-8 | | | | | | | | | |
| 30 | ● | indeno[123-cd]pyrene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-893-2 | 193-39-5 | | | | | | | | | |
| 31 | | dibenz[a,h]anthracene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | 601-041-00-2 | 200-181-8 | 53-70-3 | | | | | | | | | |
| 32 | ● | benzo[ghi]perylene | | | | <0.05 | mg/kg | | <0.05 | mg/kg | <0.000005 % | | <LOD |
| | | | 205-883-8 | 191-24-2 | | | | | | | | | |
| 33 | ● | PAHs (total) | | | | <0.8 | mg/kg | | <0.8 | mg/kg | <0.00008 % | | <LOD |
| | | | | | | | | | | Total: | 0.0303 % | | |

Key

| | |
|---|---|
| | User supplied data |
| | Determinand values ignored for classification, see column 'Conc. Not Used' for reason |
| ● | Determinand defined or amended by HazWasteOnline (see Appendix A) |
| | Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration |
| **<LOD** | Below limit of detection |
| CLP: Note 1 | Only the metal concentration has been used for classification |

## Appendix A: Classifier defined and non CLP determinands

**arsenic** (EC Number: 231-148-6, CAS Number: 7440-38-2)

CLP index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex**

CLP index number: 048-001-00-5
Description/Comments: Worst Case: IARC considers cadmium compounds Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

- **lead compounds with the exception of those specified elsewhere in this Annex (worst case)**

CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 1; Carcinogenic to humans; Lead REACH Consortium considers some lead compounds Carcinogenic category 1A
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **PAHs (total)**

Description/Comments: Worst case scenario combining risk phrases and substance specific thresholds from benzo[a]pyrene (CLP# 601-032-00-3) and benzo[a]anthracene (CLP# 601-033-00-9)
Data source: 2008/1272/EC – Table 3.2 of Annex VI of regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures and 2009/790/EC Annex IV – Annex IV of regulation 2009/790/EC - 1st Adaptation to Technical Progress for European Regulation 1272/2008
Data source date: 16 Dec 2008
Hazard Statements: Repr. 1B H360FD , Aquatic Chronic 1 H410 (M=100), Aquatic Acute 1 H400 (M=100), Muta. 1B H340 , Carc. 1B H350 >= 0.01 %, Carc. 1B H350 , Skin Sens. 1 H317

## Appendix B: Rationale for selection of metal species

**arsenic {arsenic}**

Standard

**cadmium {cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex}**

Standard

**chromium in chromium(III) compounds {chromium(III) oxide}**

Standard

**chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}**

Standard

**copper {copper sulphate}**

Worst Case

**lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}**

Worst Case

**mercury {mercury}**

Standard

**nickel {nickel}**

Standard

**selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}**

Standard

**zinc {zinc oxide}**

Most probable compound

## Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.115.3847.7849 (25 Apr 2019)
HazWasteOnline Database: 2019.115.3847.7849 (25 Apr 2019)

This classification utilises the following guidance and legislation:
**WM3 v1.1 - Waste Classification** - 1st Edition v1.1 - May 2018
**CLP Regulation** - Regulation 1272/2008/EC of 16 December 2008
**1st ATP** - Regulation 790/2009/EC of 10 August 2009
**2nd ATP** - Regulation 286/2011/EC of 10 March 2011
**3rd ATP** - Regulation 618/2012/EU of 10 July 2012
**4th ATP** - Regulation 487/2013/EU of 8 May 2013
**Correction to 1st ATP** - Regulation 758/2013/EU of 7 August 2013
**5th ATP** - Regulation 944/2013/EU of 2 October 2013
**6th ATP** - Regulation 605/2014/EU of 5 June 2014
**WFD Annex III replacement** - Regulation 1357/2014/EU of 18 December 2014
**Revised List of Wastes 2014** - Decision 2014/955/EU of 18 December 2014
**7th ATP** - Regulation 2015/1221/EU of 24 July 2015
**8th ATP** - Regulation (EU) 2016/918 of 19 May 2016
**9th ATP** - Regulation (EU) 2016/1179 of 19 July 2016
**10th ATP** - Regulation (EU) 2017/776 of 4 May 2017
**HP14 amendment** - Regulation (EU) 2017/997 of 8 June 2017
**13th ATP** - Regulation (EU) 2018/1480 of 4 October 2018
**POPs Regulation 2004** - Regulation 850/2004/EC of 29 April 2004
**1st ATP to POPs Regulation** - Regulation 756/2010/EU of 24 August 2010
**2nd ATP to POPs Regulation** - Regulation 757/2010/EU of 24 August 2010

# APPENDIX E

## Desk Study Results

# Historical Mapping Legends

## Ordnance Survey County Series 1:10,560

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
·285 Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. Rural District Boundary
Civil Parish Boundary

## Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Pylon
Electricity Transmission Line
Sloping Masonry
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
Standard Gauge Single Track
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

| | | | |
|---|---|---|---|
| BP, BS | Boundary Post or Stone | Pol Sta | Police Station |
| Ch | Church | PO | Post Office |
| CH | Club House | PC | Public Convenience |
| F E Sta | Fire Engine Station | PH | Public House |
| FB | Foot Bridge | SB | Signal Box |
| Fn | Fountain | Spr | Spring |
| GP | Guide Post | TCB | Telephone Call Box |
| MP | Mile Post | TCP | Telephone Call Post |
| MS | Mile Stone | W | Well |

## 1:10,000 Raster Mapping

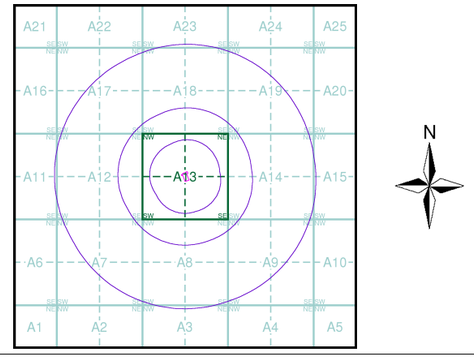
Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Mud
Sand
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

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## Historical Mapping & Photography included:

| Mapping Type | Scale | Date | Pg |
|---|---|---|---|
| Denbighshire | 1:10,560 | 1879 | 2 |
| Cheshire | 1:10,560 | 1881 | 3 |
| Denbighshire | 1:10,560 | 1899 - 1900 | 4 |
| Flintshire | 1:10,560 | 1900 | 5 |
| Denbighshire | 1:10,560 | 1914 - 1915 | 6 |
| Denbighshire | 1:10,560 | 1938 - 1954 | 7 |
| Denbighshire | 1:10,560 | 1938 - 1954 | 8 |
| Denbighshire | 1:10,560 | 1954 | 9 |
| Ordnance Survey Plan | 1:10,000 | 1964 | 10 |
| Ordnance Survey Plan | 1:10,000 | 1968 | 11 |
| Ordnance Survey Plan | 1:10,000 | 1974 - 1979 | 12 |
| Ordnance Survey Plan | 1:10,000 | 1981 - 1983 | 13 |
| Ordnance Survey Plan | 1:10,000 | 1988 | 14 |
| Ordnance Survey Plan | 1:10,000 | 1990 - 1993 | 15 |
| Ordnance Survey Plan | 1:10,000 | 1992 | 16 |
| 10K Raster Mapping | 1:10,000 | 2000 | 17 |
| 10K Raster Mapping | 1:10,000 | 2006 | 18 |
| VectorMap Local | 1:10,000 | 2019 | 19 |

## Historical Map - Slice A



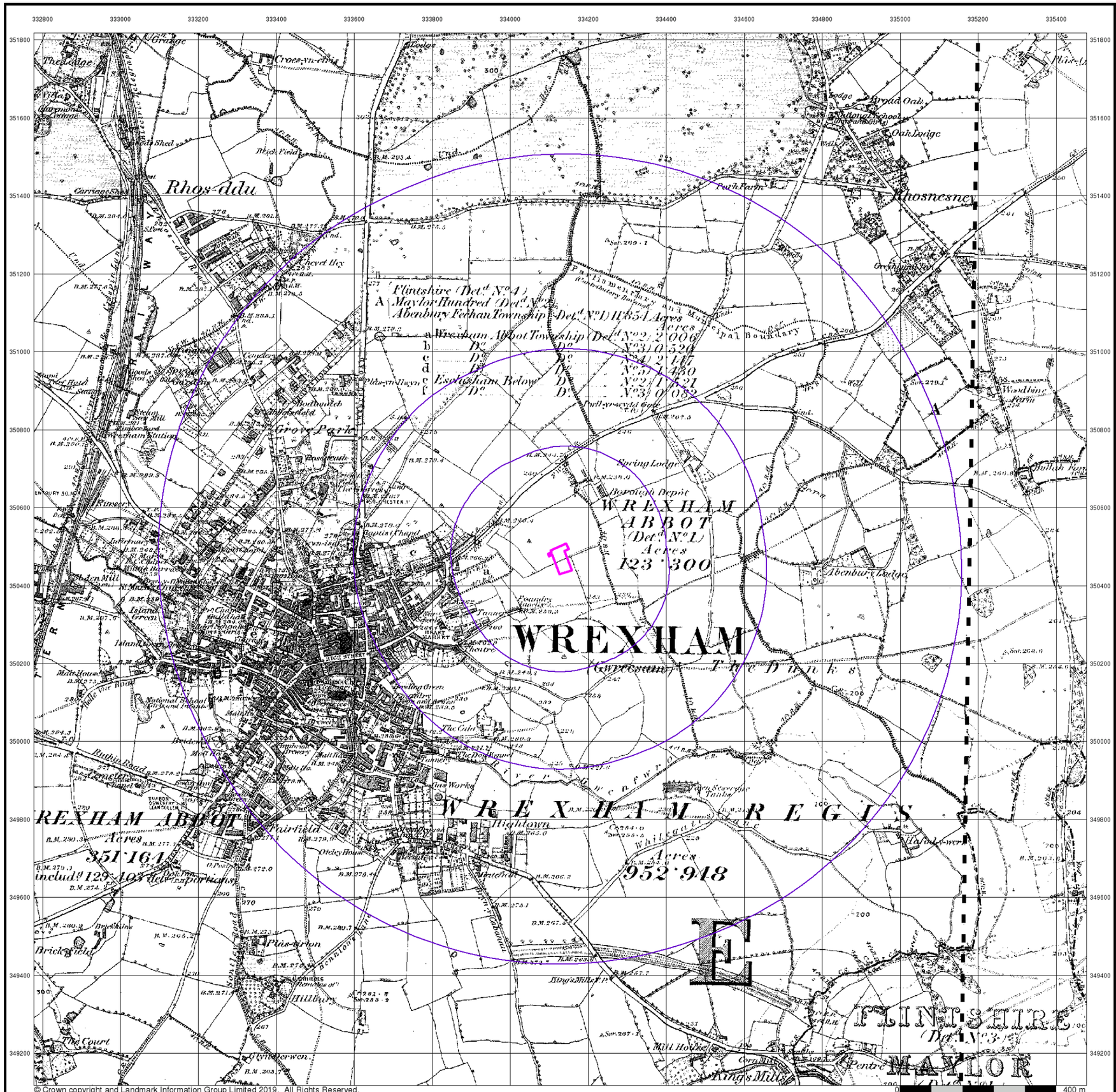

## Order Details

Order Number: 197119448_1_1
Customer Ref: JN1246
National Grid Reference: 334130, 350470
Slice: A
Site Area (Ha): 0.25
Search Buffer (m): 1000

## Site Details

JN1246, Tesco, Wrexham


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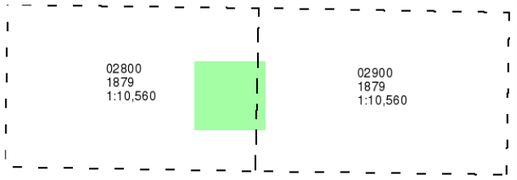
## Denbighshire

## Published 1879

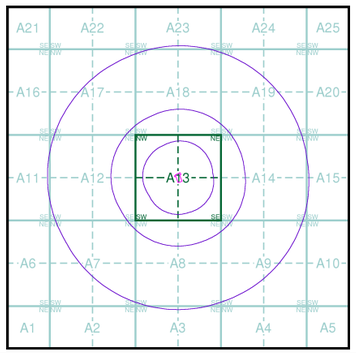
## Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A



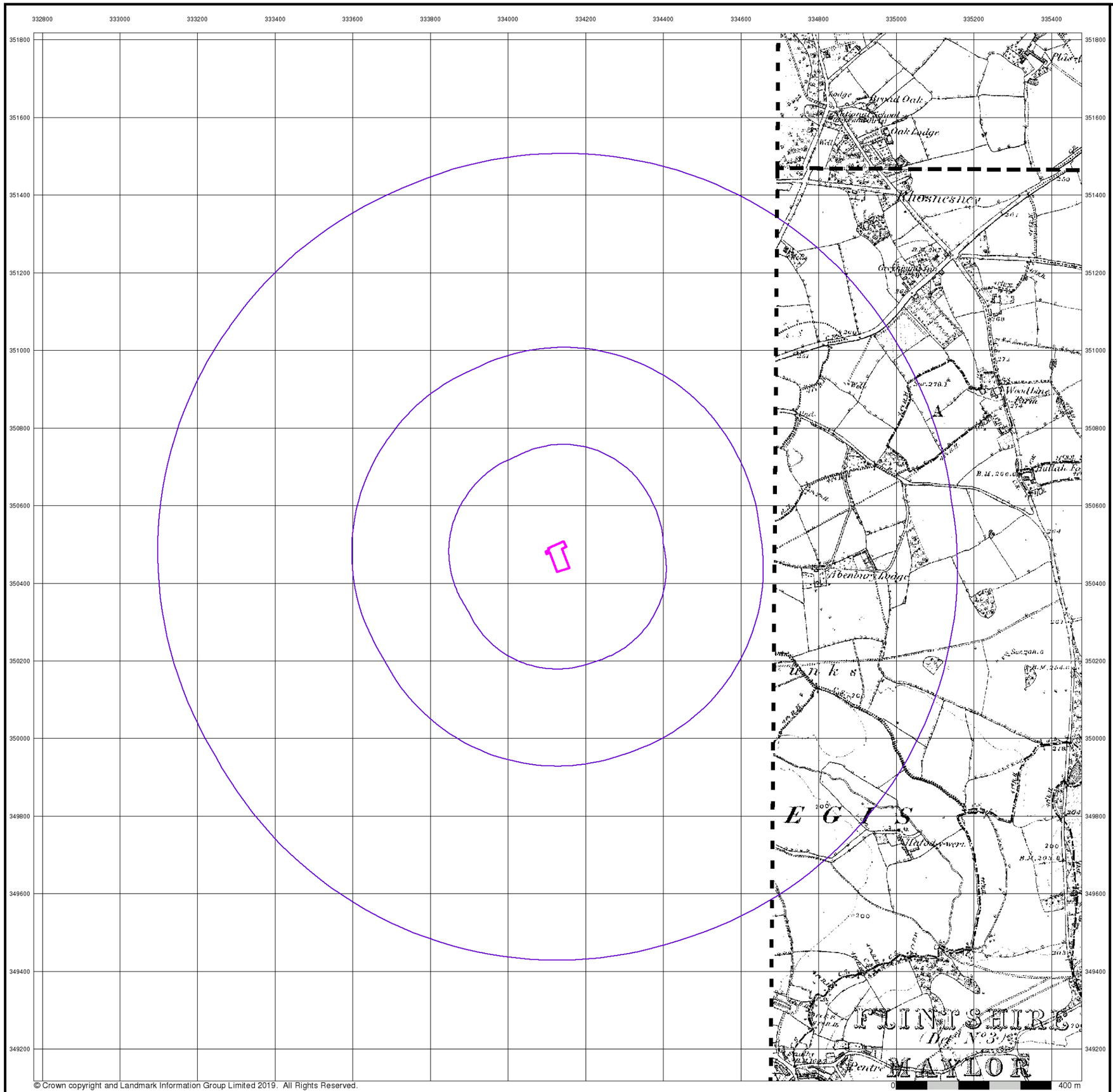

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| Slice: | A |
| Site Area (Ha): | 0.25 |
| Search Buffer (m): | 1000 |

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## Cheshire

## Published 1881

## Source map scale - 1:10,560

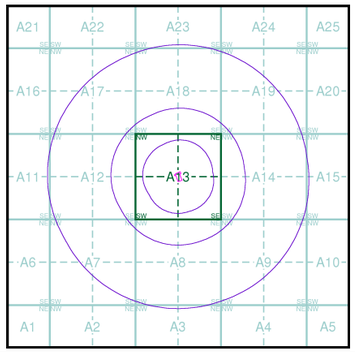
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)

05300
1881
1:10,560

05900
1881
1:10,560

## Historical Map - Slice A



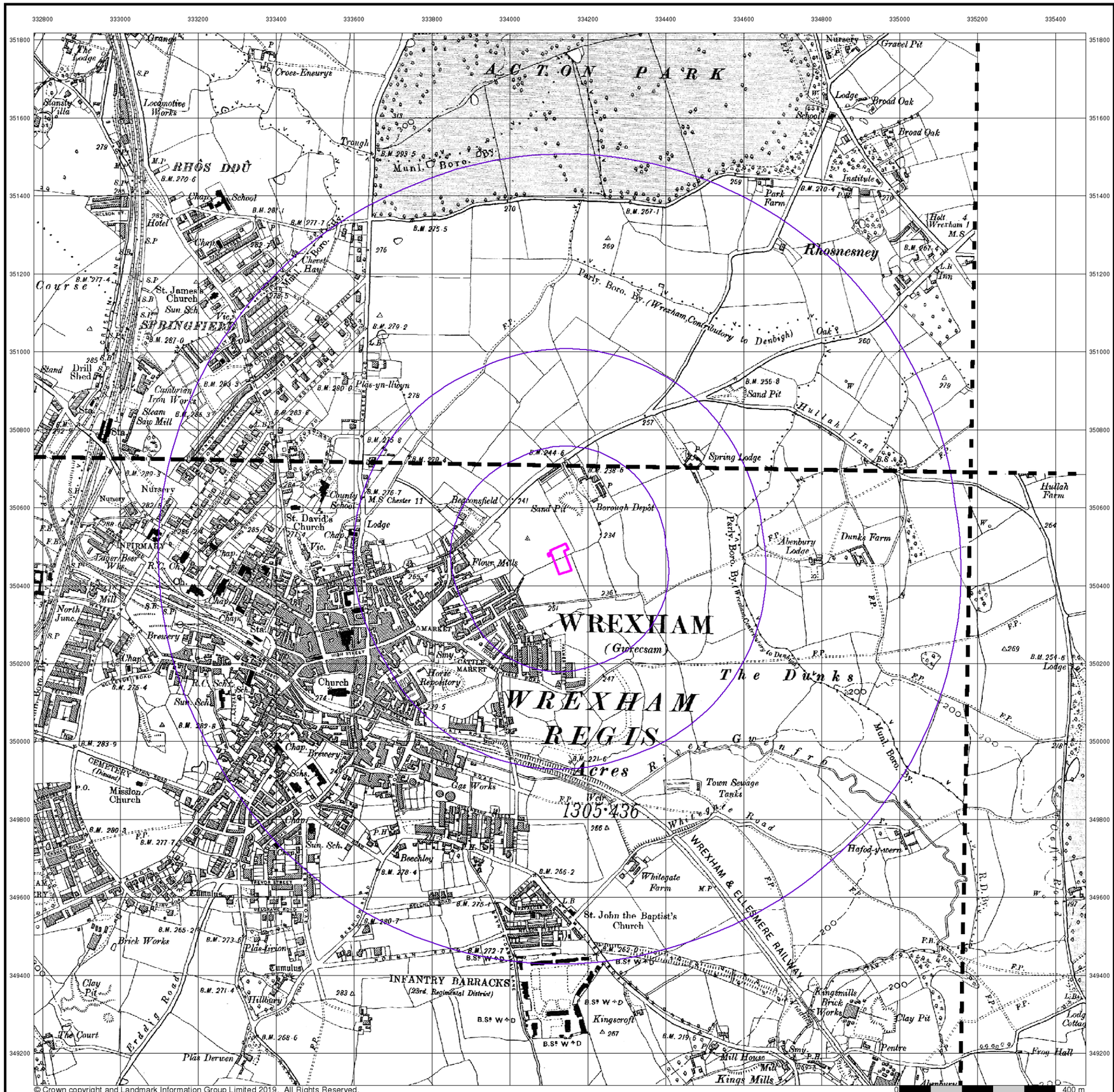

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| National Grid Reference: | 334130, 350470 |
| Slice: | A |
| Site Area (Ha): | 0.25 |
| Search Buffer (m): | 1000 |

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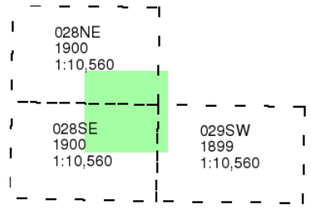
## Denbighshire

## Published 1899 - 1900

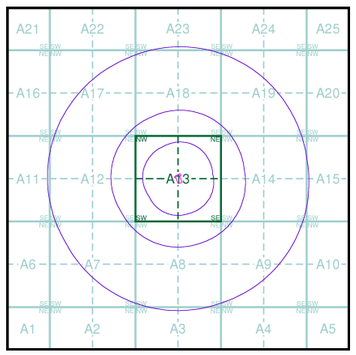
## Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A



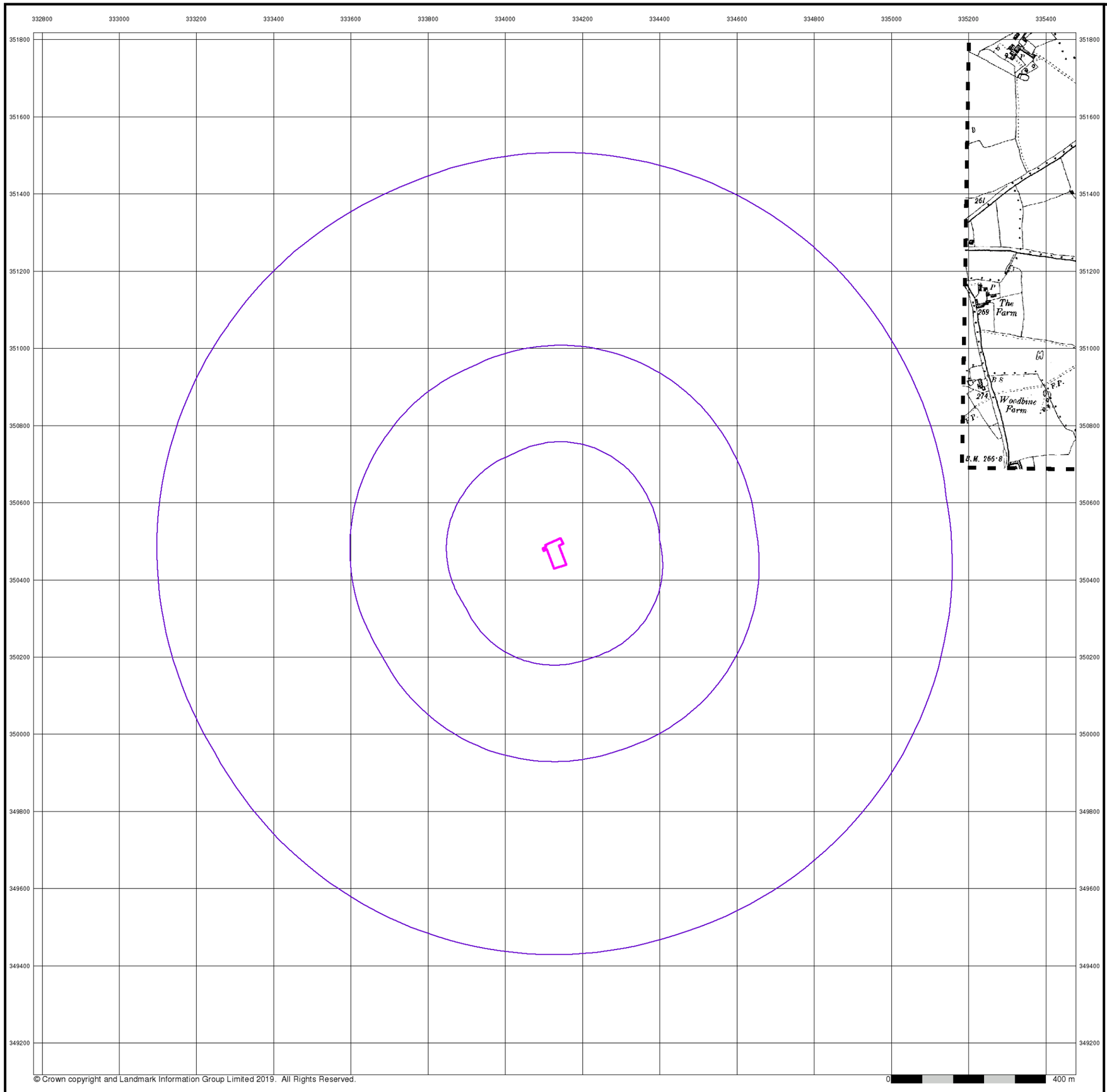

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| National Grid Reference: | 334130, 350470 |
| Slice: | A |
| Site Area (Ha): | 0.25 |
| Search Buffer (m): | 1000 |

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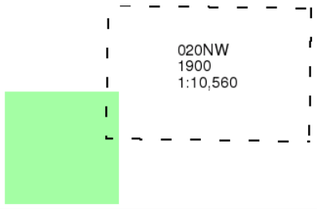
## Flintshire

## Published 1900

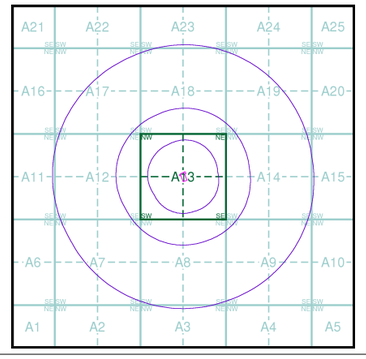
## Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A




## Order Details

| | |
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| National Grid Reference: | 334130, 350470 |
| Slice: | A |
| Site Area (Ha): | 0.25 |
| Search Buffer (m): | 1000 |

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