Lidl UK GmbH

Geo-Environmental Investigation Report

Proposed Foodstore, Wombwell, Barnsley

September 2015

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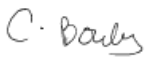
Prepared By



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A Factual Information

1 Introduction

1.1 Instruction

1.1.1 Opus International Consultants (Opus) were instructed by Lidl UK GmbH (The Client) to carry out Geo-Environmental Investigation works at a currently derelict site in Wombwell, Barnsley.

1.1.2 Lidl UK GmbH propose to develop the site for a low rise retail end use, comprising a food store in the eastern part of site, car parking to the west and a service yard to the south. An access road will be developed on the northern boundary of the site, leading out onto Bradberry Balk Lane. Development proposals are shown on the appended **Proposed Site Plan** produced by HTC Architects (**ref 1849/10, rev H, dated May 2015**).

1.1.3 A 'Preliminary Appraisal Report (Desk Study)' was previously undertaken at the site in June 2015. The report was undertaken by Sirius Geotechnical and Environmental Ltd (Sirius) and is detailed in their report referenced C6518 dated June 2015.

1.2 Objectives

1.2.1 The objectives of this Geo-Environmental Investigation were to obtain information relating to the ground conditions beneath the site in order to determine suitable methods of design and construction for foundations and floor slabs for the proposed development, and to identify any ground contamination in order to enable formulation of an appropriate remediation strategy, if required.

1.3 Limitations

1.3.1 This report has been prepared by Opus with all reasonable skill, care and attention within the terms of the Contract with the Client, Lidl UK GmbH, and taking account of the information made available by the Client, as well as the manpower and resources devoted to it by agreement with the Client. Opus disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above Contract.

1.3.2 This report has been produced on behalf of the Client and no responsibility is accepted to any Third Party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of Opus. If any unauthorised Third Party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

1.3.3 Whilst this report may express an opinion on the possible configuration of strata, groundwater, ground gas and contaminants between or beyond exploratory hole positions or on the possible presence of features based on either visual, verbal or published evidence, this is for guidance only, and no liability can be accepted for its accuracy.

1.3.4 The comments on groundwater and ground gas conditions are based on observations made at the time of the investigation. It should be noted, however, that groundwater levels and ground gas concentrations may vary from those reported due to seasonal or other effects.

1.3.5 The exploratory holes were positioned in order to provide site coverage and to target any potential sources of contamination identified by Opus from the available desk study information and on-site observations. The positions were located approximately and no guarantee can be given as to their accuracy on the appended site plans.

1.3.6 The site plans appended to this report should not be used for scaling purposes.

2 The Site

2.1 Location and Access

2.1.1 The site is approximately 1.3 hectares in area and centred on National Grid Reference 439360, 403800. The site location, off Bradberry Balk Lane within the north of Wombwell, Barnsley is shown on the appended Site Location Plan (Drawing No. J-B0914.00/401).

2.1.2 Access to the site can be gained off Bradberry Balk Lane, which is located directly to the north of the site, via a 4m wooden gate.

2.2 Site Description

2.2.1 The site forms a triangular shaped plot, its base running north-west to south-east sub-parallel to a public footpath along a former canal.

2.2.2 The site encompasses a large open field, largely surrounded by mature trees, currently used for agricultural purposes.

2.2.3 The site is bounded to the north-west by Bradberry Balk Lane, to the north-east by a footpath, and to the south partially by Mitchells Way and partially by a footpath which links to Mitchells Way. Land-use within the wider area is a mixture of retail, residential and industrial/commercial units.

2.2.4 Sirius describe variation in elevation of 1-2 m from east to west across the site. Reference to supplied topographical information however indicates that ground levels slope down from west to east from approximately 42.5m in the north-west to a lowest level of around 35.00m in the east. i.e. by of the order of 7.5m.

2.2.5 No invasive plant species are noted on site, though a potential stand of Japanese Knotweed mentioned in the Desk Study conducted by Sirius, was recorded immediately north of the site. An ecological survey was recommended by Sirius to confirm this.

3 Previous Reports

3.1 Introduction

3.1.1 A 'Preliminary Appraisal Report (Desk Study)' was undertaken by Sirius Geotechnical and Environmental Ltd (Sirius) in June 2015 and contained sections on Site History, Anticipated Ground Conditions, Mining and Quarrying, Foundations, Contamination, Gas Risk and Further Works. An Envirocheck Report was also obtained as part of the previous desk study.

3.1.2 The salient points from the above report are summarised in the following sections.

3.2 Site History

3.2.1 Maps from the period 1854 to 1907 (1:2,500 and 1:10,560 scales) show the site to be an undeveloped agricultural field during this period. A series of allotment gardens with associated outbuildings had been established in the west by 1892. A north-west to south-east trending canal was recorded along the site's eastern boundary. A glass bottle works and colliery was present approximately 220m to the north and two additional collieries are recorded by 1894, to the north-west and north-east, 350m and between 500m and 1000m from the site, respectively.

3.2.2 The majority of the allotment outbuildings are no longer shown on plans dated between 1931 and 1956 (1:2,500, 1:10,000, and 1:10,560 scales). Coke ovens were recorded 120m to the east and a garage 220m to the north-west during this time. Two refuse and slag heap areas were recorded between approximately 250m and 500m, to the east of site. A sand and gravel pit was also recorded 450m east/south-east of the site on the 1948 map.

3.2.3 On the 1970 to 1985 maps (1:1,250, 1:2,500 and 1:10,000 scales), the allotments and associated outbuildings were no longer shown and the site formed an agricultural field from 1982. The canal to the east had been infilled by 1982 with trees and a footpath shown on its previous course. Part of the previous canal to the north was also labelled as a drain. An engineering works, referred to later as a works with a travelling crane, was recorded approximately 80m to the north-west of the site.

3.2.4 The plans dated 1989 to 1994 (1:1,250 and 1:10,000 scales) records the existing roads to the south-west and north of the site, Mitchells Way and Bradberry Balk Lane respectively, joining at a roundabout beyond the north-west corner, later referred to on OS maps as White Rose Roundabout.

3.2.5 Most recent 2006 to 2015 (1:10,000 scale) maps show no significant changes to the site, though a shaft is recorded approximately 260m to the north.

3.3 Geology, Hydrogeology and Hydrology

Recorded Geology

3.3.1 No Made Ground was indicated on the site, though Made Ground deposits were considered by Sirius as *"likely to be locally encountered within the western portion of the site, owing to the presence of a number of former outbuildings associated with the allotments."* Made

Ground, the majority of which was referred to as colliery waste by the BGS, is recorded within 1km to the north, east, north-east and north-west of site.

3.3.2 Superficial deposits are not recorded beneath the site, although the existence of alluvial deposits approximately 100m north of the site was noted by Sirius. These deposits were assumed to be *"soft to firm unconsolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel."*

3.3.3 The site was recorded as being underlain by bedrock of the Oaks Rock Sandstone, described as *"a brown, yellow or light yellow fine grained, often flaggy, bedded sandstone"*.

3.3.4 A borehole recorded by BGS located 39m to the north-east of the site recorded Made Ground to 1.15m over firm clay with mudstone and sandstone fragments to 3.80m begl, underlain by clayey sand with sandstone gravel fragments to 6.70m begl. This is assessed to represent the weathered bedrock profile.

3.3.5 A north-west to south-east trending fault is conjectured to cross the northern corner of the site, downthrowing strata to the north-east

Hydrogeology

3.3.6 The Environment Agency classify the bedrock strata as a Secondary A Aquifer, defined as '*permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers*'.

3.3.7 The site is not recorded as being located within a Groundwater Source Protection Zone.

3.3.8 No Licensed Groundwater Abstractions are recorded within 1km of the site.

Hydrology

3.3.9 Surface watercourses, both unclassified/unnamed and classified according to the EA GQA scheme that are located within the near vicinity of the site are listed in Table 3.1.

Table 3.1 Hydrology

Feature	Location Relative to Site
River Dove (EA GQA Classified)	Approx. 440m to the north
Secondary river (Unnamed) – corresponding to the infilled canal and drain	Approx. 7m to the north
Tertiary river (Unnamed)	Approx. 141m to the north

3.3.10 A revoked abstraction license is recorded within 1km of the site, located approximately 736m to the east for general industrial use by British Coal.

3.3.11 The site is not recorded as lying within an indicative flood plain and not considered to be at risk of flooding. It should be noted however that this should not be taken as a detailed flood risk assessment.

3.4 Environmental Considerations

3.4.1 The 'Envirocheck' database report contained within the Sirius report comprises a summary of statutory data held on public registers and identifies potential sources of contamination on the site and within a search radius of 1km. In addition, the report identifies potential receptors of contamination on the site and within 1km. The salient information is summarised as follows;

- There are eight discharge consents within 1km of the site boundary. The nearest is located approximately 232m to the north-west of the site and licensed to British Coal Corporation, South Yorks Group in relation to sewage/trade discharges to a tributary of the River Don. This licence was revoked in November 1994.
- There are no recorded Integrated Pollution Control Permits within 1km of the site boundary.
- There are eight Local Authority Pollution Prevention and Controls permits recorded within 1000m of the site boundary, two of which are within 250m. The nearest is located approximately 133m to the north-west of the site and relates to 'Billington Structures'.
- There are five recorded Pollution Incidents to Controlled Waters within 1000m of the site boundary, the closest of which is located approximately 360m to the north-west and relates to a petrol pollutant in a highway/car park.
- There are no BGS Recorded Landfill Sites within 1km of the site boundary.
- There are three Historical Landfill Sites recorded within 1km of the site boundary, the closest being located 415m to the south-east and referred to as 'North Ferriby Tip' (Landfill). First and last input dates are not supplied.
- There are no Local Authority ore Registered landfills located within 500m of the site.
- There are two Licensed Waste Management Facilities within 1000m of the site boundary. The nearest is located approximately 275m to the north-west, relating to Mitchell's Enterprise Park and operated by G B Cullet Ltd. The license was issued in February 2013 although no expiration date is supplied.
- There are no Control of Major Accident Hazards (COMAH) sites within 1km of the site boundary.
- The site is considered to be in an area where there is no or very low potential for collapsible and compressible ground, landslides, running sand or shrinking or swelling clays.
- There are twenty three Contemporary Trade Directory entries within 250m of the site and eighty seven within 1000m. Of those within 250m, eight are active. The nearest active entry is located approximately 119m to the north of the site, and relates to 'Bespoke Glass Fibre Solutions'. Further active entries include a reclamation of waste products entity (161m north), a blinds, awnings & canopies entity (165m north), a commercial printer entity (181m north) and a glass fibre manufacturer entity (181m north).
- There are two Fuel Station entries recorded within 1km of the site, one within 250m relating to 'Dixon' on Barnsley Road approximately 212m to the north-west of the site although its status is Obsolete. The second entry, 'Auto Trade Centre' fuel station, is located approximately 907m to the north-west of the site and its status is also recorded as being Obsolete.

3.5 Mining

3.5.1 A Coal Authority (CA) mining report from 19th May 2015 was used in conjunction with BGS data to provide information on previous mining and quarrying. Results are summarised in Table 3.2.

Table 3.2 Past Mining and Quarrying

Feature	Key Information
Productive Seams	No seams shown to outcrop directly under the site. The Wheatworth Seam is recorded to outcrop approximately 50m east of the site, but dipping away from the site. The shallowest seam recorded beneath the site is the Swindon Pottery coal seam which is recorded immediately beneath the Oaks Rock. The seam is recorded as 'thin' and likely to be at significant depth beneath the site. The Newhill coal seam is recorded 25m below the Swindon Pottery seam and is recorded as being between 0.30m and 0.76m thick. The Swinton Pottery Coal is recorded as consisting of interbedded bands of coal and fireclay. The seam, which was mined for the underlying seatearths used in manufacturing pottery, was worked in localised areas in the Swinton / Newhill areas of Rotherham, rather than the coal. The coal is generally noted to be of poor quality.
Mining Records	The property is recorded as being 'in the likely zone of influence from workings in eight seams of coal at 190m to 580m depth, last worked in 1978. Any ground movement from these workings should have stopped by now. The site is not in the likely zone of influence of any present underground coal workings.'
Mine Entries	None shown within 20 metres of the boundary of the site.
Opencast Coal Mining	None were stated within 200m of the site.
Quarries	None were identified within 250m of the site.
Non-coal mining	Risk associated with non-coal mining stated as "highly unlikely" by the Envirocheck report.

3.6 Radon

3.6.1 No radon protection measures were deemed necessary in the construction of new buildings, determined by 'BRE 211 – Radon: Guidance on the protective measures for new dwellings', the National Radiological Protection Board's (NRPB) 'Radon Atlas of England and Wales' and the Envirocheck report.

4 Preliminary Conceptual Site Model

4.1 Potential Sources of Contamination

4.1.1 The following potential **on site** sources of ground contamination have been identified:

- Potential metal, PAH, TPH and asbestos contamination in Made Ground across the site;
- Potential ground gas generation from organic materials within Made Ground on site as well as natural strata;
- Potential for elevated water-soluble sulphate concentrations in soils across site.

4.1.2 The following potential **off-site** sources have been identified.

- Potential migration of leachable contaminants in Made Ground from adjoining areas, particular backfill to the former canal beyond the north-eastern site boundary. Contaminants may include heavy metals, PAH's and TPH;
- Potential migration of ground gases from organic materials within Made Ground off site including the former canal backfill.

4.2 Receptors of Contamination and Migration Pathways

4.2.1 Receptors are defined as human or non-human organisms that have the potential to experience adverse effects from direct or indirect exposure to contaminated material.

4.2.2 Migration pathways are defined as the courses chemicals take from a source to an exposed organism or receptor. The exposure pathway can be direct (i.e. stays within the same exposure media) or indirect where transport from one medium to another takes place.

4.2.3 The following potential human health and environmental receptors have been identified:

- Future Site Users (e.g. customers & staff)
- Construction and Maintenance Workers
- Groundwater in underlying Secondary 'A' Aquifer
- Buried concrete and plastics (e.g. concrete foundations and water supply pipes)

4.2.4 The following potential migration pathways have been identified:

- **Inhalation**
  Breathing dust and vapours from contaminated soil and groundwater in outdoor air. Vapours can also migrate into buildings resulting in inhalation by the occupants.
- **Ingestion**
  Eating and swallowing of contaminated soil either by deliberate consumption, indirectly by eating or smoking with dirty hands or by ingestion of fugitive dust.

- **Dermal Contact**
  Direct contact with contaminated soil and groundwater, causing skin conditions such as dermatitis etc. Certain contaminants can be absorbed into the body through the skin or enter directly through open cuts or abrasions.
- **Leaching**
  Infiltration of water through soil can leach out soluble contaminants resulting in groundwater pollution.
- **Migration of Contaminated Groundwater**
  Contaminated groundwater can migrate laterally or vertically dependent on permeability, preferential pathways, man-made voids etc.
- **Migration of Ground Gas**
  Ground gases can migrate laterally or vertically through permeable or voided ground and accumulate within unprotected buildings.
- **Aggressive Attack**
  Building materials can be damaged by direct contact with aggressive ground conditions, for example sulphate attack on concrete and hydrocarbon attack on plastics.

4.3 Pollutant Linkages and Environmental Risks

4.3.1 The preliminary **Source-Pathway-Receptor** relationships identified for the site bearing in mind the proposed redevelopment are summarised as follows:

Table 4.1 Preliminary Source Pathway-Receptor Relationships

Source Material/Activity	Potential Contaminant	Pathways	Receptor	Risk
Made Ground, topsoil, shallow natural soils	Metals. Asbestos PAHs TPHs Pesticides	Inhalation Ingestion Dermal contact	Future Customers and Staff Construction Workers Maintenance Workers	**Low to Medium**
			Adjacent Site Users	**Low**
	Metals TPH PAHs	Migration of mobile contaminants in permeable strata	Groundwater in underlying Secondary A Aquifer	**Low**
	Water-soluble sulphate	Direct Contact	Buried Concrete	**Low**
	Hydrocarbons	Direct Contact	Water Supply Pipes	**Low**
Backfilled canal, superficial deposits to the north, mine gas	Methane Carbon Dioxide Carbon Monoxide Hydrogen Sulphide	Gas migration through permeable strata and accumulation inside buildings	Future Customers Lidl Staff Construction Workers Maintenance Workers	**Low**

5 Investigation Methodology

5.1 Objectives

5.1.1 The objectives of this Geo-Environmental Investigation were to obtain information relating to the ground conditions beneath the site in order to determine suitable methods of design and construction for foundations, floor slabs and car parking for the proposed development, and to identify any ground contamination in order to enable formulation of an appropriate remediation strategy for the proposed development if necessary.

5.2 Clearance of Underground Services

5.2.1 Prior to commencing the site works, Opus were provided with utilities information by the Client. The exploratory holes were then positioned in locations to ensure that no 'known' services were struck during the works. As an extra precaution, all exploratory hole locations were scanned by Opus using a Cable Avoidance Tool (CAT).

5.3 Exploratory Holes

5.3.1 Eight window sample boreholes (WS01-WS08) were advanced across the site using a small, tracked, light percussion window sampling rig, on 14th July 2015. Seven trial pits (TP01-TP07) were advanced, including two for soakaway tests, using a JCB 3CX on the 15th July 2015.

5.3.2 All exploratory holes were located within soft areas of ground at ground level, away from any hardstanding.

5.3.3 Combined ground gas and groundwater monitoring wells were installed in window sample holes WS01, WS02, WS04, WS05, WS07 and WS08. The wells were constructed using 50mm HDPE plain pipe in a bentonite seal from ground level to the depth as specified in **Appendix 'A'** and 50mm HDPE slotted pipe in a gravel surround for the remaining depth of the window sample borehole. The well was fitted with a gas tap assembly at ground level suitable for connection to proprietary gas monitoring equipment and a lockable cover at ground level to provide protection. The remaining window sample holes were backfilled with arisings and reinstated at surface where appropriate.

5.3.4 The approximate locations of exploratory holes are shown on the appended **Exploratory Hole Location Plan (Drawing No. J-B0914.00_402_R0)**.

5.3.5 The rationale for the positioning of the exploratory holes is summarised below:

Table 5.1 Exploratory Hole Rationale

Exploratory Hole	Rationale
WS01	Provide site coverage
WS02	Provide site coverage
WS03	Provide site coverage
WS04	Located within proposed store footprint

Exploratory Hole	Rationale
WS05	Located within proposed store footprint
WS06	Provide site coverage
WS07	Provide site coverage
WS08	Provide site coverage
TP01	Provide site coverage
TP02	Located within proposed store footprint
TP03	Located within proposed store footprint
TP04	Provide site coverage
TP05	Provide site coverage
SA01	Soakaway test – outside proposed building footprint
SA02	Soakaway test – outside proposed building footprint

5.4 Logging and Sampling

5.4.1 Engineers' logs of the strata encountered in the window sample holes were developed in accordance with BS EN ISO 14688 and copies are presented as **Appendix 'A'**.

5.4.2 Standard Penetration Tests (SPT's) were taken at regular 1.0m intervals and at End of Hole (EOH) within the window sample boreholes to provide 'N' values for empirical assessment of strength and density parameters of the strata.

5.4.3 In the window sample holes, disturbed soil samples were taken at selected depths and in the trial pit, both disturbed and bulk samples were obtained. All samples were placed in appropriate containers and submitted for chemical and geotechnical laboratory testing.

5.5 Soakaway Testing

5.5.1 Soakaway testing was undertaken within SA01 and SA02 in general accordance with the methodology described within BRE Digest 365 – Soakaway Design. Testing was limited however, to a single test at each position on the day of the trial pitting. Monitoring was completed during the day and a return visit was made to dip the water level on SA02 on the following day.

5.5.2 The trial pits were backfilled with a single sixed stone prior to filling with water and measurements were taken through a slotted pipe installed prior to backfill.

5.6 Chemical Testing

5.6.1 Selected soil samples were subjected to appropriate chemical testing at the MCERTS and UKAS accredited laboratory of QTS Environmental for a suite of potential contaminants taking account of the Conceptual Site Model and site observations.

5.6.2 The following chemical testing was carried out on selected soil samples:

- Metals 6 samples
- Speciated Polycyclic Aromatic Hydrocarbons (PAH) 6 samples
- Soil Organic Matter 6 samples
- Asbestos Screen 6 samples
- Speciated Total Petroleum Hydrocarbons (TPHCWG) 2 samples

5.6.3 The following chemical testing was carried out on selected soil leachate samples:

- Metals 2 samples
- Speciated Polycyclic Aromatic Hydrocarbons (PAH) 2 samples

5.6.4 The results of the chemical testing are presented as **Appendix 'B'**.

5.7 Geotechnical Testing

5.7.1 Selected soil samples were subjected to appropriate geotechnical testing at the UKAS accredited laboratories of Professional Soils Laboratory (PSL) and QTS Environmental Ltd.

5.7.2 The following geotechnical testing was carried out on soil samples:

- Moisture Content 3 samples
- Plasticity Index 3 samples
- Remoulded California Bearing Ratio (CBRs) 2 samples
- pH 6 samples
- Water soluble sulphate 6 samples

5.7.3 Geotechnical testing results are presented as **Appendix 'C'** and the pH and sulphate results included with the chemical testing in **Appendix 'B'**.

5.8 Gas/Groundwater Monitoring

5.8.1 Gas and groundwater levels have been recorded within monitoring wells WS01, WS02, WS04, WS05, WS07 and WS08 on two occasions to date with a further four visits to be undertaken.

5.8.2 Methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide concentrations have been measured using a calibrated Gas Data GFM400 Gas Analyser. Atmospheric pressure and gas flow rates were also recorded at the same time.

5.8.3 The results of the ground gas / groundwater monitoring are presented as **Appendix 'D'**.

5.9 Soakaway Testing

5.9.1 The following infiltration rates were calculated from soakaway test pits SA01 – SA02:

Table 5.2 Soakaway Test Results

Test Position	Soil Infiltration Rate
SA01	5.2×10^{-7}
SA02	3.89×10^{-6}

6 Results of Investigation

6.1 Introduction

6.1.1 The ground conditions encountered in the window sample boreholes generally comprised a layer of topsoil, categorised partially as Made Ground within the northern part of site, varying in thickness from 0.30m to 0.50m, overlying a variable weathered bedrock profile of clays, sands and gravels grading with depth to intact sandstone.

6.2 Strata Observations

Made Ground/Topsoil

6.2.1 Made Ground was encountered locally in three trial pit holes in the north of the site (TP04, TP06 and SA02) from ground level to depths ranging between 0.30m begl and 0.50m begl.

6.2.2 The Made Ground generally comprised slightly gravelly, very clayey, fine to coarse sand and topsoil with variable content of brick, ceramic and glass fragments.

6.2.3 Intact and relatively undisturbed topsoil was encountered generally across the site to depths ranging between 0.25m and 0.40m begl.

Weathered Bedrock Profile

6.2.4 Beneath the topsoil and localised Made Ground, a weathered bedrock profile was encountered to depths ranging between 2.0m and 4.50m begl. This profile comprises an interlayered sequence of clays, sands and gravels derived through the weathering of typical interlayered mudstones and sandstones within the Pennine Middle Coal Measures.

6.2.5 Mudstones are generally weathered to soft and firmer consistency variably light yellow and grey brown gravelly, sandy CLAY with siltstones and sandstones weathered to variably light yellow and grey brown gravelly, clayey SAND. There are localised areas where gravels, comprising sub-angular and angular fragments of sandstone are more dominant, described as SAND & GRAVEL (WS07, TP05 and TP04) and as sandy GRAVEL (TP02, WS01, WS02, WS04, WS05, WS06, WS08) and representing more competent sandstone horizons within the Pennine Measures.

Intact Bedrock

6.2.6 Relatively intact bedrock was encountered at depths ranging between 2.00m begl and 4.50m begl and comprising light yellow grey and yellow grey weathered SANDSTONE, believed to be the Oaks Rock Sandstone.

6.3 Standard Penetration Tests (SPT's)

6.3.1 The SPT's undertaken within the window sample boreholes are summarised in the table below:

Table 6.1 Standard Penetration Test 'N' Values

Depth (m)	Exploratory Hole							
	WS01	WS02	WS03	WS04	WS05	WS06	Ws07	WS08
1.00	33	7	19	12	25	16	25	18
2.00	50+	17	12	38	46	50+	16	50+
3.00	-	28	13	16	50+	-	50	-
3.80	-	50+	-	-	-	-	-	-
4.00	-	-	37	37	-	-	-	-
4.50	-	-	50+	-	-	-	-	-

6.3.2 The test results generally display an increasing strength profile with depth of penetration. However, tests within cohesive layers returned consistently lower N values (N= 7-17) than those within the granular horizons (N=16-46).

6.3.3 By correlation with empirical data, the N values derived for the cohesive layers indicate a medium to high strength range whilst those in the granular layers indicate medium dense to very dense consistency in situ.

6.3.4 N values of 50+ were recorded within the relatively intact bedrock reflecting virtual refusal at depths ranging between 2.0m and 4.45m begl.

6.4 Visual and Olfactory Evidence of Contamination

6.4.1 No obvious visual or olfactory evidence of contamination was encountered within any exploratory holes advanced as part of this investigation.

6.5 Groundwater Observations

6.5.1 A groundwater strike was encountered in TP01 during the intrusive investigation as a seepage at 1.90m begl, representing localised perched water within granular material above cohesive material. Groundwater was not encountered in any of the other exploratory holes.

6.5.2 During the single combined ground gas and groundwater monitoring visit, the following standing groundwater levels were recorded within the standpipes:

Table 6.2 Standing Groundwater Levels within Monitoring Wells

Exploratory Hole	Depth to Groundwater (m begl)
WS01	No Groundwater
WS02	1.50
WS04	1.70
WS05	No Groundwater
WS07	1.60
WS08	No Groundwater

6.6 Chemical Testing – Soils

6.6.1 The results of the chemical testing of soil samples have been reviewed in accordance with the current legislative framework and criteria to assess the risk to human health.

6.6.2 The soil sample chemical testing results have been compared to the Environment Agency Soil Guideline Values (SGV's), DEFRA Category 4 Screening Levels, Opus In-House Tier 1

Screening Values (IHSV's) and Land Quality Management (LQM) Generic Assessment Criteria (GAC's) 3rd Edition derived using CLEA 1.06 to be protective of human health.

6.6.3 Given that the site is to be developed as a retail facility, the 'commercial' end-use has been adopted for the assessment of chemical test results.

6.6.4 The metal and PAH results for the tested natural soil samples have been subjected to a statistical Tier 1 Human Health Risk Assessment in accordance with the CL:AIRE and CIEH document titled 'Guidance on Comparing Soil Contamination with a Critical Concentration' published in May 2008 using the ESI Contaminated Land Statistical Calculator software.

6.6.5 Under the land use planning system, the objective is to determine the 'suitability for use' of the land under consideration and hence demonstrate that there is a 95% probability that the true population mean is below the set critical concentration, such as published SGV's, and Category 4 Screening Levels and, in their absence, Opus Tier 1 IHSV's and LQM GAC's for a 'Commercial' site end use.

6.6.6 Where the objective is to demonstrate 'suitability for use', the Null and Alternative Hypotheses are as follows:

- Null Hypothesis: "Is the true mean concentration more than or equal to that of the critical concentration?"
- Alternative Hypothesis: "Is the true mean concentration less than the critical concentration?"

6.6.7 The Tier 1 Human Health Risk Assessment Spreadsheets are presented as **Appendix 'E'**.

6.6.8 Soil Organic Matter (SOM) analysis has also been undertaken to enable the determination of appropriate screening values for organic contaminants. The average SOM% value for the site is 2.8%.

Metals

6.6.9 Six natural soil samples were analysed for a standard metals suite.

6.6.10 No metal concentrations exceeded their applicable screening values in the tested natural soil samples. Statistical analysis has confirmed that the Null Hypothesis has been rejected for the metals data set (i.e. the true mean concentration is less than the critical concentration). Hence, no remedial action is considered necessary for metals with respect to human health.

Speciated PAH's

6.6.11 Two natural soil samples were analysed for speciated polycyclic aromatic hydrocarbons (PAH).

6.6.12 No individual PAH concentrations exceeded their applicable screening values in the tested natural soil samples. Statistical analysis has confirmed that the Null Hypothesis has been rejected for PAH data set (i.e. the true mean concentration is less than the critical concentration). Hence, no remedial action is considered necessary for PAH's with respect to human health.

Asbestos Screen

6.6.13 One Made Ground sample and five natural soil samples from exploratory holes advanced across the site were screened for asbestos fibres.

6.6.14 No asbestos fibres were detected in either the screened Made Ground samples or natural soil samples.

TPH & BTEX

6.6.15 Two natural soil samples were analysed for speciated Aliphatic and Aromatic TPH and Benzene, Toluene, Ethyl benzene and Xylene (BTEX) analysis.

6.6.16 The results of the TPH and BTEX analysis have been screened against the appropriate screening criteria based upon a 'Commercial' end-use. No concentrations of TPH or BTEX were recorded above the lower laboratory detection limit. Hence, no remedial action is considered necessary for TPH or BTEX with respect to human health.

6.7 Chemical Testing - Leachate

6.7.1 The results of chemical testing carried out on two soil leachate samples form the site have been assessed against the Environmental Quality Standards (EQS) for freshwater, or, where these are not available, the UK Drinking Water Standards 2000 (UKDWS) or World Health Organisation (WHO) values. EQS values have been used in the first instance due to the close proximity of the River Dove and the absence of any groundwater abstractions within 1km of the site. This screening allows potential 'contaminants of concern' to be identified with regard to Controlled Waters. A number of EQS values used within the assessment are dependent upon the hardness of the water within the receiving water course.

Metals

6.7.2 Two samples of soil leachate were analysed for a standard metals suite.

6.7.3 No metal concentrations exceeded their applicable screening values in the tested samples. Hence, no remedial action is considered necessary for metals with respect to controlled waters.

Speciated PAH's

6.7.4 One sample of groundwater was analysed for speciated PAH's.

6.7.5 No individual PAH concentrations exceeded their applicable screening values in the tested samples. Hence, no remedial action is considered necessary for PAH's with respect to controlled waters.

6.8 Geotechnical Testing

6.8.1 Six soil samples have been tested for pH and water-soluble sulphate. In addition, three soil samples have been tested for moisture content and plasticity index and three remoulded samples have been tested for CBR Design value.

6.8.2 The results of the geotechnical testing are summarized as follows:

- pH values between 7.1 and 7.5
- Water-soluble sulphate values between <0.01g/l and 0.02g/l
- Moisture content values between 12% and 14%
- Modified plasticity index values between 7.76(8) and 12.48(13)
- CBR Design values of 10 and 53%.

6.9 Ground Gas/Groundwater Monitoring Results

6.9.1 Gas monitoring results have been compared to guidance presented in CIRIA Report C665, Assessing Risks Posed by Hazardous Ground Gases to Buildings, 2007.

6.9.2 CIRIA C665 indicates that ground gas protection measures may be necessary in new buildings on sites where methane concentrations exceed a threshold value of 1% v/v and/or where carbon dioxide concentrations exceed a threshold value of 5% v/v. The gas flow rate is also considered in the required level of protection.

6.9.3 Maximum methane (CH_4) and carbon dioxide (CO_2) concentrations, as percentage volume in air (%v/v), minimum oxygen (O_2) concentrations (%v/v), maximum carbon monoxide (CO) and hydrogen sulphide (H_2S) concentrations, in parts per million (ppm), and gas flow rates in litres per hour (l/hr) have been monitored in the six monitoring wells on two occasions to date, during periods of falling and stable atmospheric pressure.

6.9.4 The results of the gas monitoring visits are summarised as follows:

- Carbon dioxide has been recorded at concentrations between 0.5% v/v (WS05) and 3.8% v/v (WS02).
- Methane, carbon monoxide and hydrogen sulphide have not been recorded within any monitoring wells above the respective instrument detection limits.
- No gas flow has been detected within any monitoring wells.
- Atmospheric pressure for the monitoring period was 1004mb.

6.10 Soakaway Test Results

6.10.1 The following infiltration rates were calculated from soakaway test pits SA01 – SA02:

Table 6.3 Soakaway Test Results

Test Position	Soil Infiltration Rate
SA01	5.2×10^{-7}
SA02	3.89×10^{-6}

B Assessment & Recommendations

7 Environmental Assessment

7.1 Soil

7.1.1 No metal, PAH or TPHCWG concentrations were found to exceed their adopted screening values in any of the tested soil samples. No asbestos fibres were found in any of the screened soil samples. Hence, it is considered that there is no requirement for soil remedial action to be undertaken as part of the proposed development in the context of human health.

7.1.2 The water-soluble sulphate concentrations in the Made Ground and natural soils beneath the site indicate that the risk posed to future buried concrete structures is negligible. This issue is characterised further in Section 8.5 of this report.

7.2 Ground Gas

7.2.1 A maximum carbon dioxide concentration of 2.0% v/v, no carbon monoxide, no methane and hydrogen sulphide concentrations or gas flow was recorded during the gas monitoring visit. The maximum carbon dioxide concentration was recorded in monitoring well WS01. No significant gas flow was detected.

7.2.2 The maximum carbon dioxide concentration classifies the site as 'Characteristic Situation 1' (Very low Risk) in accordance with CIRIA Report C665.

7.2.3 On the basis of the preliminary gas assessment undertaken, it is not considered that gas protection measures will be required for the proposed development.

7.2.4 It should be noted that a further four rounds of gas monitoring are required to fully characterise the ground gas regime.

7.2.5 No radon protection measures are deemed necessary in the construction of new buildings.

7.3 Revised Conceptual Site Model

7.3.1 The revised Conceptual Site Model based on information obtained from the intrusive investigation, the Tier 1 Human Health Risk Assessment and the Ground Gas Risk Assessment has identified that the majority of the potential pollutant linkages identified at the desk study stage have been broken due to no source being identified. The remaining identified pollutant linkages that require mitigation or remedial works as part of the proposed development are tabulated below.

Table 7.1 Updated Source Pathway-Receptor Relationships

Source Material/Activity	Potential Contaminant	Pathways	Receptor	Risk
Made Ground on site and within adjacent in-filled cutting.	Carbon Dioxide.	Gas migration through permeable strata and accumulation inside buildings.	Future Customers. Lidl Staff. Construction Workers. Maintenance Workers.	**Very Low**

7.4 Health & Safety

7.4.1 The Principal Contractor should provide an assessment of the appropriate procedures required to protect site workers from the materials likely to be encountered at the site.

7.4.2 The following basic health and safety measures should be adopted as a minimum during the site redevelopment works:

- Basic Personal Protective Equipment (PPE) including hard hats, gloves, coveralls and steel toe-capped boots to be worn at all times;
- Eating, drinking and smoking to be forbidden at all times except in designated mess areas; and
- Breathing equipment to be available for those working in confined or unventilated spaces.

7.4.3 If ground conditions should differ significantly from those encountered during the intrusive investigation, including the discovery of any visible or odorous contamination, site redevelopment works should be suspended until the suspect material has been inspected and assessed by a competent Geo-Environmental Engineer.

7.5 Waste Disposal

7.5.1 The reuse of Made Ground as engineered fill should be undertaken in accordance with an appropriate Environment Agency licence as defined in the statutory guidance on the 'Definition of Waste' or CL:AIRE Code of Practice.

7.5.2 Any materials designated for off-site disposal are likely to require classification by the Waste Acceptance Criteria (WAC) in accordance with the Landfill Regulations. No WAC testing has been undertaken as part of this investigation.

7.6 Liaison with Regulators

7.6.1 It is recommended that this report be submitted to the Local Authority Environmental Health Officer (EHO) for review and comment prior to any irrevocable action taking place.

7.7 Water Supply Pipes

7.7.1 It is recommended that this report be submitted to the relevant Water Supply Authority to confirm the necessary level of protection, if any, for future plastic water supply pipes.

7.8 Environmental Protection

7.8.1 The following environmental protection measures should be adopted as a minimum during the site redevelopment works:

- Covering or dampening of spoil to prevent the spread of dust;
- Containment of surface water runoff to prevent the pollution of surface water drains, sewers etc.;
- Cleaning and washing of boots, vehicle wheels and other equipment at site entry and exit points to prevent the spread of mud.

8 Geotechnical Assessment

8.1 Foundation Design

8.1.1 At present the loadings for the proposed Lidl retail store are not known and it is noted that ground levels vary considerably across the proposed building position by of the order of 4-5m and the development proposal will include a cut and fill process. The following account should therefore be reviewed on completion of the detailed design and in particular the proposed levels.

8.1.2 Base on the results of the investigation, it is considered that traditional strip and/or pad foundations may be adopted for the proposed development, founding within the weathered clay, sand and gravel materials near surface, adopting a minimum foundation depth of 0.75m below existing or proposed ground level, whichever is the lower. The minimum depth is based on the potential presence of clays with low volume change potential and is the minimum depth required to penetrate the zone potentially impacted by seasonal changes in moisture content. Shallower foundations may be adopted in proposed 'cut' areas where intact sandstone bedrock is encountered and this is feasible where levels are reduced along the south-west edge of the building.

8.1.3 Careful consideration should be given to the proposed programme of foundation construction taking into account also the proposed cut and fill. For the traditional foundation solution, it would be most practical to construct foundations after the 'cut' exercise and prior to filling. This will minimise trench fill through any material placed during the filling process which may then be completed after the foundations are in place.

8.1.4 On this basis, for a traditional strip foundation up to 1m wide and individual pad foundations up to 2.5m square, an allowable net bearing pressure of at least 100kN/m^2 will be available to support imposed loadings. It should be noted that, given the significant variability of the weathered rock profile and the potential presence of clays, sands and intact rock, the total settlement, up to a likely maximum of 20mm, and indeed the rate of settlement, is likely to vary considerably across the foundations. Traditional strip foundations should therefore be provided with appropriate longitudinal reinforcement and any portal frame supported by pads should be capable of accommodating differential settlements of the order of 10mm.

8.1.5 As an alternative to the traditional shallow solution, consideration may be given to the adoption of a raft foundation for the proposed store constructed over a granular blanket of fully engineered re-worked natural granular soils derived as part of the proposed cut and fill process. This will require 'over cut' in the higher areas to ensure that a minimum of 1m of compacted material is present beneath the raft at any one point and the engineered blanket will also need to be extended a distance outside the building footprint equivalent to the depth of engineered fill present.

8.1.6 Assuming all compaction works are completed in a carefully controlled manner to an agreed specification, the raft foundation, which may be a flat raft or thickened edge beam option, may be designed based on an allowable net bearing pressure of the order of 50kN/m^2.

8.1.7 Whilst considering the feasibility of the raft foundation option, particular emphasis will need to be given to the likely practical issues in sorting granular and cohesive materials during the 'cut' process. It is feasible that suitable granular material will need to be imported to supplement on-site granular fractions and there will be a similar cohesive volume generated for off-site disposal.

8.2 Floor Slab Design

8.2.1 Assuming that traditional strip and/or pad foundations are adopted for the proposed development and given the proposal to 'cut and fill' it is recommended that a suspended ground floor system should be adopted for the proposed development.

8.2.2 For the raft foundation option, it is assumed that the ground floor will be formed by the raft slab, although a suspended slab may be constructed at a higher level if preferred.

8.3 Pavement Design

8.3.1 Specific design requirements for pavement areas should be reviewed based on finished levels. In areas of cut, it is anticipated that the existing natural soils will provide a design CBR value of the order of 4-5% where limited by the presence of cohesive soils with significantly higher values available within granular natural soils and bedrock (10% +).

8.3.2 In proposed fill areas, the performance criteria will be dictated by the compaction specification adopted. Assuming careful selection and sorting of materials and an appropriate level of compaction, a design CBR of the order of 2-5% will be available for pavements.

8.4 Construction

8.4.1 Anticipated excavation depths should be readily achieved using conventional plant (JCB 3CX or similar) within the Made Ground and natural weathered soils, i.e. to depths of at least 2m below existing ground level.

8.4.2 Higher specification plant and possibly breaking equipment may be required to penetrate to greater depths, particularly in the west of the site where significant 'cut' is likely to be required.

8.4.3 Groundwater seepages may be encountered locally where water has been able to accumulate with granular material sealed above cohesive material. Sumping and pumping may be required locally to deal with such groundwater entries.

8.4.4 Support must be provided for all excavations requiring entry by site workers in accordance with guidance presented in CIRIA Report 97 'Trenching Practice'.

8.5 Concrete Specification

8.5.1 The ground conditions, pH values and water-soluble sulphate concentrations have been assessed for potential aggressive attack on concrete in accordance with BRE Special Digest 1 'Concrete in Aggressive Ground (2005)'.

8.5.2 The results indicate that the Made Ground, and natural soils fall within Design Sulphate Class DS-1. The results indicate an ACEC (Aggressive Chemical Environment for Concrete) Class within Made Ground and natural strata of AC-1.

8.5.3 The specific concrete mixes for the DS Class to be used at the site will be determined, mindful of the ACEC Class, by the site-specific concrete requirements in terms of the required

durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any Additional Protection Measures (APM).

8.6 Soakaways

8.6.1 The ground conditions at the site are typified near surface by the presence of a sequence of inter-layered clays and sands and the feasibility of soakaways will be dictated by the relative proportion of cohesive soils within the proposed infiltration zone.

8.6.2 The two soakaway tests have been completed within areas which illustrate this variability. Within SA01, the soils are primarily cohesive and this was reflected by the very low soil infiltration rate 5.20 x 10^{-7} m/s at this position. A nominally higher infiltration rate (3.89 x 10^{-6} m/s) was calculated for SA 02 where more granular layers were encountered below 1.4m depth.

8.6.3 On the basis of the above, it is considered unlikely that soakaways will provide a viable drainage option for the site.

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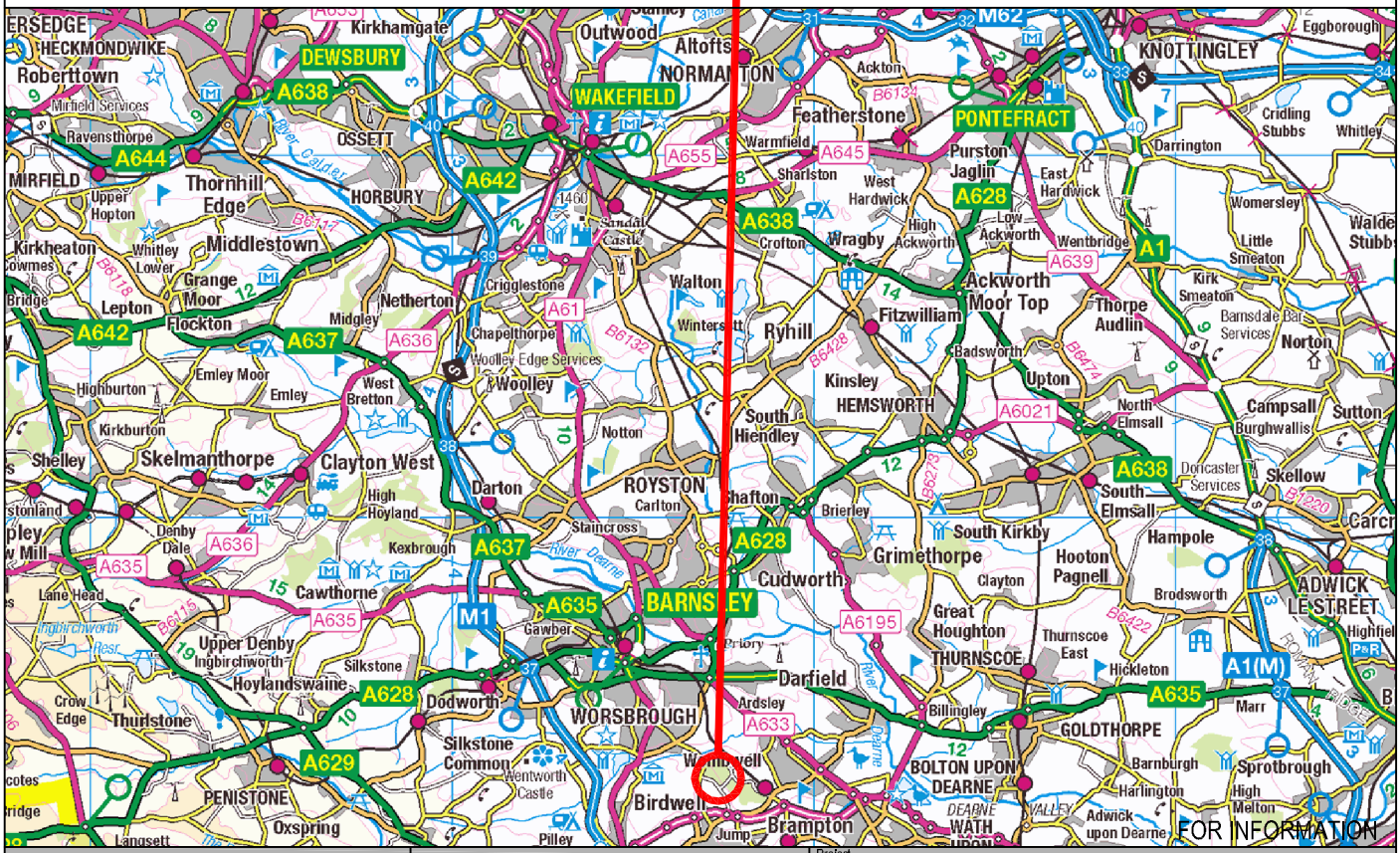
DRAWINGS

Site Location: Land off Mitchells Way, Wombwell, S738DS

Grid Reference: 403933, 403867



FOR INFORMATION

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Project
Lidl New Store
Mitchells Way, Wombwell
Barnsley

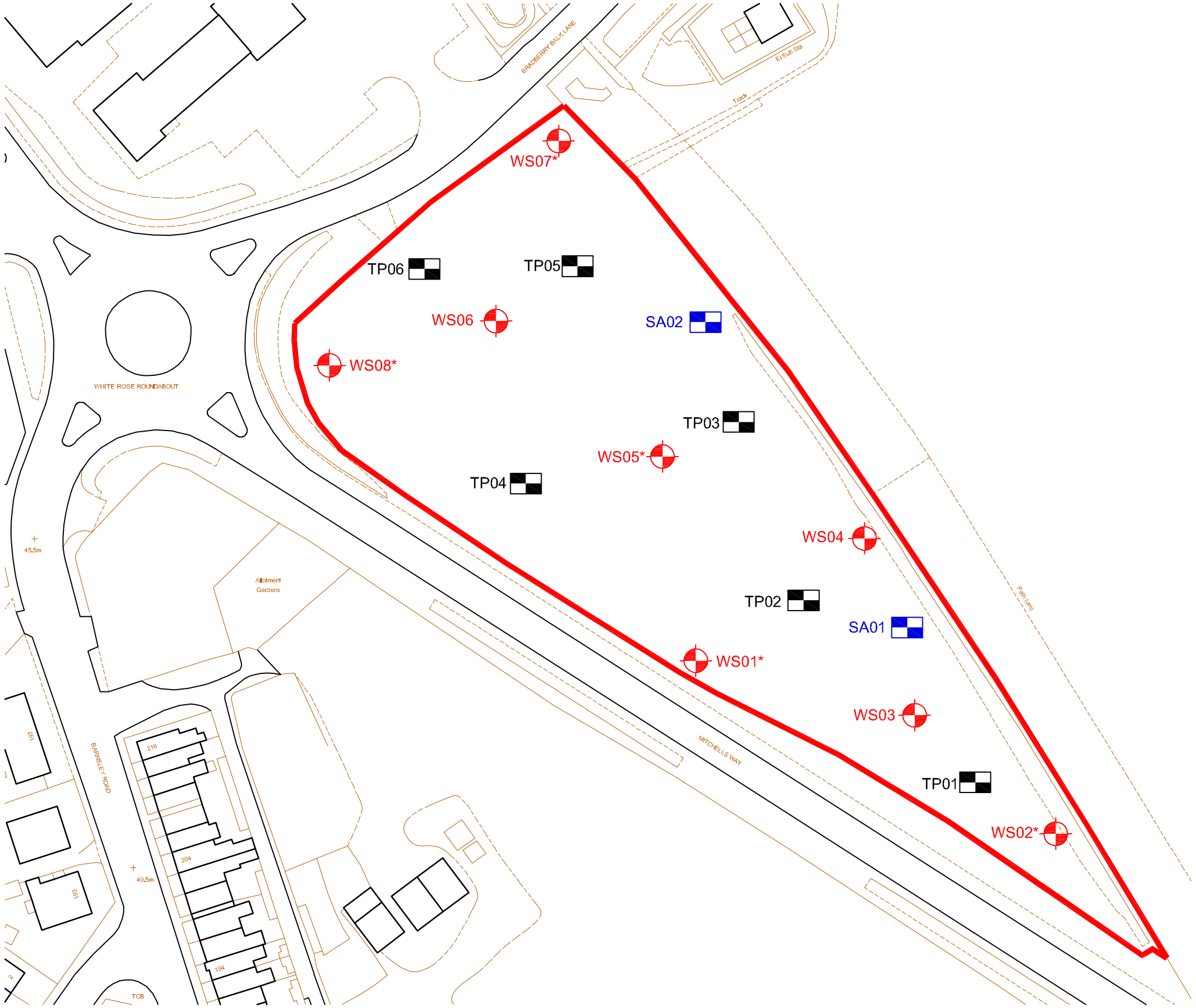
Sheet
Site Location Plan

R0	First Issue					

Drawn	Designed	Approved	Revision Date
DW	DW	PT	09.07.15

Project No.	Scale	Drawing No.	Sheet. No.	Revision
J-B0914.00	NTS	J-B0914.00	401	R0

Original Sheet Size A4 [210x297] Plot Date 31 Jul 2015 @ 7:53 AM Path G:\Projects\Projects 2015\J-B0914.00 - Lidl Wombwell\Drawings\Current\J-B0914.00_401_R0 Site Location Plan.dwg 401



150 mm
100
50
0
10 mm

Notes:

1. DO NOT SCALE.
2. This drawing is should be read in conjunction with J-B0914.00_R0
3. Should there be any conflict between the details indicated on this drawing and those indicated on other drawings, the Engineer should be informed PRIOR to construction on site.
4. Until Technical Approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and Not for Construction.
   Should the Contractor commence site work prior to Approval being given, it is entirely at his own risk.
5. All dimensions are in metres U.N.O.

Key:

- Site Boundary
- WS* Window Sample with ground gas well installation
- TP Trial Pit
- SA Soakaway Test Pit

Construction Risks	Maintenance/Cleaning Risks	Demolition/Adaption Risks

The table above is provided to assist the Principal Contractor to fulfil his obligations under the Construction (Design & Management) Regulations 2015. It does not include residual risks that a competent Contractor will be aware of nor does it absolve the Principal Contractor of his legal responsibilities.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

Revision	Amendment	Approved	Revision Date
R0	First Issue	JS	15.07.15

1:1 @ A3 — 0 10 20 30 40 mm

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Drawn	Designed	Approved	Revision Date
DW	DW	JS	15.07.15

Project: Land off Mitchells Way, Wombwell

Sheet: Exploratory Hole Location Plan

Project No.	Scale	Drawing No.	Sheet No.	Revision
J-B0914.00		DO J-B0914_402_R0	402	R0

Original Sheet Size A3 [420x297] Plot Date 17 Jul 2015 @ 10:44 AM Path G:\Projects\Projects 2015\J-B0914.00 - Lidl Wombwell\Drawings\Current\J-B0914.00_402_R0 E.H.L.P.dwg Layout2-Layout1

ALL DIMENSIONS SHOULD BE CHECKED ON SITE BEFORE WORK COMMENCES

DRAWING SUBJECT TO VEHICLE TRACKING CHECK

SUBJECT TO HGV TRACKING CHECK

SUBJECT TO TITLE PLAN CHECK

N

S

Site Area (sq m)	12,779 sq m
Store Type	LOF Type 14
Reference	(19.03.15)
Sales Areas (sq m)	1,424 sq m
Number of Aisles	5 Aisle
G/F GIA (sq m)	2,270 sq m
G/F GEA (sq m)	2,345 sq m
F/F GIA (sq m)	200 sq m EST
Car Park Spaces	133

Rev.	Date	Description	Drawn
H.	13.05.15	Layout updated as per previous sketch.	NJV
G.	13.05.15	Sketch - car park updated for discussion	MH
F.	08.05.15	Retaining wall adjacent to Mitchells Way omitted. Parking layout amended accordingly.	DW
E.	29.04.15	Scheme updated for planning issue	DW
D.	27.04.15	FF added	LS
C.	27.04.15	Sales area increased from 1421 to 1424 sq m	MH
B.	23.04.15	Updated with proposed EGL's and retaining wall requirements	MH
A.	13.04.15	2 Trolleybays + landscaping added	LS

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client
Lidl UK GmbH

project
New Store
Mitchells Way, Wombwell, Barnsley

drawing title
Proposed Site Plan

date	April 2015				
status	Planning Issue				
scale	1:750 @ A3				
drawn	MH	checked	-		
job no.	1849	dwg no.	10	rev.	H

APPENDIX A
Exploratory Hole Records

OPUS

Borehole Log

Borehole No.
WS01
Sheet 1 of 1

Project Name:	Lidl Wombwell	Project No. J-B0914.00	Co-ords:	439333E - 403794N	Hole Type BH
Location:	Land off Mitchells Way, Wombwell		Plant:	Competitor Dart	Scale 1:35
Client:	Lidl UK GmbH		Dates:	14/07/2015	Logged By CA

Backfill	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	ID	Results				
		0.30	D1		0.40			Soft consistency friable dark grey brown slightly silty slightly gravelly sandy clay TOPSOIL with rare rootlets. Gravel is angular to subangular fine to medium of sandstone and mudstone.
		0.50	D2					Dense light yellow slightly gravelly slightly clayey fine to medium SAND. Gravel is subangular to subrounded medium to coarse of sandstone.
		0.80	D3					
		1.00	D4					
		1.00	SPT	N=33 (3,2/5,6,10,12)				
		1.50	D5					
		1.80	D6		1.75			Very dense light yellow grey sandy GRAVEL. Gravel is subangular to subrounded medium to coarse of sandstone. Sand is medium.
		2.00	SPT	N=50 (3,3/9,16,13,12)	2.00			End of Borehole at 2.00m

Remarks

1. Borehole terminated at 2.00m due to refusal on suspected bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

AGS

OPUS

Borehole Log

Borehole No. **WS02**

Sheet 1 of 1

Project Name:	Lidl Wombwell	Project No. J-B0914.00	Co-ords:	439410E - 403763N	Hole Type BH
Location:	Land off Mitchells Way, Wombwell		Plant:	Competitor Dart	Scale 1:35
Client:	Lidl UK GmbH		Dates:	14/07/2015	Logged By CA

Backfill	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	ID	Results				
		0.30	D7		0.40			Firm consistency dark grey brown slightly sandy slightly gravelly clay TOPSOIL with rare rootlets. Gravel is subangular fine of brick, mudstone and coal fragments.
		0.50	D8					Firm consistency dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular fine sandstone.
		0.80	D9		0.70			Soft consistency brown sandy CLAY.
		1.00	SPT	N=7 (0,1/1,1,2,3)	1.00			Soft consistency yellow grey slightly gravelly sandy medium strength CLAY. Gravel is subangular fine to medium of sandstone.
		1.20	D10		1.50			Firm consistency yellow orange brown grey slightly sandy slightly gravelly high strength CLAY. Gravel is subangular fine to medium. of sandstone.
		2.00	D11					
		2.00	SPT	N=17 (3,3/3,5,4,5)				
		2.50	D12		2.50			Soft to firm consistency light brown and grey rare black slightly sandy CLAY.
		2.90	D13		2.90			Orange brown slightly sandy slightly clayey subangular GRAVEL of sandstone.
		3.00	D14		3.00			Medium dense orange slightly gravelly SAND. Gravel is subangular fine of sandstone.
		3.00	SPT	N=28 (5,6/6,8,7,7)				*Wet.*
		3.60	D15		3.60			Light yellow grey weathered SANDSTONE recovered as light yellow grey subangular coarse GRAVEL.
		3.80	SPT	50 (25 for 105mm/50 for 220mm)	3.80			End of Borehole at 3.80m

Remarks

1. Borehole terminated at 3.80m due to refusal on suspected bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

AGS

OPUS

Borehole Log

Borehole No. **WS03**

Sheet 1 of 1

Project Name:	Lidl Wombwell	Project No. J-B0914.00	Co-ords:	439378E - 403790N	Hole Type BH
Location:	Land off Mitchells Way, Wombwell		Plant:	Competitor Dart	Scale 1:35
Client:	Lidl UK GmbH		Dates:	14/07/2015	Logged By CA

Backfill	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	ID	Results				
		0.20	D16		0.30			Soft consistency friable black grey slightly gravelly very sandy clay TOPSOIL. Gravel is subangular to subrounded fine sandstone and limestone.
		0.50	D17					Soft consistency dark brown slightly gravelly very sandy CLAY. Gravel is subangular fine to medium of sandstone.
		0.70	D18		0.70			Medium dense yellow brown slightly clayey gravelly fine SAND with a low cobble content. Gravel is subangular to subrounded medium to coarse of sandstone.
		1.00	SPT	N=19 (5,5/5,5,5,4)	1.00			Yellow brown slightly gravelly slightly clayey fine SAND. Gravel is subangular fine to medium sandstone.
		1.20	D19		1.40			Soft to firm consistency light yellow grey with orange slightly gravelly sandy CLAY. Gravel is subangular fine to medium of sandstone.
		2.00	D20					
		2.00	SPT	N=12 (2,2/2,3,3,4)				
		2.50	D21		2.30			Firm consistency light grey mottled brown black and orange slightly sandy medium strength CLAY.
		3.00	SPT	N=13 (2,2/2,3,4,4)	3.00			Firm consistency dark orange brown mottled black slightly sandy slightly gravelly medium strength CLAY. Gravel is subangular medium of sandstone.
		3.50	D22					
		4.00	SPT	N=37 (5,6/9,8,6,14)	4.00			Dark grey orange brown slightly gravelly sandy very high strength CLAY. Gravel is subangular medium of sandstone.
		4.20	D23					*Wet.*
		4.50	SPT	N=50 (25 for 125mm/16,12,12,10)	4.45 4.50			Light grey weathered SANDSTONE recovered as light grey subangular coarse gravel.
								End of Borehole at 4.50m

1 2 3 4 5 6 7

Remarks

1. Borehole terminated at 4.50m due to refusal on bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey. 5. Borehole backfilled with arisings.

AGS

OPUS

Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name:	Lidl Wombwell	Project No. J-B0914.00	Co-ords:	439376E - 403827N	Hole Type BH
Location:	Land off Mitchells Way, Wombwell		Plant:	Competitor Dart	Scale 1:35
Client:	Lidl UK GmbH		Dates:	14/07/2015	Logged By CA

Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	ID	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.20	D24		0.40			Soft consistency friable dark grey black slightly gravelly sandy clay TOPSOIL. Gravel is angular to subangular fine of coal fragments and sandstone.
		0.60	D25		0.70			Soft consistency dark brown slightly gravelly sandy CLAY. Gravel is angular to subangular fine to medium of limestone and sandstone.
		0.90	D26					Firm consistency light yellow grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium of sandstone.
		1.00	SPT	N=12 (2,2/2,3,3,4)	1.00			Stiff consistency orange brown slightly gravelly medium strength CLAY. Gravel is subangular medium of sandstone.
		1.20	D27					
		1.50	D28		1.45			Soft consistency light orange brown slightly gravelly very sandy CLAY. Gravel is subangular fine to medium of sandstone.
		1.80	D29		1.65			*Damp.*
		2.00	D30		2.00			Stiff consistency orange brown mottled light grey slightly gravelly sandy CLAY. Gravel is subangular medium of sandstone.
		2.00	SPT	N=38 (4,5/10,12,8,8)	2.10			Light orange brown slightly sandy clayey subangular to subrounded medium to coarse GRAVEL of sandstone.
		2.50	D31					*Very wet.*
		2.80	D32		2.70			Dense light yellow grey slightly gravelly clayey SAND. Gravel is subangular medium to coarse sandstone.
		3.00	D33		3.00			Stiff consistency light orange brown slightly sandy slightly gravelly CLAY. Gravel is subangular coarse of sandstone.
		3.00	SPT	N=16 (5,3/3,4,4,5)				Stiff consistency yellow grey brown slightly gravelly sandy high strength CLAY. Gravel is subangular coarse of sandstone.
		4.00	SPT	N=37 (5,6/9,8,6,14)	4.10			
					4.20			Light grey subangular coarse GRAVEL of sandstone.
		4.70	SPT	50 (25 for 60mm/50 for 180mm)				End of Borehole at 4.70m

1 2 3 4 5 6 7

Remarks

1. Borehole terminated at 4.70m due to refusal on suspected bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

AGS

Borehole Log

OPUS

Borehole No. **WS05**

Sheet 1 of 1

Project Name:	Lidl Wombwell	Project No. J-B0914.00	Co-ords:	439330E - 403843N	Hole Type BH
Location:	Land off Mitchells Way, Wombwell		Plant:	Competitor Dart	Scale 1:35
Client:	Lidl UK GmbH		Dates:	14/07/2015	Logged By CA

Backfill	Water Strikes	Sample and In Situ Testing: Depth (m)	ID	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.20	D34		0.30			Soft consistency friable dark grey black slightly gravelly sandy clay TOPSOIL. Gravel is subangular to subrounded fine to medium of sandstone and limestone.
		0.40	D35					Stiff consistency grey brown slightly sandy slightly gravelly CLAY. Gravel is subangular fine of sandstone.
		0.70	D36		0.60			Firm consistency light yellow brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded medium to coarse of sandstone.
		1.00	SPT	N=25 (4,5/5,5,6,9)	0.90 1.00			Yellow brown coarse sandstone GRAVEL.
		1.20	D37					Medium dense orange brown slightly clayey gravelly medium SAND. Gravel is subangular medium to coarse of sandstone.
		1.50	D38		1.50			Light grey with orange brown slightly sandy subangular tabular GRAVEL with low cobble content of sandstone.
		2.00 2.00	D39 SPT	N=46 (25 for 115mm/17,10,9,10)	2.00			Dense light yellow grey slightly gravelly fine SAND. Gravel is subangular fine to medium sandstone.
		2.50	D40		2.50			Stiff consistency light grey slightly gravelly CLAY. Gravel is subangular medium of sandstone.
		3.00	SPT	50 (4,10/50 for 285mm)	3.00			End of Borehole at 3.00m

Remarks

1. Borehole terminated at 3.00m due to refusal. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

AGS

OPUS

Borehole Log

Borehole No. **WS06**

Sheet 1 of 1

Project Name:	Lidl Wombwell	Project No. J-B0914.00	Co-ords:	439303E - 403866N	Hole Type BH
Location:	Land off Mitchells Way, Wombwell		Plant:	Competitor Dart	Scale 1:35
Client:	Lidl UK GmbH		Dates:	14/07/2015	Logged By CA

Backfill	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	ID	Results				
		0.20	D41					Soft consistency friable dark grey black slightly gravelly very sandy clay TOPSOIL. Gravel is subangular fine to medium of sandstone.
		0.50	D42		0.40			Stiff consistency dark brown slightly gravelly sandy CLAY. Gravel is subangular medium sandstone.
		0.80	D43		0.70			Yellow brown slightly clayey gravelly medium SAND. Gravel is subangular medium to coarse of sandstone.
		1.00	SPT	N=16 (4,5/4,4,4,4)	1.00			Medium dense light yellow grey slightly gravelly medium SAND. Gravel is subangular fine to medium of sandstone.
		1.20	D44					
		1.80	D45		1.60			Light yellow grey sandy subangular medium to coarse GRAVEL of sandstone.
		2.00	SPT	50 (9,5/50 for 95mm)	2.00			End of Borehole at 2.00m

Remarks

1. Borehole terminated at 2.00m due to refusal on suspected bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey. 5. Borehole backfilled with arisings.

AGS

OPUS

Borehole Log

Borehole No. **WS07**

Sheet 1 of 1

Project Name:	Lidl Wombwell	Project No. J-B0914.00	Co-ords:	439320E - 403898N	Hole Type BH
Location:	Land off Mitchells Way, Wombwell		Plant:	Competitor Dart	Scale 1:35
Client:	Lidl UK GmbH		Dates:	14/07/2015	Logged By CA

Backfill	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	ID	Results				
		0.10	D46					Soft consistency friable dark grey black slightly gravelly clayey sand TOPSOIL with rare rootlets. Gravel is subangular to angular fine to coarse of limestone, sandstone, chalk and coal fragments.
		0.40	D47					
		0.50	D48		0.50			Stiff consistency dark brown with black slightly sandy slightly gravelly CLAY. Gravel is subangular fine of sandstone.
		0.80	D49		0.60			Stiff consistency light yellow grey slightly sandy slightly gravelly CLAY. Gravel is subangular medium of sandstone.
		1.00	SPT	N=25 (6,8/7,6,5,7)	0.95			Medium dense light orange slightly sandy subangular medium GRAVEL of sandstone.
		1.30	D50		1.30			Light grey and orange slightly gravelly medium SAND. Gravel is subangular fine to medium of sandstone.
		1.60	D51		1.40			Soft consistency orange slightly gravelly very sandy CLAY. Gravel is subangular medium of sandstone.
		1.90	D52		1.90			Light grey and black slightly gravelly medium SAND. Gravel is subangular medium of sandstone.
		2.00	SPT	N=16 (5,4/4,4,4,4)	2.10			Stiff consistency brown with black orange grey slightly sandy slightly gravelly high strength CLAY. Gravel is subangular medium of sandstone.
		2.50	D53					
		2.70	D54		2.70			Orange SAND AND GRAVEL. Gravel is subangular medium to coarse of sandstone. Sand is fine to medium.
		3.00	SPT	50 (25 for 105mm/50 for 245mm)	3.00			End of Borehole at 3.00m

Remarks

1. Borehole terminated at 3.00m due to refusal on suspected bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

AGS

OPUS

Borehole Log

Borehole No.
WS08
Sheet 1 of 1

Project Name:	Lidl Wombwell	Project No. J-B0914.00	Co-ords:	439269E - 403851N	Hole Type BH
Location:	Land off Mitchells Way, Wombwell		Plant:	Competitor Dart	Scale 1:35
Client:	Lidl UK GmbH		Dates:	14/07/2015	Logged By CA

Backfill	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	ID	Results				
		0.10	D55					Soft consistency friable black slightly gravelly very sandy clay TOPSOIL with rare rootlets. Gravel is angular to subangular fine of coal and sandstone.
		0.30	D56		0.25			Firm consistency dark brown slightly gravelly sandy CLAY. Gravel is subangular fine of sandstone.
					0.40			Medium dense light yellow slightly clayey sandy angular to subrounded fine to medium GRAVEL of sandstone.
		0.80	D57					
		1.00	SPT	N=18 (7,7/5,5,4,4)				
		1.20	D58					
		1.50	D59					
		1.95	D60		1.95			Light grey sandy subangular medium GRAVEL of sandstone.
		2.00	SPT	50 (25 for 40mm/50 for 60mm)	2.00			End of Borehole at 2.00m

Remarks

1. Borehole terminated at 2.00m due to refusal on suspected bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

AGS

Trial Pit Log

TrialPit No: SA01
Sheet 1 of 1

Project Name: Lidl Wombwell	Project No. J-B0914.00	Co-ords: 439387.13 - 403806.04 Plant: JCB 3CX	Date 15/07/2015
Location: Land off Mitchells Way, Wombwell		Dimensions (m): 2.20 x 0.30 Depth 2.00	Scale 1:25
Client: Lidl UK GmbH			Logged CA

Backfill	Samples & In Situ Testing: Depth	ID	Results	Depth (m)	Level (m)	Legend	Stratum Description	Water Strike
							Black slightly gravelly clayey fine sand TOPSOIL with rare rootlets. Gravel is subangular fine to medium of sandstone and mudstone.	
				0.40			Soft consistency brown orange slightly gravelly very sandy CLAY. Gravel is subangular fine of sandstone.	
				1.00			Soft consistency light yellow brown mottled light grey slightly gravelly sandy CLAY. Gravel is subangular fine to medium of sandstone.	
				2.00			End of Pit at 2.00m	

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Remarks: 1. Trial pit terminated at 2.00m due to reaching target depth. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

Stability: Sides of Pit Stable

Trial Pit Log

TrialPit No: SA02
Sheet 1 of 1

Project Name: Lidl Wombwell	Project No. J-B0914.00	Co-ords: 439345.33 - 403871.33 Plant: JCB 3CX	Date 15/07/2015
Location: Land off Mitchells Way, Wombwell		Dimensions (m): 2.50 x 0.30 Depth 1.90	Scale 1:25
Client: Lidl UK GmbH			Logged CA

Backfill	Samples & In Situ Testing: Depth	ID	Results	Depth (m)	Level (m)	Legend	Stratum Description	Water Strike
							MADE GROUND: Black slightly gravelly very clayey fine sand TOPSOIL. Gravel is subangular to subrounded fine to medium of sandstone and rare brick.	
				0.50			Soft consistency orange brown slightly gravelly very sandy CLAY. Gravel is subangular fine of mudstone and sandstone.	
				1.40			Yellow brown slightly clayey gravelly SAND with a low cobble content. Gravel is subangular medium to coarse of sandstone.	
				1.90			End of Pit at 1.90m	

Remarks: 1. Trial pit terminated at 1.90m due to reaching target depth. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

Stability: Sides of Pit Stable

Trial Pit Log

OPUS			TrialPit No TP01 Sheet 1 of 1
Project Name: Lidl Wombwell	Project No. J-B0914.00	Co-ords: 439394.86 - 403773.82 Plant: JCB 3CX	Date 15/07/2015
Location: Land off Mitchells Way, Wombwell		Dimensions (m): Depth 2.70	Scale 1:25
Client: Lidl UK GmbH			Logged CA

Backfill	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Water Strike
	Depth	ID	Results					
	0.30	D61		0.45			Black slightly gravelly clayey fine sand TOPSOIL. Gravel is subangular to angular fine of coal fragments and sandstone.	
	0.50 0.50	D62 G63					Brown slightly gravelly very clayey fine SAND. Gravel is subangular fine to medium of sandstone.	
	1.00	D64		1.00			Yellow brown gravelly fine to medium SAND. Gravel is angular to angular fine to coarse of sandstone.	
	1.50 1.50	B65 G65		1.40			Orange brown clayey SAND and GRAVEL with a low cobble content. Gravel is angular to subangular medium to coarse of sandstone. Sand is medium to coarse.	
							Water seepage.	
	2.20	D68		2.20			Firm consistency orange brown mottled light grey sandy CLAY.	
				2.70			End of Pit at 2.70m	

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Remarks: 1. Trial pit terminated at 2.70m due to difficulty digging. 2. Groundwater seepage encountered at 1.90m. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

Stability: Sides of Pit Stable

AGS

Trial Pit Log

TrialPit No: TP02
Sheet 1 of 1

Project Name: Lidl Wombwell	Project No. J-B0914.00	Co-ords: 439357.57 - 403810.76 Plant: JCB 3CX	Date 15/07/2015
Location: Land off Mitchells Way, Wombwell		Dimensions (m): Depth 2.20	Scale 1:25
Client: Lidl UK GmbH			Logged CA

Backfill	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Water Strike
	Depth	ID	Results					
	0.20	D69		0.40			Black slightly gravelly very clayey fine sand TOPSOIL.	
	0.50	B72A					Light brown gravelly clayey fine SAND. Gravel is angular to subangular fine to coarse of sandstone.	
	0.50	B72B						
	0.50	D70						
	0.50	G70						
	1.00	D73		1.00			Orange brown slightly sandy clayey angular to subangular tabular medium to coarse GRAVEL with a low cobble content of sandstone. Sand is fine to medium.	
	1.00	G74						
	1.50	D75						
	1.70	D76		1.70			Orange brown sandy angular to subangular tabular medium to coarse GRAVEL with a medium cobbles content of sandstone.	
				2.20			End of Pit at 2.20m	

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Remarks: 1. Trial pit terminated at 2.20m due to refusal on suspected bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

Stability: Sides of Pit Stable

Trial Pit Log

TrialPit No: TP03
Sheet 1 of 1

Project Name: Lidl Wombwell	Project No. J-B0914.00	Co-ords: 439349.04 - 403852.91 Plant: JCB 3CX	Date 15/07/2015
Location: Land off Mitchells Way, Wombwell		Dimensions (m): Depth 3.70	Scale 1:25
Client: Lidl UK GmbH			Logged CA

Backfill	Samples & In Situ Testing: Depth	ID	Results	Depth (m)	Level (m)	Legend	Stratum Description	Water Strike
	0.30	D77					Dark grey black slightly gravelly clayey sand TOPSOIL. Gravel is angular to subangular fine of coal fragments and sandstone.	
	0.40	D78		0.40				
	0.40	G79					Orange brown slightly gravelly very clayey fine SAND. Gravel is angular to subangular fine to medium of sandstone.	
	0.50	B80A						
	0.50	B80B						
	0.80	D81						
	0.80	G82		0.90				
							Light yellow brown slightly gravelly clayey fine to medium SAND. Gravel is angular to subangular medium to coarse of sandstone.	
	1.20	D83						
				1.40				
	1.50	D84					Soft consistency orange mottled light grey slightly gravelly sandy CLAY.	
							Becoming firm.	
	2.50	D85						
	3.10	D86						
				3.50			Orange brown gravelly CLAY. Gravel is angular to subangular medium to coarse of sandstone.	
				3.70			End of Pit at 3.70m	

Remarks: 1. Trial pit terminated at 3.70m due to difficulty digging. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

Stability: Sides of Pit Stable

Trial Pit Log

OPUS

TrialPit No: TP04
Sheet 1 of 1

Project Name: Lidl Wombwell	Project No. J-B0914.00	Co-ords: 439308.66 - 403833.06 Plant: JCB 3CX	Date 15/07/2015
Location: Land off Mitchells Way, Wombwell		Dimensions (m): Depth 2.00	Scale 1:25
Client: Lidl UK GmbH			Logged CA

Backfill	Samples & In Situ Testing: Depth	ID	Results	Depth (m)	Level (m)	Legend	Stratum Description	Water Strike
	0.20	D87		0.40			MADE GROUND: Black slightly gravelly very clayey fine sand TOPSOIL. Gravel is angular to subangular of rare brick, ceramic fragments and sandstone.	
	0.50 0.50 0.50	B90B D88 G89		0.80			Brown slightly gravelly clayey fine SAND. Gravel is angular to subangular fine to medium of sandstone.	
	0.90 0.90	D91 G92		1.60			Light yellow brown slightly clayey gravelly SAND. Gravel is angular to subangular medium to coarse of sandstone.	
	1.60	D93		2.00			Light yellow brown slightly clayey SAND and GRAVEL with a low cobble content. Gravel is angular to subangular tabular medium to coarse of sandstone.	
							End of Pit at 2.00m	

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Remarks: 1. Trial pit terminated at 2.00m due to refusal on suspected bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

Stability: Sides of Pit Stable

AGS

Trial Pit Log

TrialPit No: TP05
Sheet 1 of 1

Project Name: Lidl Wombwell	Project No. J-B0914.00	Co-ords: 439319.31 - 403878.21 Plant: JCB 3CX	Date 15/07/2015
Location: Land off Mitchells Way, Wombwell		Dimensions (m): Depth 2.00	Scale 1:25
Client: Lidl UK GmbH			Logged CA

Backfill	Samples & In Situ Testing: Depth	ID	Results	Depth (m)	Level (m)	Legend	Stratum Description	Water Strike
	0.10	D94					Black slightly gravelly clayey fine sand TOPSOIL. Gravel is subangular fine of sandstone.	
				0.40			Brown gravelly clayey fine to medium SAND. Gravel is tabular angular to subrounded medium to coarse of sandstone .	
	0.50	B97A						
	0.50	B97B		0.60				
	0.50	D95					Yellow brown clayey SAND and GRAVEL. Gravel is tabular angular to subangular medium to coarse of sandstone.	
	0.50	G96						
	0.80	D98						
	1.20	D99					*Rare tabular cobbles.*	
	1.80	D100						
				2.00			End of Pit at 2.00m	

Remarks: 1. Trial pit terminated at 2.00m due to refusal on suspected bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

Stability: Sides of Pit Stable

Trial Pit Log

TrialPit No: TP06
Sheet 1 of 1

Project Name: Lidl Wombwell	Project No. J-B0914.00	Co-ords: 439291.24 - 403876.20 Plant: JCB 3CX	Date 15/07/2015
Location: Land off Mitchells Way, Wombwell		Dimensions (m): Depth 2.10	Scale 1:25
Client: Lidl UK GmbH			Logged CA

Backfill	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Water Strike
	Depth	ID	Results					
	0.20	D101		0.30			MADE GROUND: Black slightly gravelly clayey fine to coarse sand TOPSOIL. Gravel is angular to subangular of sandstone, glass, limestone and brick fragments.	
	0.40	D102					Orange brown slightly gravelly clayey fine to medium SAND. Gravel is angular to subangular medium of sandstone.	
	0.50	B104A						
	0.50	B104B						
	1.00	D105		1.00			Orange brown slightly clayey sandy angular to subangular medium to coarse tabular GRAVEL with a low cobble content of sandstone.	
							Occasional tabular cobble.	
	2.00	D106		2.10			End of Pit at 2.10m	

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Remarks: 1. Trial pit terminated at 2.10m due to refusal on suspected bedrock. 2. Groundwater not encountered. 3. Log based on field engineer's log to BS EN ISO 14688-1. 4. Co-ordinates based on approximated location rather than topographical survey.

Stability: Sides of Pit Stable

APPENDIX B
Chemical Analysis Results

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Scientific Analysis Laboratories Ltd

Certificate of Analysis

Report Number: 495092-1

Date of Report: 29-Jul-2015

Customer: OPUS International Consultants (UK) Ltd.
1-2 Aire House
Sidings Court
Doncaster
DN4 5NL

Customer Contact: Mr Craig Aylott

Customer Job Reference: J-B0914.00
Customer Purchase Order: PO DO20429
Customer Site Reference: Lidl Wombwell
Date Job Received at SAL: 20-Jul-2015
Date Analysis Started: 21-Jul-2015
Date Analysis Completed: 28-Jul-2015

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with Section 25 of the SAL Quality Manual

UKAS TESTING 1549

Report checked and authorised by :
Bianca Prince
Customer Service Manager

Issued by :
Bianca Prince
Customer Service Manager

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Soil Analysed as Soil
Heavy Metals(9)

				SAL Reference	**495092 001**	**495092 002**	**495092 004**	**495092 006**	**495092 007**
				Customer Sample Reference	**WS02 D9**	**TP05 D98**	**TP04 D88**	**WS01 D4**	**WS06 D41**
				Date Sampled	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**
				Depth	**0.80**	**0.80**	**0.50**	**1.00**	**0.20**
				Type	**Clay**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Arsenic	T6	M40	2	mg/kg	**5**	**7**	**6**	**3**	**23**
Cadmium	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Chromium	T6	M40	1	mg/kg	**11**	**15**	**14**	**9**	**18**
Copper	T6	M40	1	mg/kg	**8**	**14**	**14**	**6**	**50**
Lead	T6	M40	1	mg/kg	**16**	**20**	**17**	**5**	**94**
Mercury	T6	M40	1	mg/kg	<1	<1	<1	<1	<1
Nickel	T6	M40	1	mg/kg	**11**	**27**	**22**	**17**	**22**
Selenium	T6	M40	3	mg/kg	<3	<3	<3	<3	<3
Zinc	T6	M40	1	mg/kg	**44**	**63**	**54**	**19**	**230**

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Soil Analysed as Soil
Heavy Metals(9)

				SAL Reference	**495092 008**
				Customer Sample Reference	**WS04 D24**
				Date Sampled	**17-JUL-2015**
				Depth	**0.20**
				Type	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Arsenic	T6	M40	2	mg/kg	**30**
Cadmium	T6	M40	1	mg/kg	<1
Chromium	T6	M40	1	mg/kg	**18**
Copper	T6	M40	1	mg/kg	**50**
Lead	T6	M40	1	mg/kg	**71**
Mercury	T6	M40	1	mg/kg	<1
Nickel	T6	M40	1	mg/kg	**22**
Selenium	T6	M40	3	mg/kg	<3
Zinc	T6	M40	1	mg/kg	**140**

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Soil Analysed as Soil
Miscellaneous

				SAL Reference	**495092 001**	**495092 002**	**495092 004**	**495092 006**	**495092 007**
				Customer Sample Reference	**WS02 D9**	**TP05 D98**	**TP04 D88**	**WS01 D4**	**WS06 D41**
				Date Sampled	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**
				Depth	**0.80**	**0.80**	**0.50**	**1.00**	**0.20**
				Type	**Clay**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Moisture @ 105 C	T162	AR	0.1	%	**16**	**9.4**	**7.4**	**7.7**	**12**
Retained on 10mm sieve	T2	AR	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Soil Analysed as Soil
Miscellaneous

SAL Reference	**495092 008**	**495092 009**	**495092 010**	**495092 011**	**495092 012**
Customer Sample Reference	**WS04 D24**	**TP02 G71**	**TP05 G96**	**TP04 D87**	**TP03 D77**
Date Sampled	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**
Depth	**0.20**	**0.50**	**0.50**	**0.20**	**0.30**
Type	**Topsoil**	**Sandy Soil**	**Sandy Soil**		

Determinand	Method	Test Sample	LOD	Units					
Asbestos ID	T27	AR			-	-	-	N.D.	N.D.
Moisture @ 105 C	T162	AR	0.1	%	**14**	**13**	**9.0**	-	-
Retained on 10mm sieve	T2	AR	0.1	%	<0.1	-	-	-	-

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Soil Analysed as Soil
Miscellaneous

SAL Reference	**495092 013**	**495092 014**	**495092 015**	**495092 016**
Customer Sample Reference	**WS05 D34**	**WS02 D7**	**WS03 D17**	**WS07 D47**
Date Sampled	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**
Depth	**0.20**	**0.30**	**0.50**	**0.40**
Type				

Determinand	Method	Test Sample	LOD	Units				
Asbestos ID	T27	AR			N.D.	N.D.	N.D.	N.D.

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Soil Analysed as Soil
Opus (Doncaster)

SAL Reference	**495092 001**	**495092 002**	**495092 004**	**495092 006**	**495092 007**
Customer Sample Reference	**WS02 D9**	**TP05 D98**	**TP04 D88**	**WS01 D4**	**WS06 D41**
Date Sampled	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**
Depth	**0.80**	**0.80**	**0.50**	**1.00**	**0.20**
Type	**Clay**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Topsoil**

Determinand	Method	Test Sample	LOD	Units					
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
pH	T7	AR			**7.5**	**7.5**	**7.4**	**7.3**	**7.2**
(Water Soluble) SO4 expressed as SO4	T242	AR	0.01	g/l	**0.02**	<0.01	<0.01	<0.01	<0.01
SO4(Total)	T6	M40	0.01	%	**0.03**	**0.01**	**0.02**	<0.01	**0.08**
Total Organic Carbon	T21	M40	0.1	%	**0.4**	**0.2**	**0.5**	<0.1	**5.8**

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Soil Analysed as Soil
Opus (Doncaster)

SAL Reference	**495092 008**
Customer Sample Reference	**WS04 D24**
Date Sampled	**17-JUL-2015**
Depth	**0.20**
Type	**Topsoil**

Determinand	Method	Test Sample	LOD	Units	
Boron (water-soluble)	T6	AR	1	mg/kg	<1
Chromium VI	T6	AR	1	mg/kg	<1
pH	T7	AR			**7.1**
(Water Soluble) SO4 expressed as SO4	T242	AR	0.01	g/l	<0.01
SO4(Total)	T6	M40	0.01	%	**0.10**
Total Organic Carbon	T21	M40	0.1	%	**6.6**

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Soil Analysed as Soil
Total Petroleum Hydrocarbons CWG

SAL Reference	**495092 009**	**495092 010**
Customer Sample Reference	**TP02 G71**	**TP05 G96**
Date Sampled	**17-JUL-2015**	**17-JUL-2015**
Depth	**0.50**	**0.50**
Type	**Sandy Soil**	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units		
Benzene	T209	M105	10	µg/kg	(13) <10	(13) <10
Toluene	T209	M105	10	µg/kg	(13) <10	(13) <10
EthylBenzene	T209	M105	10	µg/kg	<10	<10
M/P Xylene	T209	M105	10	µg/kg	<10	<10
O Xylene	T209	M105	10	µg/kg	<10	<10
Methyl tert-Butyl Ether	T209	M105	10	µg/kg	<10	<10
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	<0.100	<0.100
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	<0.10	<0.10
TPH (C8-C10 aliphatic)	T209	M105	0.10	mg/kg	<0.10	<0.10
TPH (C10-C12 aliphatic)	T206	M105	1	mg/kg	<1	<1
TPH (C12-C16 aliphatic)	T206	M105	2	mg/kg	<2	<2
TPH (C16-C21 aliphatic)	T206	M105	1	mg/kg	<1	<1
TPH (C21-C35 aliphatic)	T206	M105	4	mg/kg	<4	<4
TPH (C6-C7 aromatic)	T209	M105	0.10	mg/kg	<0.10	<0.10
TPH (C7-C8 aromatic)	T209	M105	0.10	mg/kg	<0.10	<0.10
TPH (C8-C10 aromatic)	T209	M105	0.10	mg/kg	<0.10	<0.10
TPH (C10-C12 aromatic)	T206	M105	1	mg/kg	<1	<1
TPH (C12-C16 aromatic)	T206	M105	1	mg/kg	<1	<1
TPH (C16-C21 aromatic)	T206	M105	1	mg/kg	<1	<1
TPH (C21-C35 aromatic)	T206	M105	1	mg/kg	<1	<1

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Soil Analysed as Soil
PAH US EPA 16 (B and K split)

				SAL Reference	**495092 001**	**495092 002**	**495092 004**	**495092 006**	**495092 007**
				Customer Sample Reference	**WS02 D9**	**TP05 D98**	**TP04 D88**	**WS01 D4**	**WS06 D41**
				Date Sampled	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**	**17-JUL-2015**
				Depth	**0.80**	**0.80**	**0.50**	**1.00**	**0.20**
				Type	**Clay**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Naphthalene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**0.3**
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**0.2**
Acenaphthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**1.9**
Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**0.3**
Fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**3.5**
Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**2.8**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**1.8**
Chrysene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**1.6**
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**1.7**
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**0.8**
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**1.2**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**0.6**
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**0.2**
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**0.7**
PAH(total)	T207	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	**18**

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Soil Analysed as Soil
PAH US EPA 16 (B and K split)

				SAL Reference	**495092 008**
				Customer Sample Reference	**WS04 D24**
				Date Sampled	**17-JUL-2015**
				Depth	**0.20**
				Type	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Naphthalene	T207	M105	0.1	mg/kg	**0.6**
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	<0.1
Fluorene	T207	M105	0.1	mg/kg	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	**0.9**
Anthracene	T207	M105	0.1	mg/kg	**0.2**
Fluoranthene	T207	M105	0.1	mg/kg	**1.7**
Pyrene	T207	M105	0.1	mg/kg	**1.4**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	**1.0**
Chrysene	T207	M105	0.1	mg/kg	**0.9**
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	**1.0**
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	**0.4**
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	**0.6**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	**0.3**
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	**0.1**
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	**0.4**
PAH(total)	T207	M105	0.1	mg/kg	**9.5**

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Leachate Analysed as Water
Opus (Doncaster)

SAL Reference	**495092 003**	**495092 005**
Customer Sample Reference	**TP05 D95**	**TP04 G89**
Date Sampled	**17-JUL-2015**	**17-JUL-2015**
Depth	**0.50**	**0.50**

Determinand	Method	Test Sample	LOD	Units		
As (Dissolved)	T281	10:1	0.2	µg/l	**0.9**	**0.9**
Boron	T6	10:1	0.01	mg/l	<0.01	<0.01
Cd (Dissolved)	T281	10:1	0.02	µg/l	<0.02	<0.02
Cr (Dissolved)	T281	10:1	1	µg/l	<1	**1**
Chromium VI	T686	10:1	0.003	mg/l	(13) <0.003	(13) <0.003
Cu (Dissolved)	T281	10:1	0.5	µg/l	**4.0**	**4.2**
Pb (Dissolved)	T281	10:1	0.3	µg/l	**0.4**	**0.9**
Hg (Dissolved)	T281	10:1	0.05	µg/l	<0.05	<0.05
Ni (Dissolved)	T281	10:1	1	µg/l	<1	<1
pH	T7	10:1			**7.8**	**7.5**
Se (Dissolved)	T281	10:1	0.5	µg/l	<0.5	<0.5
Sulphate	T686	10:1	0.5	mg/l	**0.6**	**0.5**
Total Organic Carbon	T21	10:1	1	mg/l	**4**	**5**
Zn (Dissolved)	T281	10:1	2	µg/l	<2	<2

SAL Reference: 495092
Project Site: Lidl Wombwell
Customer Reference: J-B0914.00

Leachate Analysed as Water
PAH US EPA 16 (B and K split)

SAL Reference	**495092 003**	**495092 005**
Customer Sample Reference	**TP05 D95**	**TP04 G89**
Date Sampled	**17-JUL-2015**	**17-JUL-2015**
Depth	**0.50**	**0.50**

Determinand	Method	Test Sample	LOD	Units		
Naphthalene	T149	10:1	0.01	µg/l	(100) <0.02	(100) <0.02
Acenaphthylene	T149	10:1	0.01	µg/l	(100) <0.02	(100) <0.02
Acenaphthene	T149	10:1	0.01	µg/l	**0.04**	**0.02**
Fluorene	T149	10:1	0.01	µg/l	**0.06**	**0.04**
Phenanthrene	T149	10:1	0.01	µg/l	**0.16**	**0.10**
Anthracene	T149	10:1	0.01	µg/l	(100) <0.02	(100) <0.02
Fluoranthene	T149	10:1	0.01	µg/l	**0.06**	(100) <0.02
Pyrene	T149	10:1	0.01	µg/l	**0.04**	(100) <0.02
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	(100) <0.02	(100) <0.02
Chrysene	T149	10:1	0.01	µg/l	**0.02**	(100) <0.02
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	(100) <0.02	(100) <0.02
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	(100) <0.02	(100) <0.02
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	(100) <0.02	(100) <0.02
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	(100) <0.02	(100) <0.02
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	(100) <0.02	(100) <0.02
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	(100) <0.02	(100) <0.02
PAH(total)	T149	10:1	0.01	µg/l	**0.38**	**0.16**

Index to symbols used in 495092-1

Value	Description
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
10:1	Leachate
AR	As Received
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
N.D.	Not Detected
13	Results have been blank corrected.

100	LOD determined by sample aliquot used for analysis
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos was subcontracted to REC Asbestos
Samples submitted for GC/MS (Headspace) analysis were submitted in inappropriate containers. It is possible therefore that the results provided may be compromised.

Method Index

Value	Description
T7	Probe
T686	Discrete Analyser
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T6	ICP/OES
T21	OX/IR
T27	PLM
T149	GC/MS (SIR)
T162	Grav (1 Dec) (105 C)
T209	GC/MS(Head Space)(MCERTS)
T281	ICP/MS (Filtered)
T206	GC/FID (MCERTS)
T207	GC/MS (MCERTS)
T2	Grav

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Asbestos ID	T27	AR			SU	011-016
Moisture @ 105 C	T162	AR	0.1	%	N	001-002,004,006-010
Retained on 10mm sieve	T2	AR	0.1	%	N	001-002,004,006-008
Boron (water-soluble)	T6	AR	1	mg/kg	N	001-002,004,006-008
Chromium VI	T6	AR	1	mg/kg	N	001-002,004,006-008
pH	T7	AR			M	001-002,004,006-008
(Water Soluble) SO4 expressed as SO4	T242	AR	0.01	g/l	N	001-002,004,006-008
SO4(Total)	T6	M40	0.01	%	N	001-002,004,006-008
Total Organic Carbon	T21	M40	0.1	%	N	001-002,004,006-008
Arsenic	T6	M40	2	mg/kg	M	001-002,004,006-008
Cadmium	T6	M40	1	mg/kg	M	001-002,004,006-008
Chromium	T6	M40	1	mg/kg	M	001-002,004,006-008
Copper	T6	M40	1	mg/kg	M	001-002,004,006-008
Lead	T6	M40	1	mg/kg	M	001-002,004,006-008
Mercury	T6	M40	1	mg/kg	M	001-002,004,006-008
Nickel	T6	M40	1	mg/kg	M	001-002,004,006-008
Selenium	T6	M40	3	mg/kg	M	001-002,004,006-008
Zinc	T6	M40	1	mg/kg	M	001-002,004,006-008
Naphthalene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Acenaphthylene	T207	M105	0.1	mg/kg	U	001-002,004,006-008
Acenaphthene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Fluorene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Phenanthrene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Anthracene	T207	M105	0.1	mg/kg	U	001-002,004,006-008
Fluoranthene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Pyrene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Chrysene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	001-002,004,006-008
PAH(total)	T207	M105	0.1	mg/kg	U	001-002,004,006-008
As (Dissolved)	T281	10:1	0.2	µg/l	U	003,005
Boron	T6	10:1	0.01	mg/l	N	003,005

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Cd (Dissolved)	T281	10:1	0.02	µg/l	U	003,005
Cr (Dissolved)	T281	10:1	1	µg/l	U	003,005
Chromium VI	T686	10:1	0.003	mg/l	U	003,005
Cu (Dissolved)	T281	10:1	0.5	µg/l	U	003,005
Pb (Dissolved)	T281	10:1	0.3	µg/l	U	003,005
Hg (Dissolved)	T281	10:1	0.05	µg/l	U	003,005
Ni (Dissolved)	T281	10:1	1	µg/l	U	003,005
pH	T7	10:1			U	003,005
Se (Dissolved)	T281	10:1	0.5	µg/l	U	003,005
Sulphate	T686	10:1	0.5	mg/l	U	003,005
Total Organic Carbon	T21	10:1	1	mg/l	U	003,005
Zn (Dissolved)	T281	10:1	2	µg/l	U	003,005
Naphthalene	T149	10:1	0.01	µg/l	U	003,005
Acenaphthylene	T149	10:1	0.01	µg/l	U	003,005
Acenaphthene	T149	10:1	0.01	µg/l	U	003,005
Fluorene	T149	10:1	0.01	µg/l	U	003,005
Phenanthrene	T149	10:1	0.01	µg/l	U	003,005
Anthracene	T149	10:1	0.01	µg/l	U	003,005
Fluoranthene	T149	10:1	0.01	µg/l	U	003,005
Pyrene	T149	10:1	0.01	µg/l	U	003,005
Benzo(a)Anthracene	T149	10:1	0.01	µg/l	U	003,005
Chrysene	T149	10:1	0.01	µg/l	U	003,005
Benzo(b)fluoranthene	T149	10:1	0.01	µg/l	U	003,005
Benzo(k)fluoranthene	T149	10:1	0.01	µg/l	U	003,005
Benzo(a)Pyrene	T149	10:1	0.01	µg/l	U	003,005
Indeno(123-cd)Pyrene	T149	10:1	0.01	µg/l	U	003,005
Dibenzo(ah)Anthracene	T149	10:1	0.01	µg/l	U	003,005
Benzo(ghi)Perylene	T149	10:1	0.01	µg/l	U	003,005
PAH(total)	T149	10:1	0.01	µg/l	U	003,005
Benzene	T209	M105	10	µg/kg	M	009-010
Toluene	T209	M105	10	µg/kg	M	009-010
EthylBenzene	T209	M105	10	µg/kg	M	009-010
M/P Xylene	T209	M105	10	µg/kg	M	009-010
O Xylene	T209	M105	10	µg/kg	M	009-010
Methyl tert-Butyl Ether	T209	M105	10	µg/kg	M	009-010
TPH (C5-C6 aliphatic)	T209	M105	0.100	mg/kg	N	009-010
TPH (C6-C8 aliphatic)	T209	M105	0.10	mg/kg	N	009-010
TPH (C8-C10 aliphatic)	T209	M105	0.10	mg/kg	N	009-010
TPH (C10-C12 aliphatic)	T206	M105	1	mg/kg	N	009-010
TPH (C12-C16 aliphatic)	T206	M105	2	mg/kg	M	009-010
TPH (C16-C21 aliphatic)	T206	M105	1	mg/kg	M	009-010
TPH (C21-C35 aliphatic)	T206	M105	4	mg/kg	M	009-010
TPH (C6-C7 aromatic)	T209	M105	0.10	mg/kg	N	009-010
TPH (C7-C8 aromatic)	T209	M105	0.10	mg/kg	N	009-010
TPH (C8-C10 aromatic)	T209	M105	0.10	mg/kg	N	009-010
TPH (C10-C12 aromatic)	T206	M105	1	mg/kg	M	009-010
TPH (C12-C16 aromatic)	T206	M105	1	mg/kg	M	009-010
TPH (C16-C21 aromatic)	T206	M105	1	mg/kg	M	009-010
TPH (C21-C35 aromatic)	T206	M105	1	mg/kg	M	009-010

APPENDIX C
Geotechnical Testing Results

PSL
Professional Soils Laboratory

LABORATORY REPORT

UKAS TESTING
4043

Contract Number: PSL15/3507

Client's Reference: Report Date: 22 July 2015

Client Name: Opus Doncaster
1-2 Aire House
Sidings Court
Richmond Business Park
Doncaster
DN4 5NL

For the attention of: Craig Aylott

Contract Title: Wombwell

Date Received: 20/7/2015
Date Commenced: 20/7/2015
Date Completed: 22/7/2015

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)
A Watkins (Director)
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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Depth m	Description of Sample
TP01	62	D	0.50	Brown slightly gravelly very sandy silty CLAY.
TP02	72	B	0.50	Brown very gravelly very sandy CLAY.
TP06	104	B	0.50	Brown very gravelly slightly clayey SAND.
WS04	26	D	0.90	Brown slightly gravelly very sandy CLAY.
WS07	49	D	0.80	Brown slightly gravelly very sandy very silty CLAY.

PSL
Professional Soils Laboratory

Compiled by	Date	Checked by	Date	Approved by	Date
	22/07/15		22/07/15		22/07/15

WOMBWELL.

Contract No:	PSL15/3507
Client Ref:	J-B0914.00

SUMMARY OF SOIL CLASSIFICATION TESTS

(B.S. 1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Depth m	Moisture Content % Clause 3.2	Bulk Density Mg/m^3 Clause 7.2	Dry Density Mg/m^3 Clause 7.2	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4.4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	% Passing .425mm	Remarks
TP01	62	D	0.50	12				26	18	8	97	Low plasticity CL.
WS04	26	D	0.90	13				30	19	11	92	Low plasticity CL.
WS07	49	D	0.80	14				31	18	13	96	Low plasticity CL.

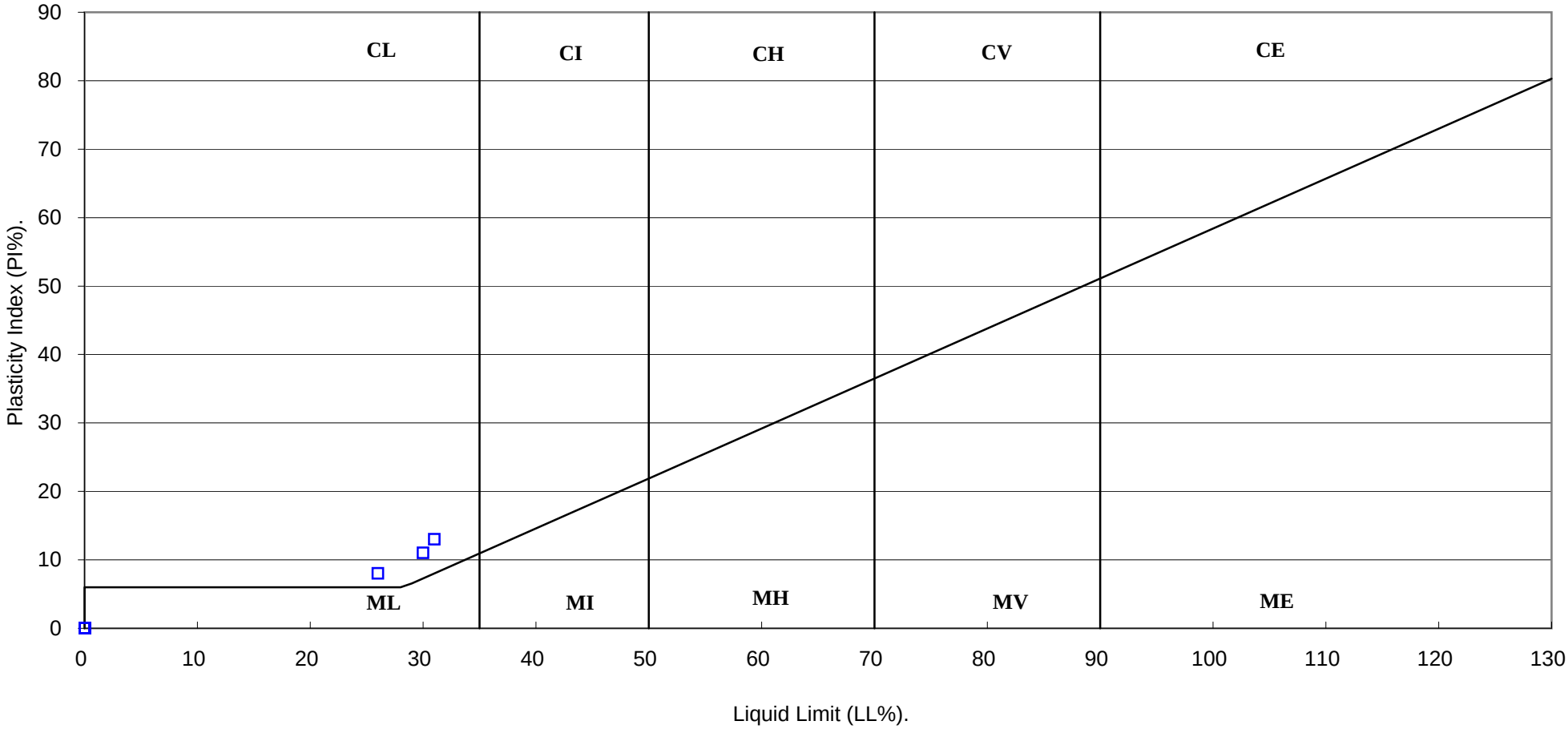
SYMBOLS : NP : Non Plastic *** : Liquid Limit and Plastic Limit Wet Sieved.**

PSL
Professional Soils Laboratory

Compiled by	Date	Checked by	Date	Approved by	Date
	22/07/15		22/07/15		22/07/15
WOMBWELL.				Contract No:	PSL15/3507
				Client Ref:	J-B0914.00

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



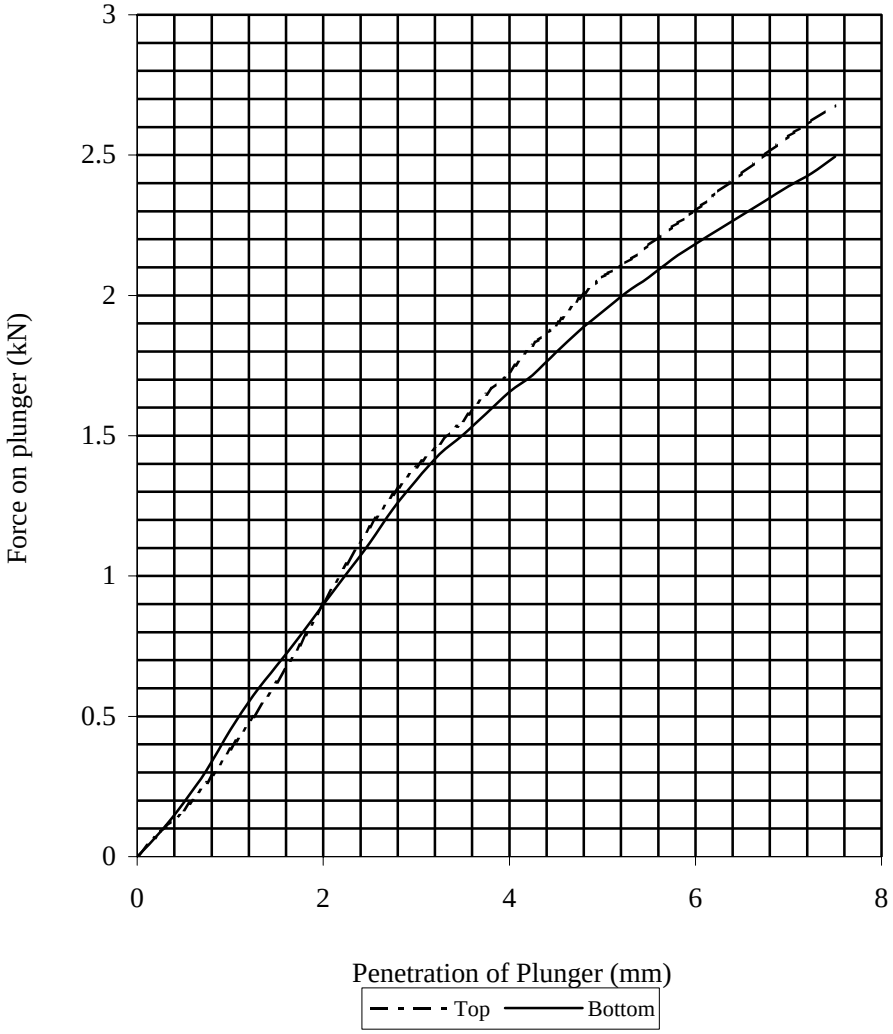
PSL Professional Soils Laboratory	Compiled by	Date	Checked by	Date	Approved by	Date
		22/07/15		22/07/15		22/07/15
	WOMBWELL.				Contract No:	PSL15/3507
					Client Ref:	J-B0914.00

California Bearing Ratio Test.

BS 1377 : Part 4 : 1990

Hole Number: **TP02** **Depth (m):** **0.50**

Sample Number: **Sample Type:** **B**



Initial Sample Conditions		Test Conditions		Method of compaction	2.5Kg Rammer		
Moisture Content:	16	Surcharge Kg:	4.20	Final Moisture Content %		C.B.R. Value %	
Bulk Density Mg/m3:	2.11	Soaking Time hrs	0	Sample Top	16	Sample Top	10.3
Dry Density Mg/m3:	1.82	Swelling mm:	0	Sample Bottom	16	Sample Bottom	9.7
Percentage retained on 20mm BS test sieve:	16	Remarks: See Summary of Soil Description.					

Checked by	Date	Approved By	Date
	22/07/15		22/07/15

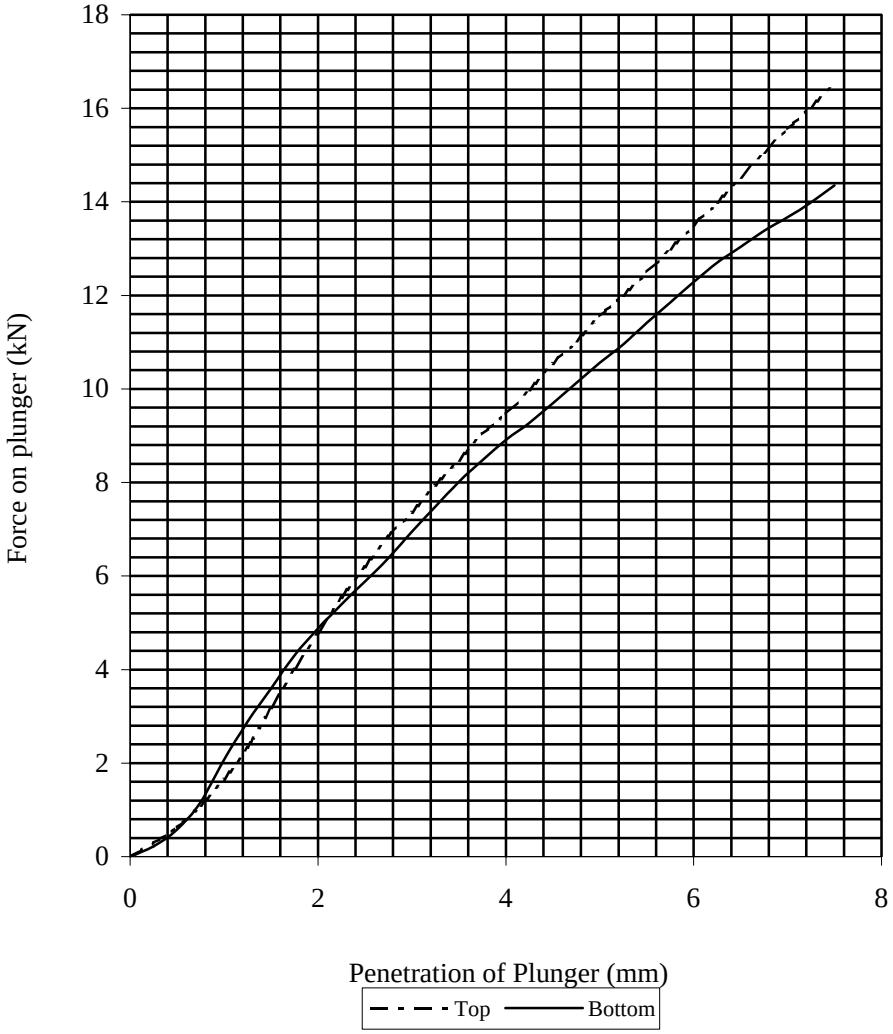
PSL Professional Soils Laboratory	**WOMBWELL.**	**Contract No. PSL15/3507**

California Bearing Ratio Test.

BS 1377 : Part 4 : 1990

Hole Number: **TP06** **Depth (m):** **0.50**

Sample Number: **Sample Type:** **B**



Initial Sample Conditions		Test Conditions		Method of compaction	2.5Kg Rammer		
Moisture Content:	12	Surcharge Kg:	4.20	Final Moisture Content %		C.B.R. Value %	
Bulk Density Mg/m3:	2.12	Soaking Time hrs	0	Sample Top	11	Sample Top	57.8
Dry Density Mg/m3:	1.89	Swelling mm:	0	Sample Bottom	12	Sample Bottom	52.8
Percentage retained on 20mm BS test sieve:	34	Remarks:	See Summary of Soil Description.				

Checked by	Date	Approved By	Date
M.Burton	22/07/15	M.Burton	22/07/15

PSL Professional Soils Laboratory	WOMBWELL.	Contract No. PSL15/3507

APPENDIX D
Gas and Groundwater Monitoring Results

GROUND GAS MONITORING RESULTS

CLIENT: **Lidl UK GmbH**
SITE: **Wombwell**
DATE: **21/07/2015**

JOB NO: J-B0914.00
VISIT NO: 1 of 6

Barometric Pressure (mb)	
Start	1004
Finish	1004
Trend	Falling

Ambient Concentration (% Vol)	
CH_4	ND
CO_2	ND
O_2	21.0

Monitoring Point	Peak					Steady State					Lowest	Steady	Flow Rate	Groundwater Level	Notes
	CH_4		CO_2	CO	H_2S	CH_4		CO_2	CO	H_2S	O_2	O_2			
	% lel	% v/v	% v/v	ppm	ppm	% lel	% v/v	% v/v	ppm	ppm	% v/v	% v/v	l/hr	m (bgl)	
WS01	ND	ND	2.0	ND	ND	ND	ND	2.0	ND	ND	13.9	13.9	ND	Dry	
WS02	ND	ND	1.9	ND	ND	ND	ND	1.9	ND	ND	19.9	19.9	ND	1.50	
WS04	ND	ND	1.1	ND	ND	ND	ND	1.1	ND	ND	20.0	20.0	ND	1.70	
WS05	ND	ND	1.4	ND	ND	ND	ND	1.4	ND	ND	19.8	19.8	ND	Dry	
WS07	ND	ND	1.7	ND	ND	ND	ND	1.7	ND	ND	19.8	19.8	ND	Dry	
WS08	ND	ND	0.8	ND	ND	ND	ND	0.8	ND	ND	20.3	20.3	ND	Dry	

	Monitoring Equipment	GFM 400 Gas Analyser	Weather Conditions	0.00
	Operator	CA	Surface Conditions	0.00

Key

NGW	indicates no ground water encountered
*	indicates that no measurement was taken
ND	indicates no gas detected
NR	indicates not recorded

Text shown in Bold & Italic indicates either:
a) Carbon Dioxide equal to or above 5% by Volume
or
b) Methane equal to or above 1% by Volume

Checked:	CJB	Approved:	PJE

GROUND GAS MONITORING RESULTS

CLIENT: **Lidl UK GmbH**
SITE: **Wombwell**
DATE: **06/08/2015**

JOB NO: J-B0914.00
VISIT NO: 2 of 6

Barometric Pressure (mb)	
Start	1003
Finish	1003
Trend	Stable

Ambient Concentration (% Vol)	
CH_4	ND
CO_2	ND
O_2	21.0

Monitoring Point	Peak					Steady State					Lowest	Steady	Flow Rate	Groundwater Level	Notes
	CH_4		CO_2	CO	H_2S	CH_4		CO_2	CO	H_2S	O_2	O_2			
	% lel	% v/v	% v/v	ppm	ppm	% lel	% v/v	% v/v	ppm	ppm	% v/v	% v/v	l/hr	m (bgl)	
WS01	ND	ND	1.6	ND	ND	ND	ND	1.6	ND	ND	19.6	19.6	ND	Dry	
WS02	ND	ND	3.8	ND	ND	ND	ND	3.8	ND	ND	17.4	17.4	ND	1.93	
WS04	ND	ND	1.0	ND	ND	ND	ND	1.0	ND	ND	20.1	20.1	ND	2.04	
WS05	ND	ND	0.5	ND	ND	ND	ND	0.5	ND	ND	20.6	20.6	ND	Dry	
WS07	ND	ND	2.4	ND	ND	ND	ND	2.4	ND	ND	18.5	18.5	ND	Dry	
WS08	ND	ND	0.9	ND	ND	ND	ND	0.9	ND	ND	19.9	19.9	ND	Dry	

	Monitoring Equipment	GFM 400 Gas Analyser	Weather Conditions	0.00
	Operator	CA	Surface Conditions	0.00

Key

NGW	indicates no ground water encountered
*	indicates that no measurement was taken
ND	indicates no gas detected
NR	indicates not recorded

Text shown in Bold & Italic indicates either:
a) Carbon Dioxide equal to or above 5% by Volume
or
b) Methane equal to or above 1% by Volume

Checked:	SMD	Approved:	PJE

APPENDIX E
Human Health Assessment Criteria

Client/client ref	Lidl UK GmbH
Project ref	J-B0914.00
Site ref	Lidl Wombwell
Data description	
Contaminant(s)	Metals
Test scenario	Planning: is true mean lower than critical concentration (μ < Cc)?
Date	5 August 2015
User details	CJB

Statistics calculator (version 1)

Input data

This spreadsheet has been produced based on the document 'Guidance on Comparing Soil Contamination Data with a Critical Concentration (CIEH/CL:AIRE, 2008)'. Users of this spreadsheet should always refer to this guidance, the User Manual and to relevant guidance on UK legislation and policy, in order to understand how the procedure should be applied in an appropriate context.

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Go to summary

Data sheet

Project details

Easting	Northing	Sample ID	Arsenic (As)	W/S Boron	Cadmium (Cd)	Hexavalent Chromium (Cr)	Copper (Cu)	Lead (Pb)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Zinc (Zn)	
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
		WS02 D9	5	<1	<1	<1	8	16	<1	11	<3	44	
		TP05 D98	7	<1	<1	<1	14	20	<1	27	<3	63	
		TP04 D88	6	<1	<1	<1	14	17	<1	22	<3	54	
		WS01 D4	3	<1	<1	<1	6	5	<1	17	<3	19	
		WS06 D41	23	<1	<1	<1	50	94	<1	22	<3	230	
		WS04 D24	30	<1	<1	<1	50	71	<1	22	<3	140	

Client/client ref: Lidl UK GmbH
Project ref: J-B0914.00
Site ref: Lidl Wombwell
Data description:
Contaminant(s): Metals
Test scenario: Planning
Date: 5 August 2015
User details: CJB

	Arsenic (As) (mg/kg)	W/S Boron (mg/kg)	Cadmium (Cd) (mg/kg)	Hexavalent Chromium (Cr) (mg/kg)	Copper (Cu) (mg/kg)	Lead (Pb) (mg/kg)	Mercury (Hg) (mg/kg)	Nickel (Ni) (mg/kg)	Selenium (Se) (mg/kg)	Zinc (Zn) (mg/kg)	
Critical concentration, C_c	**640**	**59**	**410**	**49**	**8340**	**2330**	**3600**	**1800**	**13000**	**38000**	
Notes	C4SL	Opus IHSV (Commercial)	C4SL	C4SL	Opus IHSV (Commercial)	C4SL	SGV	SGV	SGV	Opus IHSV (Commercial)	
Sample size, n	6	6	6	6	6	6	6	6	6	6	0
Sample mean, $\overline{x}$	12.3333333	0.5	0.5	0.5	23.6666667	37.1666667	0.5	20.1666667	1.5	91.6666667	No Data
Standard deviation, s	11.2723851	0	0	0	20.6462265	36.2183195	0	5.49241902	0	79.0763344	
Number of non-detects	0	**6**	**6**	**6**	0	0	**6**	0	**6**	0	
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Outliers?	No	No	No	No	No	No	No	No	No	No	
Distribution	Normal	Single value	Single value	Single value	Non-normal	Normal	Single value	Normal	Single value	Normal	
Statistical approach	Auto: One-sample t	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: One-sample t	Auto: Chebychev	Auto: One-sample t	Auto: Chebychev	Auto: One-sample t	Auto

Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?				**Evidence level required:**		**95%**	Use Normal distribution to test for outliers			
t statistic, t_0 (or k_0)	-136.3919919	N/A	N/A	N/A	-986.6584214	-155.0671542	N/A	-793.7638188	N/A	-1174.2587	
Upper confidence limit (on true mean concentration, μ)	21.6064488	0.5	0.5	0.5	60.4068959	66.961307	0.5	24.6849505	1.5	156.718027	
Evidence level	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	
Base decision on:	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	
Result	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	
Select dataset	○ Y	○ Y	○ Y	◉ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y

Back to data | **Go to outlier test** | **Go to normality test** | **Show individual summary**

Client/client ref	Lidl UK GmbH
Project ref	J-B0914.00
Site ref	Lidl Wombwell
Data description	
Contaminant(s)	PAH
Test scenario	Planning: is true mean lower than critical concentration (μ < Cc)?
Date	5 August 2015
User details	CJB

Statistics calculator (version 1)

Input data

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Go to summary

Data sheet

Project details

Easting	Northing	Sample ID	Naphthalene mg/kg	Acenaphthylene mg/kg	Acenaphthene mg/kg	Fluorene mg/kg	Phenanthrene mg/kg	Anthracene mg/kg	Fluoranthene mg/kg	Pyrene mg/kg	Benzo(a)anthracene mg/kg	Chrysene mg/kg	Benzo(b)fluoranthene mg/kg	Benzo(k)fluoranthene mg/kg	Benzo(a)pyrene mg/kg	Indeno(1,2,3-cd)pyrene mg/kg	Dibenz(a,h)anthracene mg/kg	Benzo(ghi)perylene mg/kg
		WS02 D9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		TP05 D98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		TP04 D88	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		WS01 D4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		WS06 D41	0.3	0.2	<0.1	<0.1	1.9	0.3	3.5	2.8	1.8	1.6	1.7	0.8	1.2	0.6	0.2	0.7
		WS04 D24	0.6	<0.1	<0.1	<0.1	0.9	0.2	1.7	1.4	1	0.9	1	0.4	0.6	0.3	0.1	0.4

Client/client ref: Lidl UK GmbH
Project ref: J-B0914.00
Site ref: Lidl Wombwell
Data description:
Contaminant(s): PAH
Test scenario: Planning
Date: 5 August 2015
User details: CJB

	Naphthalene (mg/kg)	Acenaphthylene (mg/kg)	Acenaphthene (mg/kg)	Fluorene (mg/kg)	Phenanthrene (mg/kg)	Anthracene (mg/kg)	Fluoranthene (mg/kg)	Pyrene (mg/kg)	Benzo(a)anthracene (mg/kg)	Chrysene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Benzo(a)pyrene (mg/kg)	Indeno(1,2,3-cd)pyrene (mg/kg)	Dibenz(a,h)anthracene (mg/kg)	Benzo(ghi)perylene (mg/kg)
Critical concentration, C_c	**76**	**97000**	**3.1**	**72600**	**22000**	**498000**	**72300**	**54200**	**130**	**13700**	**140**	**1410**	**76**	**140**	**14**	**4000**
Notes	Opus IHSV (Commercial 1% SOM)	LQM/CIEH S4ULs (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	LQM/CIEH S4ULs (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	C4SL adjusted for %SOM (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	Opus IHSV (Commercial 1% SOM)	LQM/CIEH S4ULs (Commercial 1% SOM)
Sample size, n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Sample mean, $\bar{x}$	0.18333333	0.075	0.05	0.05	0.5	0.11666667	0.9	0.73333333	0.5	0.45	0.48333333	0.23333333	0.33333333	0.18333333	0.08333333	0.21666667
Standard deviation, s	0.22730303	0.06123724	7.6012E-18	7.6012E-18	0.76550637	0.10801234	1.43457311	1.14746097	0.74161985	0.65802736	0.70687104	0.31091264	0.47819104	0.22730303	0.06055301	0.27507575
Number of non-detects	**4**	**5**	**6**	**6**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Outliers?	Yes	Yes	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	Yes	No
Distribution	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal
Statistical approach	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev
Test scenario:	Planning: is true mean lower than critical concentration (μ < Cc)?				**Evidence level required:**		**95%**	Use Normal distribution to test for outliers								
t statistic, t_0 (or k_0)	-817.0245189	-3879997	-9.82867E+17	-2.33954E+22	-70394.64572	-11293575.81	-123448.5039	-115699.4022	-427.7244228	-50996.21915	-483.4610909	-11106.68593	-387.5955633	-1506.708879	-562.9568852	-35617.20126
Upper confidence limit (on true mean concentration, μ)	0.58782204	0.18397247	0.05	0.05	1.86222857	0.30887604	3.45284155	2.77525509	1.81972219	1.62096826	1.74121957	0.78660642	1.18428052	0.58782204	0.1910882	0.70616755
Evidence level	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Base decision on:	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level
Result	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**	**μ < Cc**
Select dataset	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	○ Y	◉ Y	○ Y	○ Y

Back to data | **Go to outlier test** | **Go to normality test** | **Show individual summary**