

Geo-Environmental Assessment

Worton Grange, Imperial Way, Reading

September 2014

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Geo-Environmental Assessment

Worton Grange, Imperial Way, Reading

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This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS OHSAS 18001:2007)

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Comments		Updated Following Client Comments		

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Executive Summary

Objectives

To undertake a ground investigation at the site to provide environmental risk assessment and initial geotechnical design information on the site ground conditions and to provide supporting information for a future planning application to redevelop the site for a commercial and residential end use.

Site Setting

Current Use	The site currently comprises extensive areas of hardstanding, soft landscaping and a number of stockpiles of crushed aggregates.
History	The site was historically agricultural land, before being incorporated into the wider Worton Grange Industrial Estate. Recently the site was occupied by offices and a data centre.
Ground Conditions	The soil profile across the Site comprises made ground consisting of concrete or tarmac underlain by a yellow sand and gravel sub-base including brick, concrete, flint, granite and sandstone. Thicknesses ranged from 0.3m to 2.8m. London Clay soils were encountered between 0.4m and 2.8mbgl to a maximum depth of 15m bgl and comprised soft yellow brown very sandy clay underlain by firm to stiff sandy gravelly clay, becoming stiff to very stiff with depth, with occasional sand and shell bands.
Human Health	The results of the environmental laboratory testing were compared against the Waterman Generic Assessment Criteria for human health in a residential and commercial setting. No elevated concentrations of any determinands were recorded when screened against the commercial criteria. Localised elevated metals were recorded at two locations within the residential development area. The development design is not yet known, however, a capping layer may be required if soft landscaped / garden areas are proposed in these localised areas.
Controlled Waters	No significant concentrations of contaminants were identified within the groundwaters beneath the site. The risk to groundwater and the wider water environment is considered to be low and therefore no further actions are considered necessary.
Water Supply Pipes	The results of the environmental laboratory analysis have been compared against the UKWIR assessment criteria for the selection of buried water supply pipes. The UKWIR project steering group decided that barrier pipes would provide sufficient protection for the supply of drinking water in all Brownfield site conditions. However, this approach needs to be agreed with the local water company.
Ground Gas Regime	In accordance with CIRIA C665, results to date place the site as Characteristic Situation 1. This assessment should be revisited upon completion of the monitoring period.

Conceptual Model

Potential pollutant linkages identified for the Site are as follows:

- The potential risk to human health within the residential area of the Site associated with elevated levels of arsenic and barium; and
- The risk to buried water supply pipes and buried concrete.

These pollutant linkages can be broken using basic remedial measures.

Geotechnical Assessment

Medium strength cohesive deposits (i.e. London Clay Formation) have been identified as a suitable bearing stratum, with a design bearing resistance of approximately 150kPa. This stratum has been encountered at depths of less than 2.5m below proposed ground level across the site and as such shallow foundations (strip / pad foundations) could be adopted. Typically shallow foundations to 2.0mbgl within the commercial area and 1.5mbgl in the residential area would be adequate.

Foundations placed on shrinkable soils should be deepened where necessary to accommodate the effects of trees and hedgerows.

Based on the characteristic values derived from SD1 testing, the Design Sulphate (DS) and Aggressive Chemical Environment for Concrete (ACEC) classifications are considered to be:

- Concrete in contact with Made Ground: DS-1 AC-1

- Concrete in contact with Shallow London Clay Formation: DS-3 AC-3

Should foundation loads be significantly in excess of the design bearing resistance of the shallow soils, it is recommended that piled foundations could be utilised and the advice of a specialist piling contractor should be obtained to confirm the suitability of piling and the most appropriate pile type. However, based on the site investigation information, frictional piles could derive support from the London Clay Formation, present from depths of between 0.3m bgl and 2.8m bgl to a minimum of 15m bgl. Piled foundations may need to be adopted for residential buildings over four storeys. Piling may also be required for the Hotel complex subject to a more detailed loading assessment.

The results of compaction testing undertaken on samples of Made Ground (granular) indicate that, in its current condition, it could not be recompacted to achieve either 95% Maximum Dry Density or less than 5% air voids. However, the Particle Size Distribution testing suggests that these materials should be suitable for re-use as either Class 1A/1B or Class 6F2 Engineered Fill. Based upon the results obtained it is considered that Made Ground (Granular) would require some processing (e.g. selection, screening, crushing) and wetting prior to re-use as an Engineered Fill. It should be noted that suitability for compaction is highly dependent on the initial moisture content of the material to be compacted.

Where Made Ground is to be reused as an engineered fill, it would be sensible to select granular fills only and subject them to a confirmatory testing regime where they were required to achieve a compaction specification as a structural fill.

The natural subgrade has CBR values in the range 2.7% to 6.1% and it is recommended that a value of 3% is used for the purposes of pavement design and temporary works design. Subgrade strength may vary considerably across the site.

Ground bearing floor slabs are potentially viable for the proposed development, however, to enable this to be adopted, the existing Made Ground would have to be re-engineered or some type of ground improvement technique (such as vibro-compaction) adopted to provide an adequate CBR value at formation level, given that the CBR results from the existing Made Ground suggest that this material is variable in nature. Specialist advice will be need to be sought to determine the most suitable ground improvement technique for the site.

Within the area intended for residential development Made Ground will need to be heavily compacted to provide a suitable bearing strata for floor slabs failing this suspended floor slabs such as beam and block slabs could be adopted.

Based on observations made during fieldwork, shallow excavations (<1.2m) likely to be stable in the short term. Simple sump pumping may be required to control moderate groundwater seepages in granular materials.

Soakaway drainage is unlikely to be suitable for the proposed development due to the low permeability of the natural strata.

Consideration should be given to the re-use of arisings from foundation trenches / drainage runs etc.

Conclusions

Given the proposed commercial and residential end use the overall environmental risk rating for the Site is **low**.

Recommendations

A copy of this and any subsequent reports prepared for the Site should be submitted to the local authority in support of the planning application for redevelopment for residential and commercial purposes. In addition, a copy should be sent to the utilities provider to agree the type of water supply pipes suitable for use at the site.

Localised areas of soft landscaping within the flatted residential area of the site may require to be capped with a capping layer to mitigate against risk to human health. This should be reviewed once the proposed development plan is known.

Ensure good working practices during construction, including the damping down of soils, to minimise the potential for offsite migration of dust and PPE should be worn at all times by construction workers, commensurate with the contaminants present and the activities being undertaken.

Based on ground gas monitoring results available to date, the Site would be classified as Characteristic Situation 1 whereby no ground gas protection measures are considered necessary. It is recommended that this requirement be reassessed at the end of the monitoring period due to be completed by end of September 2014.

No requirement for radon protection measures has been identified; however current guidance indicates that basic radon protection measures should be incorporated as standard into all new properties. This should be discussed with the Building Control Officer at the local authority. Typical basic radon protection measures require that all gaps within building floors, such as joins or service penetrations, are sealed either with a PE sheet or suitable plastic based sealant material.

Earthworks requirements, including materials permitted for use in the works, should be detailed within an Earthworks Specification document. It is recommended this be prepared in accordance with Series 600 of the Specification for Highway Works and should outline requirements for preparation of sub-grade, compaction of fills and the frequency of acceptability testing to be undertaken on site won and imported materials.

Consideration should be given to the re-use of arisings from foundation trenches / drainage runs etc. Where contamination has been encountered, it may be possible to reuse foundation arisings subject to risk assessment; however, certainty of use and volume should be confirmed in accordance with the requirements of the CL:AIRE waste protocol.

1. Introduction

1.1 Objectives and Brief

Waterman Energy, Environment & Design Limited (Waterman) was instructed by Kier Property to undertake a Geo-environmental Assessment for the proposed commercial and residential redevelopment of Land at Worton Grange, Reading. The main objectives of the report are to:

- Provide an exploratory geotechnical and geo-environmental investigation to obtain design information; and
- Provide an environmental risk assessment of ground conditions as supporting information for a future planning application to redevelop the site for a commercial and residential end use.

This assessment has been undertaken in general accordance with the Model Procedures for Management of Land Contamination (Contaminated Land Report 11 – Environment Agency, September 2004) and forms a decision record in relation to the assessment of the site. The report also provides a refined conceptual based on the findings of the ground investigation, an evaluation of potential risks and recommendations relating to any necessary remediation.

The assessment was undertaken in accordance with the scope agreed between Waterman and Kier Property as documented in Waterman's fee letter Ref: EED14273-00-F-001-GH_JLD and with Waterman's standard Terms of Appointment.

The benefit of this report is made to Kier Property Developments Limited and Bellway Homes Ltd.

1.2 The Proposed Development

The proposed development comprises commercial redevelopment of the site. A site location plan and site plan with development boundary is illustrated in Figure A1 and A2 in Appendix A.

1.3 Limitations

The information contained in this report is based on a review of the sites history, geology, hydrology and hydrogeology, a review of available previous information and a site walkover, observations made on site, exploratory hole records, laboratory test results, groundwater monitoring and ground gas monitoring.

The ground conditions reported relate only to the point of excavation and do not necessarily guarantee a continuation of the ground conditions throughout the non-inspected area of the site. Whilst such exploratory holes would usually provide a reasonable indication as to the general ground conditions, these cannot be determined with complete certainty.

Waterman has endeavoured to assess all information provided to them during this investigation, but makes no guarantees or warranties as to the accuracy or completeness of this information.

The scope of this site investigation includes an assessment of the presence of asbestos containing materials in the ground at the site, but not within buildings or structures or below ground structures (basements, buried service ducts and the like).

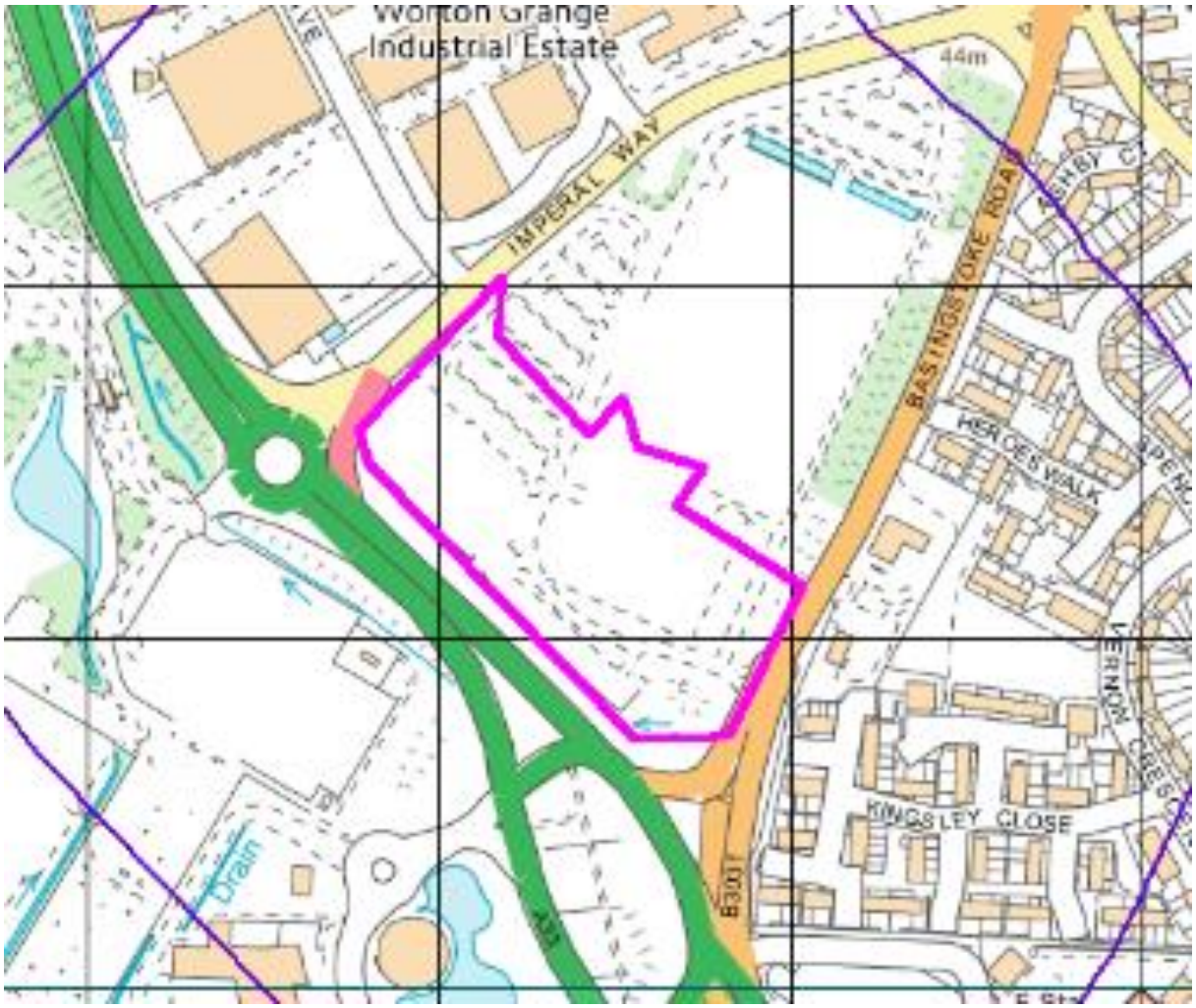
The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the site.

2. Site Setting

2.1 Description and Reconnaissance

The site is located at National Grid Reference 471480 169270 on Imperial Way, Reading. Please note that site boundary indicated in Figure 1 below is for the proposed commercial area only, however, the site description provided covers the whole site.

Figure 1: Current Site Layout



Source: Landmark Information Group, History Slice 2014, Scale 1:10,000

The site comprises extensive areas of hardstanding, soft landscaping and a number of stockpiles of crushed aggregates.

The site is bound to the northwestern and southeastern boundaries of the site are bound by raised banks of soft landscaping along the east and western boundaries of the site, a swale was also located in the southeastern corner of the site. Along the western bank, rubbles, general rubbish and tarmacadam were identified with the soils. The south of the site is bound by a metal fence and dense undergrowth. Much of the west and south of the site is covered in hardstanding comprising tarmacadam where former car parking

spaces once existed. Raised beds of soft landscaping were recorded within the tarmacadam in the west of the site. Other hardstanding included possible concrete foundations of a former building in the centre and north of the site. The western flank of the concrete was surrounded by compressed crushed aggregate. In addition, 3No. crushed aggregate stockpiles were located in the southwest, south and north of the site, these materials also included: wire; flints; metals; and woods.

A number of drains were recorded across the site, one of which was noted to have a slatted cover located in the southeast of the site. This drain was noted to be several feet deep and is assumed to be linked with the onsite swale.

A fuel tank is set within the landscaped bund along the western site boundary. The tank was believed to have been used for supply of onsite generators. A filling point is located off Imperial Way, it is not known if this fuel tank has been decommissioned.

According to the Landmark EnviroCheck report, there are no licences or consents registered to the property.

A site location plan and site layout plan are presented as Appendix A. A selection of photographs taken during the site inspection is presented as Appendix B.

Current potentially contaminative site uses were identified during the property inspection, and are summarised in Table 1 below:

Table 1: Summary of potentially contaminative activities on-site

Potential Issue	Description	Condition
Underground Storage Tanks (and fuel lines)	None recorded	N/A
Aboveground Storage Tanks (and fuel lines)	An above ground tank is set within a landscaped bund (160,000 litre diesel tank) within the west of the site.	N/A
Drainage	None recorded.	N/A
Hazardous Materials	None recorded. However, previous service plans record two electrical substations as part of the former onsite infrastructure.	N/A
Solid and Liquid Waste Storage	None recorded.	N/A

2.1.1 Site Surroundings

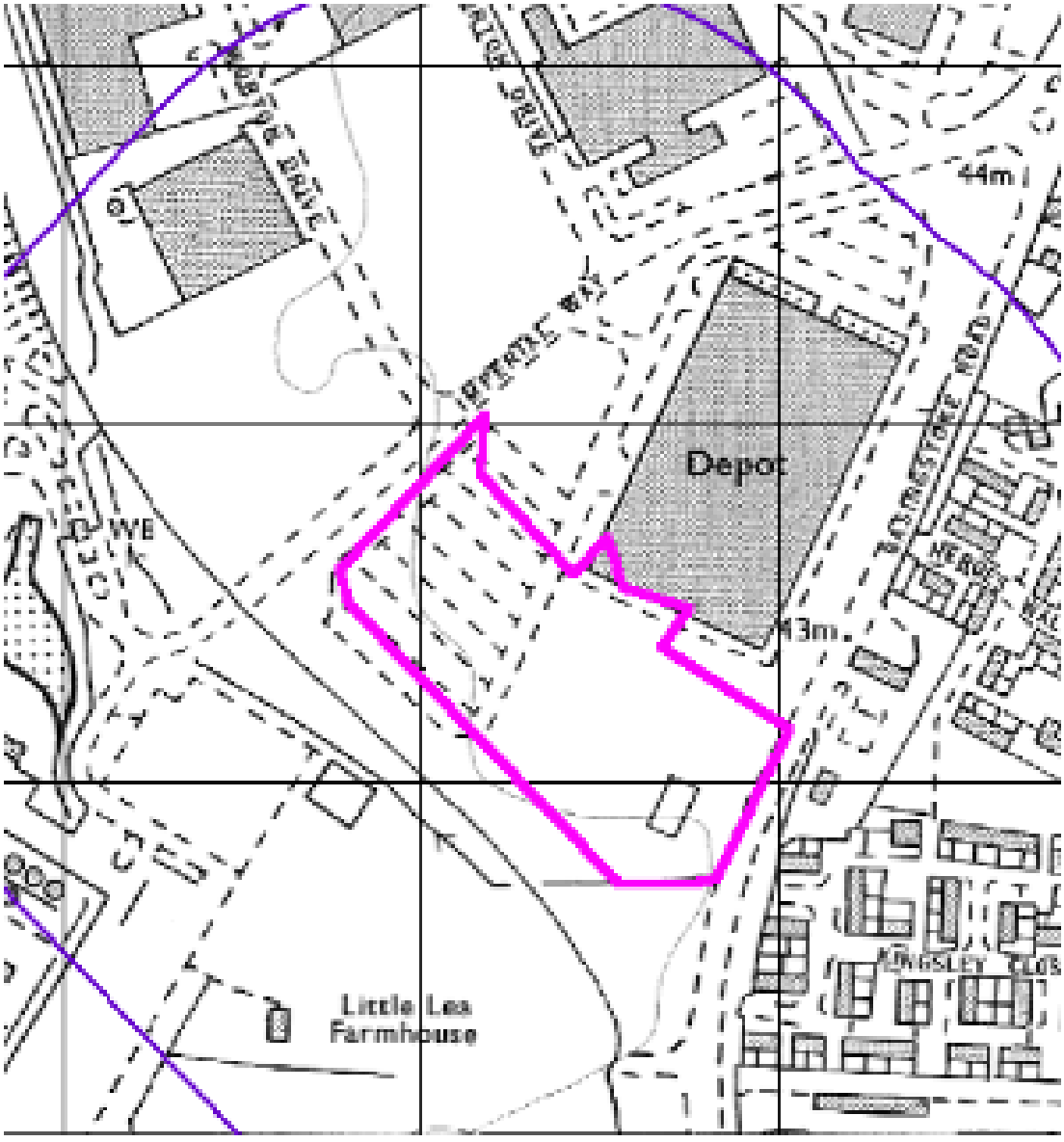
Table 2: Summary of surrounding land uses

Location	Description
North	The Worton Grange Industrial Estate is located immediately northwest of the site and a Holiday Inn is located immediately north.
East	A fuel station is located immediately east of the site. Typically, the land east of the site comprises residential property. A man-made brook was recorded at the southeast of the site.
South	Immediate land south of the site is Reading International Business Park, which is followed by the M4 and agricultural land.
West	The west comprises a mixture of industrial, commercial and retail land uses. In addition, the Madejski football stadium is west of the site.

There are 6No. active Local Authority Pollution Prevention and Controls recorded between 402m and 907m of the site. The closest is located approximately 402m northeast of the site, registered to Fairfield Service Station Shell for a PG1/14 Petrol Filling Station.

2.2 History

Figure 2: Historical Site Use



Source: Landmark Information Group, History Slice (1984), Scale 1:10,000

A review of historical maps obtained from Landmark Information Group Historical Maps has been undertaken, and a summary of relevant information is shown in chronological order in Table 3.

Table 3: History for the subject site

Source	On Site	Surroundings
OS Map		
1870s – 1900s	Earliest mapping records the site as Lower Whiley Farm and associated agricultural land.	Earliest mapping records the surrounding area as largely agricultural land with associated farm buildings. A road was located immediately east of the site.
1910s – 1950s	No significant change.	Residential development was recorded to the east and south of the site. An ***Isolation Hospital*** was recorded approximately 470m northwest of the site.
1960s – 1980s	An unknown building, car park, ***an unknown depot (north) and an unknown tank (southeast)*** were located at the site.	A ***tank*** was located approximately 110m north of the site and a ***filling station*** (inc. a tank) was located approximately immediately east of the site. The ***Worton Grange Industrial Estate*** was located immediately northwest of the site. An ***unknown depot*** was located approximately 180m south of the site. 2No. ***electrical substations*** were recorded, the closest was located approximately 160m southwest of the site and ***numerous tanks*** were recorded approximately 210m southwest of the site. ***Numerous works and factories*** and an ***unknown depot*** were located approximately 490m north of the site. An ***unknown warehouse*** and ***bus depot*** were located approximately 630m north of the site. The Isolation Hospital is no longer recorded. An ***unknown pit*** was located approximately 610m northwest of the site. Extensive urban development was recorded in all directions surrounding the site.
1990s – 2010s	The tank is no longer recorded at the site.	The industrial buildings southwest of the site are no longer recorded.

[a] potentially contaminative uses are shown in bold italics.

2.2.1 Previous Environmental Assessments

The following environmental reports were provided with respect to the subject site:

Table 4: List of previous environmental reports reviewed

Author	Title	Date and Reference
BAE SYSTEMS Environmental	Phase One Land Quality Assessment. Hewlett Packard, Worton Grange, Reading	August 2006, A0624-00-R1-A
BAE SYSTEMS Environmental	Phase Two Land Quality Assessment. Hewlett Packard, Worton Grange, Reading	September 2006, A0624-01-R1-A

BAE SYSTEMS Environmental Phase One Land Quality Assessment (August 2006)

A desk based phase one land quality assessment was carried out on an area of land approximately 8.66 hectares, which includes the subject site and the land immediately north. At the time of writing the site comprised two large buildings, four separate car parks (including a steel and concrete decking system to form a three and two storey car park), two irrigation lagoons and numerous areas of soft landscaping.

In order to assess the potential environmental risks associated with the Site, the Phase I Desk Study report examined the site geology, hydrology, hydrogeology and history and used this information to prepare an environmental risk assessment for the Site.

BAE SYSTEMS Environmental report the site to be underlain by the London Clay Formation which is followed by mottled clays with sand beds of the Reading Formation, which overlie the Upper Chalk of Cretaceous Age.

The BAE SYSTEMS Environmental review of historical maps identifies the site as comprising agricultural land between the 1880s and 1970s, where between the 1970s to 2000s the site is recorded as being part of the Worton Grange Industrial Estate.

The report concludes that the site is primarily in use for offices by the current occupier of the site. Day to day activities on the site are not considered to present any direct risk of ground or groundwater contamination. The only significant source of contamination identified during the report is that of the landscape mounds around the periphery of the site. The phase one report recommends that environmental testing of the earth mounds is undertaken to confirm that these soils are uncontaminated. In addition, the report also recommends that a geotechnical investigation is carried out to confirm the existing ground conditions.

BAE SYSTEMS Environmental Phase Two Land Quality Assessment (September 2006)

The objectives of this assessment were to investigate the potential presence of contaminated soils within the site's landscape bunds, which also includes a waste management strategy to determine the disposal route for bunded materials. In addition, samples were sent to the laboratory for geotechnical analysis.

The scope of the BAE SYSTEMS Environmental Intrusive Investigation undertaken in 2006 included:

- 8No window sample boreholes to a maximum depth of 3m below ground level; and
- 3No. cable percussion boreholes to a maximum depth of 14.4m below ground level.

The encountered geology is detailed in the table below.

Table 5: Encountered Geology in previous phase two investigation

Stratum	Depth to top of stratum (m)	Thickness (m)	Typical Description
Made Ground	0m	0.7m – 3.0m	Reworked natural strata with varying proportions of rubble; reworked organic soil; and subsoils.
London Clay Formation	0.7m	At least 11.3m	Stiff to very stiff blue very slightly sandy CLAY with some occasional visible crystals.
Upper Harwich Formation	12.5m	Unproven	Light grey / green sandy SILT with shell fragments and occasional chalk fragments.

No visual or olfactory evidence of contamination was encountered during the intrusive investigation.

No gas or groundwater monitoring standpipes were installed as part of the investigation.

The contamination assessment concluded that there is no evidence of elevated concentrations of contaminant species within the landscape bunds which surround the site.

The waste management assessment determined that, based on the total concentrations of relevant chemicals discovered in the material, bunded landscaped materials could be accepted as inert waste. However, such acceptance depends on the individual classification by the particular landfill operator.

Of the encountered ground conditions the following geotechnical considerations should be incorporated into the proposed development, where necessary:

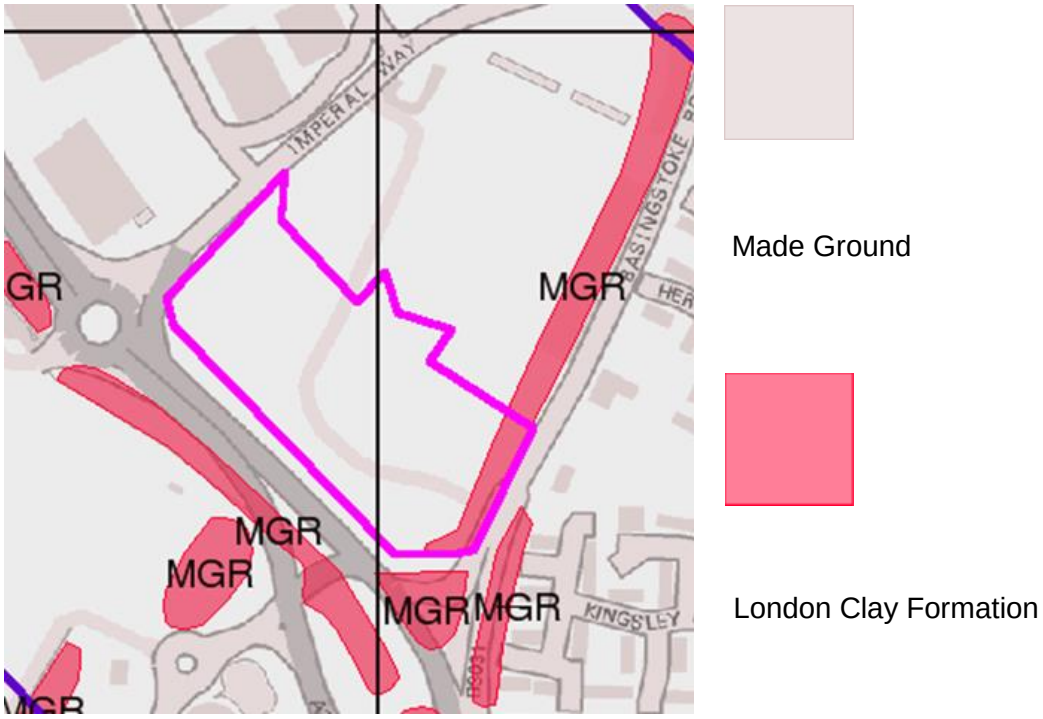
- When considering shallow foundations, conventional shallow strip footings, 600mm wide at 900mm depth bearing on firm to stiff London Clay could assume a maximum safe bearing capacity of 150 kN/m^2. Total settlements for such systems should be less than 25mm; and

- The limited analysis undertaken did not detect significate elevated sulphate concentrations in near-surface London Clay. Crystals observed particularly within unweathered London Clay suggests the presence of selenite or pyrite. To accurately determine soil aggression conditions for founding, a comprehensive assessment should be carried out in accordance with BRE Special Digest 1:2005: Concrete in Aggressive Ground. Reference should be made to C5.1.4 of this special Digest for guidance.

2.3 Geology

The geology beneath the site has been established from the Landmark Information Group 1: 10,000 scale Geological Map, Sheet Combined Surface Geology, and is shown in Figure 3 below.

Figure 3: Geology



Source: Landmark Information Group, Mixed Geology Slice, Scale 1:10,000

A summary of the geology is provided in Table 6 below:

Table 6: Site geology

Stratum	Area Covered	Estimated Thickness	Typical Description
Made Ground	Eastern boundary	Unknown	Unknown
London Clay formation	Entire Site	Unproven	Firm orange brown CLAY, becoming firm to very stiff dark grey with depth.

Please note, soil descriptions have been obtained from Landmark data and historical boreholes adjacent to the site and do not necessarily represent the site.

2.3.1 Ground Stability

The Landmark datasheet did not reveal any structural, geomorphological or geochemical features on or near to the site. In addition, the Landmark Envirocheck Report stated that the site is not in an area that could be affected by coal mining or metalliferous activity.

2.3.2 Ground Gas

According to information from the Health Protection Agency, the site is not located in an area of elevated radon gas levels (a naturally occurring gas. However, current advice from the HPA is that all new buildings should include basic radon protective measures as a minimum whether they are in a radon affected area or not.

There are no registered landfills within 500m of the subject site. There are however, three registered landfills recorded between 600m and 1km from the site. Due to the distance from the site boundaries the potential risk of ground gas migration from the landfills is considered to be low.

Table 7: Summary of landfills in the vicinity of the site

Site Name (Reference)	Distance and Direction from Site	Status	Details of Content	Regulator / Information Source
Smallmead Tip	613m NW	Inactive, last received waste 31 March 1981.	Waste includes: Inert; Industrial; Commercial; Household; Special (hazardous); and Liquids / sludge.	Landmark / Environment Agency
Reading Football Club	739m NW	Inactive, last received waste 3 June 1997.	Waste includes: Household; Commercial; and Industrial waste.	Landmark / Environment Agency
Smallmead Stadium	981m NW	Inactive, unknown closure date.	Inert waste only.	Landmark / Environment Agency

2.4 Controlled Waters

2.4.1 Surface Waters

The Landmark dataset has identified the nearest surface water feature to the site to be a man-made brook flowing along the southeastern boundary of the site, flowing towards a drain, located approximately 40m southwest of the site. A number of surface water features are recorded within the Landmark dataset all of which are minor features which lead towards drainage systems.

According to data from the General Quality Assessment scheme, the Environment Agency (EA) has classified the Foundry Brook, located 946m northwest of the site, in accordance with the GQA scheme as a River Quality B.

There are 4No. discharge consents within 1km of the site, 2No. sewerage discharges and 2No. trade discharges – cooling water. All are discharged into a freshwater stream / river, the closest is located approximately 745m southwest of the site and is registered to the Thames Water Utilities Ltd, for a sewerage discharge.

There are 20No. recorded pollution incidents to controlled waters, all noted as a category 3 – minor incident. A significant number of these incidents include a pollution type of oils or chemicals. The closest is located

approximately 149m southeast of the site, dated 10 March 1998, for a pollutant of oils, however it is noted that no pollutants were found.

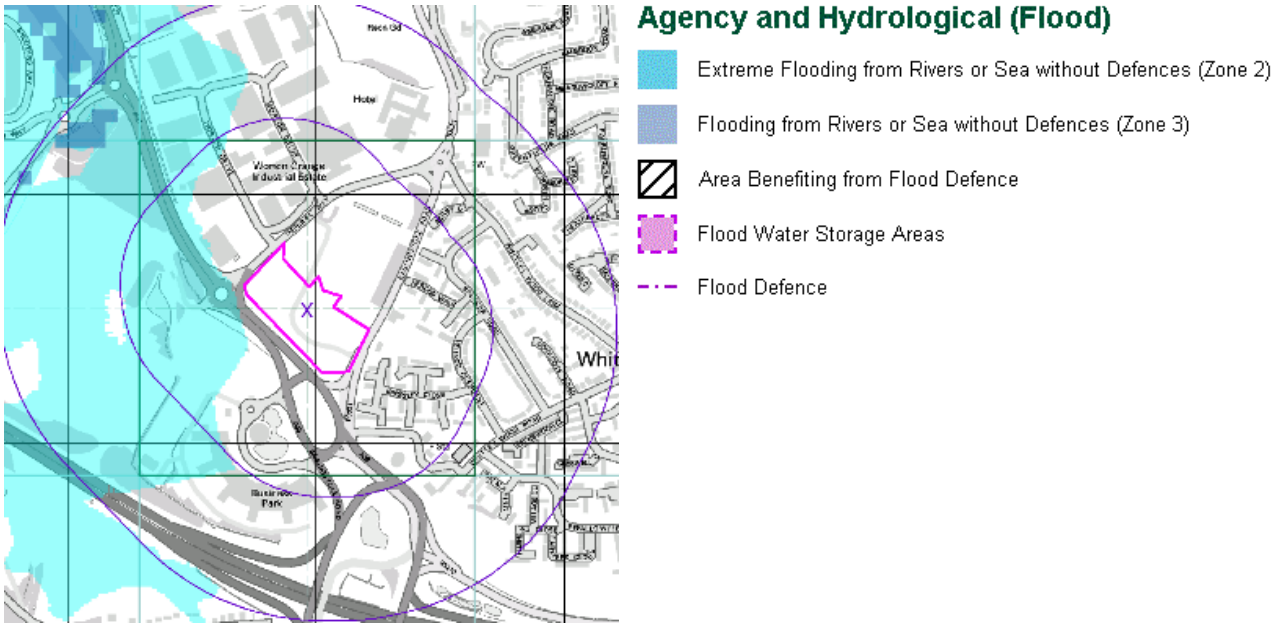
There is 1No. category 2 – significant incident recorded, located approximately 879m northwest of the site, dated 17 February 1992, for the pollution of oils at Smallmead.

1No. Prosecution Relating to Authorised Processes is recorded approximately 905m west of the site for failing to store clinical waste correctly, resulting in a fine of £8,000.

Overall, the data suggests that nearby surface water quality is likely to be of a poor to moderate quality.

The risk of surface water flooding (tidal and fluvial) is shown in Figure 5 below:

Figure 4: Flood Risk



Source: Landmark Information Group, Flood Map, Scale 1:10,000

According to the EA's indicative flooding data, the site is not located in an area of fluvial flooding/on a flood plain. There are no recorded flood defences in the area.

2.4.2 Groundwaters

According to the Landmark Information Group Groundwater Vulnerability Map, the geological deposits underlying the site are classified as per Table 8 below:

Table 8: Summary of hydrogeological properties of the main geological strata

Stratum	EA Classification	Hydrogeological Significance
Made Ground	Unproductive Stratum	Layers of very low permeability which are incapable of supporting significant water supplies.
London Clay formation	Unproductive Stratum	Layers of very low permeability which are incapable of supporting significant water supplies.

The site is not located within a groundwater Source Protection Zone.

Based on available information, it is anticipated that groundwater flow will be insignificant.

There are 10No. recorded groundwater abstractions within a 1km radius of the site, the closest of which is located approximately 358m south of the site. This entry is registered to Akeler Developments Ltd for the abstraction of water for Business Parks: make up or top up of water.

As the site is underlain by an unproductive stratum, groundwater is anticipated to be limited. However, the data suggests that the groundwater in the surrounding area is likely to be of a moderate quality.

2.5 Consultations

The agencies and individuals which have been contacted and/or their records reviewed during the course of this study are listed in Table 9.

Table 9: List of parties consulted during this study

Organisation	Consultee	Response
Reading Borough Council		
Environmental Health	Reading Borough Environmental Protection Department	Received
Planning	Reading Borough Online Planning Portal	Obtained

2.5.1 Environmental Protection

A response was received from the Reading Borough Council's Environmental Protection Officer. The response stated that the site has been identified as being potentially contaminated and identified for future investigation under the council's Part IIA inspection strategy. However, there is currently no schedule set for the investigation of the site.

There are no records of any odour, noise or nuisance complaints relating to the site. There is one Part B (EPA 1990) located within 250m of the site, permitting to a PG1/14 (05) unloading of petrol into storage at petrol stations (PVRI&II).

2.5.2 Planning Department

A review of Reading's online Planning Portal did not yield any planning applications relating to the site.

3. Initial Conceptual Model

The initial Conceptual Model for the Site is presented in Table 10 below. The risk rating included in Table G1 has been assessed qualitatively using the criteria given in Appendix G.

Table 10: Initial Conceptual model for the Site

Receptor	Potential Sources	Pathways	Risk	Justification / Mitigation
Human Health				
Existing Site Users	Potentially elevated concentrations of contaminants relating to onsite uses	Direct Contact, ingestion and inhalation	Medium	Historical land uses within the site include a depot, an unknown tank, and a diesel tank. Large amounts of hardstanding cover the site acting as a barrier blocking potential pathways. However, areas of soft landscaping are present on the site, which may act as a pathway between existing site users and potential contaminants. Further investigation is required to assess the potential of hydrocarbons within the made ground.
	Potentially elevated concentrations of contaminants relating to offsite uses	Direct Contact, ingestion and inhalation	Low to medium	The immediate surrounding area of the site comprises industrial uses (including a fuel station), it is not possible to discount migration of contaminants onto the site via groundwater flow. However, the low permeability of the underlying strata will offer some protection against this.
	Ground gas	Inhalation	Low	A number of former landfills have been identified greater than 600m form the site, they are therefore not deemed to pose a risk to the site. There are no buildings currently onsite.
	Unknown crush stockpiles	Direct Contact, ingestion and inhalation	Low to medium	Three crushed aggregate stockpiles were recorded onsite, the materials of which are unknown, as such, their potential to contain contaminants cannot be discounted at this time. If the stockpiles are to be removed to a landfill, it is recommended that Waste Acceptance Classification testing is undertaken to assess their potential as inert waste. In addition, if materials are to be reused on site, validation testing should be undertaken to assess the suitability for a residential or commercial use.
Future Site Users	Potentially elevated concentrations of contaminants	Direct Contact, ingestion and inhalation	Medium	The majority of the proposed development will include hardstanding cover, however, areas of soft landscaping will provide a pollution pathway between site users and potential contaminants.

Receptor	Potential Sources	Pathways	Risk	Justification / Mitigation
	relating to onsite and offsite uses.			It is anticipated potential onsite contaminants will be identified during the ground investigation and appropriate remediation will be carried out, reducing the potential risk of exposure to future site users.
	Potentially elevated concentrations of contaminants relating to onsite and offsite uses.	Direct Contact, ingestion and inhalation	Medium	The potential for offsite contaminants to migrate onsite and the risk to human health is recognised. With areas of soft landscaping being included in the proposed development, the risk to human health from offsite contaminants cannot be discounted. However, the low permeability of the underlying strata will offer some protection against migration of contaminants.
	Ground gas	Migration into structures and inhalation.	Low to Medium	With a large number of buildings to be constructed at the site, the potential for ground gas to impact upon the site cannot be discounted. It is recommended that ground gas monitoring is undertaken to fully assess this potential risk.
Offsite residents/users	Potentially elevated concentrations of contaminants relating to onsite uses	Direct Contact, ingestion and inhalation	Low to medium	The potential for onsite historical contaminants to migrate offsite is recognised. However, the low permeability of the underlying strata will offer some protection against this. Nevertheless, it is recommended that the mobility of potential contaminants should be tested via leachate analysis.
Construction Workers	Potentially elevated concentrations of contaminants relating to onsite and offsite uses.	Direct Contact, ingestion and inhalation	Low to medium	As such, the potential for construction workers to come into contact with potential contaminants in the underlying soils cannot be discounted. The use of standard PPE such as gloves, overalls and good hygiene practices would further mitigate potential risk.
	Ground gas	Accumulation in service trenches	Medium	During construction ground gas could potentially accumulate within service trenches. Confined spaces risk assessments are therefore recommended to assess the requirement for RPE prior to any excavations being entered.
Property				
On site structures	Elevated concentrations of toxic and organic contaminants	Direct Contact	Low to medium	The potential of toxic contaminants to be onsite cannot be discounted. The results from the ground investigation should dictate, where necessary, the type of concrete that is required to ensure buried concrete is resistant to attack from potentially deleterious contaminants.

Receptor	Potential Sources	Pathways	Risk	Justification / Mitigation
Controlled Waters				
Onsite Swale	Potentially elevated concentrations of contaminants relating to onsite sources	Leaching and migration	Low to medium	The potential for contaminants to enter the onsite swale is recognised. However, the mobility of potential contaminants is not yet known and therefore the risk cannot be discounted at this time. It is recommended that leachate and groundwater testing is carried out to determine the potential mobility of potential contaminants at the site.
Groundwater	Potentially elevated concentrations of contaminants relating to onsite sources	Leaching and migration	Low	The potential for contaminants to migrate is recognised. However, given the site is not underlain by a productive aquifer, the risk to the groundwater is not considered to be significant.

3.1 Recommendations for further works

Given the proposed end use of a mixed residential and commercial development the overall risk rating for the Site is assessed as **medium**.

The site is currently not in use and all former buildings have been demolished. Consequently, the site is largely covered by hardstanding with a number of stockpiles of crushed aggregate and areas of soft landscaping.

The initial risk assessment has identified the potential for contamination to be present at the site. There are also a number of uncertainties regarding the potential contaminant pathways and pollutant linkages.

Potentially significant linkages between contamination hazard sources and relevant receptors are summarised below.

- The risk to human health from potential elevated concentrations of contaminants from onsite and offsite sources; and
- The risk to construction worker's human health from potential elevated concentrations of ground gas accumulating in service trenches.

In order to develop the initial conceptual model a phase of ground investigation was designed and undertaken as reported in the following sections of this report.

4. Ground Investigation Methodology

An intrusive investigation was undertaken in general accordance with Eurocode 7, the Code of Practice for Site Investigation BS 5930 (1999) and the Code of Practice for the Investigation of Potentially Contaminated Sites and its Investigation BS 10175 (2011).

The objectives of the investigation are to characterise the ground conditions, the hazard sources, pathways and receptors and to reduce uncertainties associated with the proposed redevelopment. In addition to provide outline geotechnical design information for a commercial warehouse and residential development as indicated on Kier Property's drawing ref. KP-119-sk-05-A dated 7th July 2014.

4.1 Design of Investigation

Sampling locations were carefully selected in order to characterise the features identified in the conceptual model and to target, as far as possible, potentially contaminated areas identified in preliminary investigation. Locations were also determined based on particular built features of the proposed future development.

Samples of the landscaped bunds surrounding the site along with samples of the crushed aggregate stockpiles were sent for analysis to determine the material already present on site.

A summary of the investigation locations and features investigated is presented in Table 11 below:

Table 11: Ground investigation strategy

Zone	Exploratory Holes	Monitoring Wells	Comments
Entire Site	BH 1 – 6, WS 1 – 6 and TP 1 – 12.	BH 1, 3, 4 and 6. WS 1 and 2.	To provide supplementary geotechnical and environmental information on the ground conditions and to allow for the recovery of soil and groundwater samples for environmental laboratory analysis.

4.2 Quality Control

A Brownfield Solutions Geo-Environmental Engineer had a full time site presence to monitor the performance, quality of work and health and safety compliance throughout the investigation period, with Waterman attending on a part time basis. Samples were despatched in batches on a regular basis under a chain of custody procedure to Environmental Scientifics Group (ESG) who are a UKAS accredited laboratory, for subsequent chemical analysis. Where appropriate, samples were instructed to be stored within cool boxes containing ice packs.

Soil samples taken for geotechnical testing were transported to Professional Soils Laboratory Ltd.

All contractors, including laboratories, used during this project have been approved by Waterman as a part of in-house Integrated Management System (BS ISO 9001, BS ISO 14001) procedure. This requires all third parties to demonstrate competence and a high standard of work during a regular audit scheme.

4.3 Health and Safety

All work carried out on site was in accordance with Waterman Group Health & Safety policy. No Health and Safety incidents occurred during the duration of the site works.

5. Fieldwork

Fieldwork was carried out in three stages, comprising ground investigation, surveying of intrusive locations, and groundwater and ground gas monitoring. The works were procured to Brownfield Solutions Ltd, while Waterman Energy, Environmental & Design carried out water sampling followed by water and gas monitoring.

5.1 Constraints

Travellers occupied the property illegally during the latter stages of the ground investigation, and following instruction from Kier Property the site works were terminated early. Environmental samples were, however, obtained from the majority of the site, offering a good indication of the ground conditions across the site as a whole.

The locations of the exploratory holes completed are shown in Appendix A, Figure A3.

5.2 Ground Investigation

Trial pits were excavated to a depth of between 3.0m and 4.0m below ground level (bgl) using a wheeled mechanical excavator with a backactor. Where reinforced concrete was present, prior to excavation this layer was removed with a concrete breaker and set aside. Upon completion, excavations were backfilled with arisings and the excavated concrete.

6No. cable percussive boreholes were drilled to a depth of between 10m bgl 15m bgl. Inspection pits were excavated at each location to confirm the absence of buried services at depths of up to 1.2m bgl. Standard Penetration Tests (SPT) were carried out at regular intervals to assess the relative density of granular deposits and the consistency of cohesive strata. Monitoring wells were installed in 4No. cable percussive boreholes.

6No. window sample boreholes were drilled to depths of between 0.4m and 5.0m bgl. Standard Penetration Tests (SPT) were carried out at regular intervals to assess the relative density of granular deposits and the consistency of cohesive strata. Monitoring wells were installed in two of the window sample boreholes.

Copies of the ground investigation logs are included in Appendix C.

5.3 Sampling Strategy

Representative soil samples were obtained from the exposed strata and sealed in one litre plastic tubs with airtight lids, phials and amber glass jars containing preservatives, as appropriate.

Disturbed and undisturbed samples were taken at regular intervals and retained for geotechnical and geo-environmental testing and logging. SPT tests/ U100 sampling were to be alternated within natural cohesive horizons.

Selected samples of soil recovered during the investigation were subject to laboratory analysis for a full suite of potential contaminants to assess potential risks to human health, to assess the potential risks to the water environment and also to assist with the selection of suitable water pipe materials. The presences of asbestos fibres with recovered soils were also screened as part of environmental testing. In addition, due to the potential hydrocarbon odour noted two samples recovered for geotechnical testing were sent for chemical laboratory testing. Four groundwater samples were also recovered to assess the potential risks to the water environment and human health. The chemical laboratory test results are presented in Appendix E.

5.4 Monitoring Wells

On completion of cable percussive and window sample drilling, 6 No. 50mm diameter HDPE ground gas and groundwater monitoring standpipes were installed. The response zone of the wells comprised of a section of strata sealed off with plain pipe above slotted pipe. The boreholes are kept sealed by a lockable secure cap at ground level.

5.5 Gas and Groundwater Monitoring

To date five rounds of ground gas and groundwater monitoring have been carried out with a further one monitoring visit scheduled.

On each of the monitoring visits, the peak and steady concentration readings of methane, carbon dioxide and oxygen were recorded at each installed monitoring standpipe, together with borehole gas flow readings and atmospheric pressure. This was undertaken using an infrared gas analyser, Groundwater levels were also measured on each visit.

A full set of ground gas and groundwater monitoring results is presented in the respective fieldwork report sheet in Appendix D.

6. Results

Detailed logs of the strata encountered, together with records of the samples taken during both trial pitting and borehole installation, are provided in Appendix C. A summary of the geological strata and manmade underground structures encountered is presented below.

6.1 Geological Strata

The strata encountered during the investigation was generally consistent with the anticipated geology identified in the Preliminary Risk Assessment. A summary of the geological strata encountered is shown in Table 12 below.

Table 12: Geological strata encountered

Soil Type	Depth of Top of Stratum (m bgl)	Thickness (m)	Typical Description
Made ground	0.0	0.3 – 2.8	Concrete or tarmac underlain by a yellow sand and gravel sub-base including brick, concrete, flint, granite and sandstone.
Weathered London Clay	0.4 – 1.5	0.4 – 1.5	Soft yellow brown very sandy clay. A layer of black organic clay (0.2m) was recorded in TP11. TP5 recorded a 1.35m layer of sand from 0.45mbgl.
London Clay	0.4 – 2.8	1.4 – 14.5*	Firm to stiff sandy gravelly clay, becoming stiff to very stiff with depth, with occasional sand and shell bands

*Depth not proven

6.2 Underground Structures and Obstructions

No buried structures, obstructions or services were encountered during the intrusive works.

6.3 Potential Sources of Contamination

Olfactory and visual evidence was not identified in the majority of the exploratory hole locations during the site works with the exception of the following:

- Borehole BH02 – Slight hydrocarbon odour between 0.1mbgl and 1.2mbgl.
- Trial Pit TP11 – Slight hydrocarbon odour between 0.7mbgl and 1.3mbgl.
- Trial Pit TP11 – Possible heavy end organic odour and occasional organic matter at 1.5mbgl

6.4 Groundwater Levels

Five rounds of groundwater monitoring have been undertaken to date, with one visit remaining. The results of the groundwater monitoring are shown in Table 13 below. Groundwater sampling was undertaken during the second monitoring round.

Table 13: Groundwater Levels (To date)

Monitoring Point	Response zone (m)	Groundwater Level during monitoring period (m bgl)				
		01/08/14	07/08/14	13/08/14	29/08/14	04/09/14
BH1	1.0 – 8.0	4.95	4.95	4.92	4.87	4.964
BH3	1.0 -8.0	2.85	2.67	2.40	2.58	2.729
BH4	0.5 – 8.0	5.55	4.26	3.14	1.55	1.508
BH6	2.0 – 8.0	0.61	0.55	0.48	0.54	0.511
WS1	0.5 – 4.0	0.65	0.49	0.44	flooded	0.392
WS2	0.5 – 4.0	1.38	0.93	0.41	0.446	1.14

7. Geotechnical Testing

7.1 In-Situ Testing

7.1.1 Standard Penetration Tests

Standard Penetration Tests (SPT's) were undertaken at regular intervals within the boreholes to provide 'N' values for empirical assessment of strength and density parameters. Detailed results of the SPT tests and blow counts are included on the borehole logs included in Appendix C and a summary is presented in Table 14 below:

Table 14: Standard penetration test results

Stratum / Geological Origin	Range of SPT 'N' Values	Comments	Derived Values Range of φ' or cu
Made Ground	17 – 26	Dense Gravel and high strength Clay	-
London Clay Formation	13 – 50	Medium to very high strength Clay	cu = 65 – 250kN/m^2

SPT 'N' Values increase with depth in the London Clay Formation.

7.1.2 Plate Bearing Tests

Field based Plate Bearing tests were undertaken beneath access roads and parking areas for the purposes of pavement design. Tests were undertaken at shallow depths (typically approximately 500mm) below existing ground level at the time of the investigation, which is likely to be representative of the subgrade to the paved development areas. The results and plots of equivalent CBR values are included in Appendix F and summarised in the table below:

Table 15: CBR test results

Stratum / Geological Origin	Type of Test	Range of CBR Values (%)	Characteristic CBR Value (%)	Comments
Made Ground	Plate Bearing Test	0.8 – 12.7%	<1%	Made Ground is variable, with low CBR values likely in reworked cohesive strata. Granular material may give higher CBR values
London Clay Formation	Plate Bearing Test	2.7 – 6.1%	3%	Areas of softened London Clay may be present in places

In addition to the above assessment of near surface subgrade, consideration should also be given to materials at deeper levels which will have a more significant effect on the long-term settlement of the slab / pavement.

7.1.3 Falling Head Tests

Falling Head tests were undertaken in two boreholes, BH03 and BH04, in accordance with BS5930. The results of the tests are presented within Appendix C and summarised within Table 16 below.

Table 16: Falling Head test results

Stratum / Geological Origin	Range of soakage rates (m/s)	Characteristic soakage rate (m/s)
London Clay Formation	$0.00 – 6.49\times10^{-5}$	-

7.2 Laboratory Testing

Representative soil samples were scheduled for:

- Natural moisture content and plasticity index
- Particle Size Distribution testing
- pH value and water soluble sulphate (SD1 Suite)
- Undrained Shear Strength Triaxial Tests and Laboratory vane tests
- Compaction Testing
- One dimensional Consolidation Tests

The results are summarised below and presented in Appendix E and F.

7.2.1 Natural Moisture Content and Plasticity Index

Samples of natural cohesive material were taken for moisture content and plasticity index determinations. The test results are included in Appendix F and are summarised in Table 17 below. The modified plasticity index can be used as an indicator of volume change potential of the soil and is calculated as the plasticity index of the soil multiplied by the fraction of particles less than 425µm.

Table 17: Volume Change Potential

Stratum / Geological Origin	Range of Plasticity Indices % (Modified)	Volume Change Potential
Made Ground	26	Medium
London Clay Formation	30 – 40	Medium

7.2.2 Particle Size Distribution tests

Particle Size Distribution (PSD) testing was undertaken on 2No. samples of the site soils. The results of the tests are presented within Appendix F and summarised within Table 18 below.

Table 18: Particle Size Distribution Results

Soil Type	Sample Depth & Location	% passing 0.063mm sieve	Comments
Made Ground (Granular)	TP11 – 1.2m bgl	10	Granular, predominantly Gravel
	TP12 – 0.6m bgl	10	Granular, predominantly Gravel

The 2No. PSD test results show that the majority of the Made Ground (Granular) comprises Gravel and would be classed as Class 1A/1B or Class 6F2 in accordance with the Specification for Highway Works.

7.2.3 pH Value and Water Soluble Sulphate (SD1 Suite)

The Aggressive Chemical Environment for Concrete classifications for the soil types identified at the site have been determined in accordance with BRE Special Digest 1:2005 (SD1). SD1 requires that sites are

first identified as being in one of four categories based on natural ground / 'Brownfield' conditions and pyrite content. The site has been categorised as: Brownfield - pyrite.

The results of laboratory testing are included in Appendix E and summarised in Table 19 below:

Table 19: Summary of SD1 Suite Analysis

Stratum / Geological Origin	Characteristic Water Soluble Sulphate Value (mg/l SO4)	Characteristic pH Value
Made Ground	361	8.9
Shallow London Clay Formation	501	8.6

As the characteristic value of sulphate is less than 3000mg/l and the characteristic pH is greater than 5.5, the concentrations of magnesium, nitrate and chloride are not considered significant in determining the design sulphate class.

7.2.4 Undrained Triaxial & Laboratory Shear Vane Testing

Shear strength of the natural superficial strata was determined by quick undrained triaxial tests on single 100mm diameter specimens. In addition, samples were scheduled for laboratory hand shear vane tests to improve coverage. The results of these tests are presented in Appendix F, and are summarised in Table 20 below:

Table 20: Triaxial and Lab Vane Test Results

Stratum / Geological Origin	Apparent Cohesion Values – Quick Triaxial Tests (kN/m2)	Apparent Cohesion Values – Lab Vane Tests (kN/m2)	Range of Derived Values	Undrained Shear Strength / Comments
London Clay Formation	56 - 212	74 - >120	56 - 212	Medium to very high strength

The majority of the results for the shallow London Clay Formation (<3.5m bgl) ranged between 75kN/m² and 90kN/m², indicating clays of high strength, which are consistent with the descriptions presented within the exploratory hole logs. The results generally increase with depth.

7.2.5 2.5kg Dry Density / Moisture Content Relationship Testing

Dry Density / Moisture Content Relationship testing was undertaken on 2No. samples of Made Ground (Granular) to assess the feasibility of re-compaction of shallow fills at the site. The results of the compaction tests are presented within Appendix F and summarised within Table 21 below.

Table 21: Dry Density / Moisture Content Relationship Results

Stratum / Geological Origin	Sample Loc & Depth	MDD (Mg/m³)	Initial Moisture Content %	OMC %	> 95% of MDD?	<5% air voids?
Made Ground (Granular)	TP11 – 1.2m	2.28	3%	7%	N	N
	TP12 – 0.6m	2.28	3%	7%	N	N

The compaction data has been assessed by comparing the results against criteria commonly used in earthworks to achieve an adequate density for engineered fills. The criteria summarised in the above table

indicate whether the samples could achieve in excess of 95% of maximum dry density (a requirement often included in highways specifications) and whether they could be compacted to less than 5% air voids ratio (a requirement applied where raft foundations are to be adopted).

7.2.6 One Dimensional Consolidation

One dimensional consolidation tests were undertaken on 100mm diameter specimens of natural soils at a series of confining pressures. The results of the tests are presented within Appendix F and summarised within Table 22 below.

Table 22: Summary of 1D Consolidation Testing

Stratum / Geological Origin	Range of mv values at at overburden plus 100kPa (m^2/MN)	Qualitative Description of Compressibility / Comments
London Clay Formation	0.131 - 0.205	Medium compressibility

The results from the one dimensional consolidation testing are consistent, with all results suggesting a medium compressibility. Compressibility generally decreases with depth in the London Clay Formation.

7.3 Excavations, Trench Shoring & Dewatering

All trenches should be excavated in accordance with CIRIA Report 97 'Trenching Practice'. Comments relating to the stability of excavations (i.e. trial pits) and groundwater seepages are included in the logs in Appendix C and a summary of the stability is provided in Table 23 below.

Table 23: Stability of excavations and groundwater flows

Stratum / Geological Origin	Stability / Seepages	Comments
Made Ground	All trial pits stable, no groundwater encountered during drilling.	Shallow excavations (<1.2m) likely to be stable in the short term. However, the presence of unstable/water bearing Made Ground in other areas of the Site cannot be entirely ruled out. Simple sump pumping may be required to control moderate groundwater seepages in granular materials.
London Clay Formation	All trial pits stable, generally no groundwater encountered during drilling, however, groundwater may be present within coarser grained horizons, as in BH03 where groundwater was present at 2.5m bgl.	Shallow excavations (<1.2m) likely to be stable in the short term. Excavations in soft/water bearing strata likely to require shoring to maintain stability in the long-term.

8. Generic Environmental Assessment Criteria

The information requirements for generic quantitative risk assessment will depend on:

- The substance being assessed;
- The receptors being considered;
- The pathways being considered;
- The complexity of the site.

The outline conceptual model developed for the site has identified several potential pollutant linkages. These potential pollutant linkages have been investigated and the results assessed against generic assessment criteria. The generic assessment criteria selected for each potential pollutant linkage are summarised in Table 24 below:

Table 24: Generic assessment criteria

Source	Pathway	Receptor	Generic Assessment Criteria
Contaminated Soils	Direct contact, inhalation	Future users of the proposed Development	Waterman Generic Assessment Criteria
Contaminated Soils	Leaching and migration	Controlled Waters	UK Environmental Quality Standards (EQS), UK and World Health Organisation (WHO) Drinking Water Standards
Contaminated Soils	Direct Contact	New water supply pipes	UKWIR Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites
Contaminated Soils	Direct plant uptake	Flora and fauna	Ministry of Agriculture, Fisheries and Food: Code of Agricultural Practice for Protection of Soil

The generic assessment criteria used in this report are included in Appendix G.

8.1 Site Specific Information used to Support the Generic Risk Assessment

The site specific information used to support the generic risk assessment undertaken as part of this investigation are described in the sections below:

8.1.1 Human Health Risk

The site is being developed for a mixed commercial and residential end use. For this reason, the results of the laboratory analysis have initially been compared against the Waterman Generic Assessment Criteria (GAC) for human health in a residential setting (as the most sensitive end use scenario). These values vary slightly with Soil Organic Matter (SOM) Content. At this site, SOM varied between 0.71% and 9.28% with an average concentration of 1.6%. For this reason the GAC for 1% SOM has been selected in this assessment.

8.1.2 Controlled Waters

The analytical results for groundwater have been compared against the UK/WHO Drinking Water Standards. Furthermore, the site is not understood to lie within a groundwater Source Protection Zone. The analytical results for leachate were compared against both the UK Drinking Water Standards (DWS) and the Environmental Quality Standards (EQS). Leachate testing was undertaken using the CEN 10:1 methodology.

8.1.3 Ground Gas

The site is being developed for commercial and residential purposes. It is assumed that basement areas are not to form part of the proposed development. The gas regime at the site has been assessed based on the highest concentrations of gas recorded over all monitoring visits. The greatest flow rate recorded over the visits has been utilised. These results have been assessed using the guidance contained within the CIRIA report C665.

9. Quantitative Environmental Risk Assessment

9.1 Regulatory Context

This assessment has been undertaken in general accordance with the Model Procedures for Management of Land Contamination (Contaminated Land Report 11 – Environment Agency, September 2004). The environmental risk assessment includes the following:

- outline Conceptual Model for the Site;
- results of Intrusive Ground Investigation;
- confirmation of Generic Assessment Criteria used to assess risks;
- assessment of results against Generic Assessment Criteria;
- formulation of a new Conceptual Model for the Site;
- identification of potentially unacceptable risks; and
- recommendations for further action.

This report forms a decision record for the pollutant linkages identified, the generic assessment criteria used to assess risks, the unacceptable risks identified and the proposed next steps in relation to the site. The report also provides an explanation of the refinement of the outline conceptual model following the ground investigation, the selection of criteria and assumptions, the evaluation of potential risks and the basis for the decision on what happens next.

The site is currently vacant and does not comprise any buildings or structures. Surface conditions comprise of: reinforced concrete, tarmacadam and hardcore. Two stockpiles of crushed demolition materials are cited along the southern site boundary. The site is proposed to be redeveloped for a mixed commercial and residential end use.

The National Planning Policy Framework (NPPF) sets out Government planning policy for England and how this is expected to be applied to development. Paragraphs 120 to 122 of Section 11 – Conserving and enhancing the natural environment of the NPPF relate to contaminated land matters and state the following:

"To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

Planning policies and decisions should ensure that:

- *the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;*
- *after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and*
- *Adequate site investigation information, prepared by a competent person, is presented.*

In doing so, local planning authorities should focus on whether the development itself is an acceptable use of the land and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes. Local planning authorities should assume

that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

In order to assess the contamination status of the Site, with respect to the proposed end use, it is necessary to assess whether the Site could potentially be classified as "Contaminated Land", as defined in Part IIA of the Environmental Protection Act 1990 and Contaminated Land Statutory Guidance 2012. This is assessed by the identification and assessment of potential pollutant linkages. The linkage between the potential sources and potential receptors identified needs to be established and evaluated.

To fall within this definition, it is necessary that, as a result of the condition of the land, substances may be present in, on or under the land such that:

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

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

It should be noted that DEFRA has advised (Ref. Section 4, DEFRA Contaminated Land Statutory Guidance 2012) Local Authorities that land should not be designated as "Contaminated Land" where:

a) the relevant substance(s) are already present in controlled waters;

b) entry into controlled waters of the substance(s) from land has ceased; and

c) it is not likely that that further entry will take place.

These exclusions do not necessarily preclude regulatory action under the Environmental Permitting (England and Wales) Regulations 2010, which make it a criminal offence to cause or knowingly permit a water discharge of any poisonous, noxious or polluting matter to controlled waters. In England and Wales, under The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009, a works notice may be served by the regulator requiring appropriate investigation and clean-up.

The potential pollutant linkages identified in Section 2 have been evaluated using the Generic Assessment Criteria described in Section 7 and Appendix G. The results of this evaluation are reported below:

9.2 Risk to Human Health

The results of the soil analysis were compared against the Waterman Generic Assessment Criteria for human health in a residential and commercial setting. Table 25 below provides a summary of the results that exceeded the assessment criteria.

Table 25: Summary of generic quantitative risk assessment for human health

Stratum	Contaminant	Location	Conc. (mg/kg)	Generic Assessment Criteria (mg/kg)	Number of Exceedences
Made ground	Arsenic	BH1, TP2, TP5, TP8, TP11 (0.35,0.8m)	35.80 – 70.60	32*/ 640**	5*/ 0**
Made ground	Barium	BH1, TP2, TP5, TP8, TP10, TP11 (0.35,0.8m)	1760 – 3790	1300*/ 22000**	6*/ 0**
Made ground	Benzo(a)pyrene	TP6, TP11	1.26 – 1.71	0.83*/14**	2*/0**

*Residential GAC Screening levels **Commercial GAC Screening levels

As can be seen above five locations, TP2 (0.4mbgl), TP5 (0.4mbgl), TP8 (0.4mbgl), BH1 (0.2mbgl), and TP11 (0.35m, 0.8m) recorded elevated concentrations of Arsenic. The same locations also showed exceedances of Barium with the addition of TP10 (0.4m) making six locations in total. Exceedences of benzo(a)pyrene were recorded in TP6 (0.4mbgl) and TP11 (1.5m) within the made ground deposits when compared against residential screening criteria. However all of these contaminant concentrations were recorded below the commercial end use screening criteria.

Trial pits TP5, TP6 and TP8 are located within the proposed commercial area of the site and therefore the soils within this area are not deemed to pose a risk to human health. Borehole BH1 and Trial pits TP2 and TP11 are located within the proposed residential development area in the north of the Site and therefore contaminant concentrations may pose a risk to human health if located within soft landscaped areas.

9.3 Risk to Construction Workers

Limited elevated concentrations of contaminants have been identified with respect to human health criteria for residential and commercial land use. The provision of basic PPE and site hygiene facilities such as hand washing facilities and dedicated eating areas should ensure that the risks to construction personnel are minimised.

9.4 Risk to Plants

The risk to plant life within the proposed development has been assessed by comparing the results of the phytotoxic contaminants to the threshold values listed in “The Soil Code”, Appendix 3 revised issue, 1998.

Table 26: Phytotoxicity Screening Assessment on Soils

Contaminant	Location	Conc. (mg/kg)	Generic Assessment Criteria (mg/kg)	Number of Exceedences
Arsenic	TP5, TP11 (0.8m)	69.40, 70.6	50	2

As can be seen above, the majority of phytotoxic metals were recorded at concentrations below their respective threshold values with the exception of slightly elevated levels of arsenic. The soils are not deemed to pose a phytotoxic risk to plant life via root uptake. This should be confirmed with the landscape architect.

9.5 Risk to Controlled Waters

9.5.1 Leachate Testing

The results of leachate analysis undertaken on three soil samples have been compared against Environmental Quality Standards (EQS) and Drinking Water Standards (DWS) to assess the risk to both surface water and shallow groundwater resources.

A summary of the results that exceeded the assessment criteria is given in the table below:

Table 27: Summary of generic quantitative risk assessment for controlled waters

Contaminant	Location	Conc. (µg/l)	EQS (µg/l)	DWS (µg/l)	Exceedances
Arsenic	WS5	19.0	50	10	1*/0**
Chromium	WS9	59.0	250	50	1*/0**
Phenol	WS9	31.2	7.7	0.5	1*/1**

*DWS exceedance **EQS exceedance

The majority of the contaminants have been recorded at concentrations below the screening criteria used indicating that these contaminants are not in a mobile state within the soils. Slight elevations of arsenic, chromium and phenol have been found to exceed DWS concentrations and a single slight elevation of phenol was found to exceed the corresponding EQS screening concentration. However, the site is underlain by the fairly impermeable London Clay and location WS9 is located within the proposed commercial development area and likely be beneath hardstanding. It is therefore considered that these concentrations do not pose a significant risk to groundwater or the wider environment.

9.5.2 Groundwater Testing

Groundwater samples were collected from boreholes BH1, BH3, BH4 and BH6 and tested for a number of contaminants. The results have been compared to the Drinking Water Standards and recorded exceedances are summarised below:

Table 28: Summary of generic quantitative risk assessment for controlled waters

Contaminant	Location	Conc. (µg/l)	DWS (µg/l)	Exceedances
Phenol	BH6	1.4	0.5	1

The majority of the contaminants were recorded below their respective screening levels with the exception of a single elevated phenol level recorded in borehole BH6. Phenol was recorded below the level of detection (LOD) across the majority of the site and within soils tested in BH6. It is therefore deemed that this concentration does not pose a risk to controlled waters.

9.6 Risk to Water Supply Pipes

The UKWIR project steering group decided that barrier pipes would provide sufficient protection for the supply of drinking water in all Brownfield site conditions. However, this approach needs to be agreed with the local water company.

9.7 Ground Gas

Six standpipes have been monitored on four occasions to date with a further two to be undertaken in accordance with the CIRIA C665 guidance report.

Table 29: Ground gas monitoring summary

Monitoring Point	No visits	Atmospheric Pressure (mbars)	Gas Concentration (%)					
			CH_4	No. >1%v/v CH4	CO_2	No. >1.5%v/v	No. >5%v/v	O_2
BH1	4	1004 - 1015	<0.1	0	<0.1 – 3.1	4	0	17.1 – 20.6
BH3	4	1004 - 1015	<0.1	0	0.4 – 2.2	3	0	17.8 – 20.2
BH4	4	1004 - 1015	<0.1	0	<0.1 – 0.2	0	0	12.8 – 20.7
BH6	4	1004 - 1015	<0.1 – 0.2	0	<0.1	0	0	20.0 – 20.4
WS1	4	1004 - 1015	<0.1 – 0.1	0	0.2 – 0.3	0	0	19.5 – 20.6
WS2	4	1004 - 1015	<0.1	0	<0.1 – 0.1	0	0	19.7 – 20.8

Gas monitoring to date has not recorded concentrations of methane (CH_4) ground gas above the guideline value of 1.0%v/v. Carbon dioxide (CO_2) ground gas was recorded above the guideline value of 1.5% v/v within boreholes BH1 and BH3 up to three occasions to date, but below the maximum guideline value of 5% v/v. Depleted oxygen concentrations were recorded below 18% within borehole BH1 and BH3 to date.

Flow rates have been monitored in all six boreholes with a maximum flow rate of <0.1litres per hour recorded, however to be more conservative, a reading of 0.1 l/h has been used to calculate the Gas Screening Level (GSV). The following assessment is based on the results to date.

Both gas concentrations and borehole flow rates measured in the field are used to calculate the limiting borehole gas volume flow, or Gas Screening Value (GSV) for gases presenting high levels. The GSV is equal to the maximum borehole flow rate (l/h) multiplied by the maximum gas concentrations (%v/v). The calculated GSV is then compared to the classification system described in C665 to determine the characteristic situation defining the general scope of gas protective measures required.

Methane was not detected in any of the standpipes and therefore a GSV for methane has not been calculated. The maximum carbon dioxide concentration recorded was 2.9%, and was recorded in borehole BH1. The more conservative flow reading of 0.1 l/h has been used. Using the guidance in CIRIA C665 the Gas Screening Value (GSV) is calculated as follows:-

Carbon Dioxide = Gas Concentration / 100 x Gas Flow Rate

= 3.1% / 100 x 0.1

= 0.0031 l/h

In accordance with CIRIA C665, the gas screening value places the site as Characteristic Situation 1, therefore no gas remedial measures are required in relation to methane and carbon dioxide.

The above is a provisional ground gas risk assessment based on the limited monitoring carried out to date. Any recommendations relating to gas protective measures should be considered provisional until issue of our updated ground gas risk assessment on completion of the monitoring period.

9.7.1 Radon

In addition to the above, with regard to naturally occurring radon, the site has been identified as being in a non-Radon affected area. However, current advice from the HPA is that all new buildings should include basic radon protective measures as a minimum whether they are in a radon affected area or not.

10. Hazardous Waste Assessment

10.1 Waste Classification Process

Waste management practices and requirements in the UK are largely driven by the European Waste Framework Directive, which is implemented in the UK by a variety of statutory regulations. A key component of the process is the need to determine the hazardous properties of a potential waste under the Environmental Protection (Duty of Care) Regulations 1991 (as amended) to determine whether it poses a potential risk during transit and to ensure that waste is removed to a suitable receiving site. Forming part of this process, the European Waste Catalogue (EWC) is a comprehensive list of all wastes split into 20 chapters, which is predominantly based on industry practice (e.g. construction and demolition wastes), but some chapters are based on materials and processes (e.g. oily wastes). Each waste is coded by a 6 digit code, where wastes are either classified as hazardous or non-hazardous.

Hazardous wastes are signified by entries where the code is followed by an asterisk, where some wastes are deemed hazardous without further assessment, which are termed “Absolute Entries” e.g. most waste oils. Alternatively waste entries are termed “Mirror” entries that require further assessment of hazardous properties, in order to determine whether they are hazardous waste or not (e.g. soil and stones). The EWC codes relevant to excavation wastes are:

- 17 05 03* soil and stones containing dangerous substances; or
- 17 05 04 soil and stones other than those mentioned in 17 05 03

Therefore, soil and stones (or similar) can be either hazardous or non-hazardous waste, depending upon the concentrations of contaminants (e.g. diesel, asbestos, metals) in the waste. Inert waste is a subset of non-hazardous waste.

In order to determine if soil excavation waste is hazardous or not, the potential contaminants that may be present in the excavation wastes are identified based on the history of the waste (e.g. desk study of the source site for soils), with sufficient representative samples of the waste being subjected to appropriate laboratory chemical analysis. The data are compared to published national thresholds (e.g. 0.1% for asbestos, 1% for diesel – based upon CHIP3 method), detailed in Environment Agency guidance using the CATWaste Tool.

The hazard assessment does not define inert waste, nor does the hazard assessment confirm in the case of hazardous excavation waste whether or not the waste can be landfilled. Further Waste Acceptance Criteria (WAC) testing is required in these instances. WAC testing is therefore used to determine possible off site landfill disposal options for these wastes.

10.2 CATWaste Tool

The results of the soil laboratory analysis have been inserted in to the CATWaste tool. Results confirmed that no hazardous properties are present from the soil samples obtained from within the made ground and natural ground below the site.

10.3 WAC Analysis

WAC analysis was completed on samples of made ground, landscaped bunds and crushed aggregate stockpiles. The analysis confirmed that the material could be disposed of at an inert waste landfill subject to agreement from the landfill operator.

11. Geotechnical Assessment

11.1 Proposed Development

This preliminary assessment has been prepared on the understanding that the site is to be developed with residential properties, including gardens and a hotel, which are understood to cover the middle and north of the site. The south of the Site is understood to include a series of lightly loaded industrial buildings with associated car parking and access road. If development proposals change from that indicated on drawing refs. KP-119-sk-05-A, it may be necessary to revise the conclusions and recommendations made in this report and Waterman EED should be contacted to provide further advice.

11.2 Characteristic Values and Design Bearing Resistance

Based upon the ground investigation data and a review of the derived values summarised in Section 7, characteristic values can be assigned to each strata. EC7 defines the characteristic value of a soil or rock as a cautious estimate of the value affecting the occurrence of the limit state. The characteristic values to be used in design are highlighted in Table 30 and are considered to be:

Table 30: Characteristic Values for Geotechnical Design

Stratum / Geological Origin	Strength / Density Descriptor	Range of Derived Values	Characteristic Undrained Strength (cu - kPa)
London Clay Formation	Medium to very high strength	56 - 250	70kPa at depths shallower 3.5m bgl.

For the purposes of estimating design bearing resistance, shallow foundations placed on medium strength cohesive deposits (i.e. London Clay Formation), with a characteristic cu value of at least 70kPa would be expected to have a design bearing resistance of approximately 150kPa.

The above preliminary assessment of design bearing resistance is based on a square pad footing founded in suitable bearing strata at 1m below ground level, where horizontal actions are less than 20% of the total vertical actions.

It has also been assumed that a maximum total settlement of 25mm would be acceptable within the serviceability of the design. Differential settlement should be assessed when the foundation layout has been developed, however provided all foundations are taken onto a consistent bearing strata, pad foundations spaced at a minimum of 10m centres should yield differential settlements of less than 1 in 400.

11.3 Shrinkability / Volume Change Potential

London Clay Formation has been shown to have a medium shrinkability.

Foundations placed on shrinkable soils should be deepened where necessary to accommodate the effects of trees and hedgerows. Where foundations are beyond the influence of existing and proposed planting (i.e. 1.5 times the mature tree height), the minimum founding depth in London Clay Formation of a medium volume change potential would be 0.9m below existing or proposed ground level (whichever is lower).

Foundations within the zone of influence of existing or proposed trees should be deepened as necessary in accordance with recommendations provided in NHBC Chapter 4 – Building Near Trees. If trees are present within influencing distance of proposed foundations, a tree survey should be undertaken to identify appropriate founding depths.

11.4 Design Class for Concrete

Based on the characteristic values derived from SD1 testing, the Design Sulphate (DS) and Aggressive Chemical Environment for Concrete (ACEC) classifications are considered to be:

- Concrete in contact with Made Ground: DS-1 AC-1
- Concrete in contact with Shallow London Clay Formation: DS-3 AC-3

If piled foundations are required, further testing is likely to be required to confirm the design class for concrete penetrating deeper strata.

Whilst concentrations of water soluble sulphate were found to be relatively low in the London Clay Formation, these deposits have been identified as potentially containing pyrite. Therefore, it is recommended that the Design Sulphate and Aggressive Chemical Environment for Concrete classifications recommended above are used as a minimum. It may also be necessary to increase the design class for concrete penetrating reworked London Clay Formation within the Made Ground.

11.5 Shallow Foundations

Made Ground and softened London Clay Formation are not considered to be suitable bearing strata. Where these materials are present, foundations should be placed on adequate bearing strata at deeper levels. Foundations should be placed on uniform founding strata to avoid differential settlement.

Identification of the appropriate founding stratum on site must be undertaken by an experienced engineer. If necessary, Waterman EED should be contacted to provide further advice.

The descriptions and results of lab and in-situ testing suggest that pad foundations could be placed on the medium to high strength London Clay Formation at relatively shallow founding depths (i.e. generally less than 2.5m below existing ground level). If pad foundations are utilised, they should be placed on a uniform bearing strata (i.e. medium to high strength cohesive deposits), and as such it may be necessary to deepen foundations if Made Ground or softened London Clay Formation (as in BH04) is encountered at foundation level. Deeper Made Ground (2.8m thick) has been identified in Borehole BH05 however this location was positioned within a landscaped bund and therefore significantly elevated compared to the remaining site.

The design bearing resistance(s) quoted above have been estimated in accordance with EC7, Design Approach 1, Load Combination 2. Bearing resistance and settlement are functions of shape and depth of foundation, and the magnitudes of inclined, static and variable loads and these should be reviewed as part of detailed geotechnical design.

In summary, shallow foundations could be adopted across the entire site. Within the area of site intended for commercial development shallow pad or strip foundations would need to be approximately 1.5m depth extending to 2.0m depth in areas of TP5 and BH3. Within the area intended for residential development shallow pad or strip foundations would need to be approximately 1.0m in depth extending to 1.5-2.0m depth in areas of TP11 and TP4.

11.6 Piled Foundations

For foundation loads significantly in excess of the design bearing resistance estimated above, piled foundations could be utilised. It is recommended that the advice of a specialist piling contractor should be obtained to confirm the suitability of piling and the most appropriate pile type. However, based on the site investigation information, frictional piles could derive support from the London Clay Formation, present from depths of between 0.3m bgl and 2.8m bgl to a minimum of 15m bgl (maximum drilled depth).

The final design of the piles will be the responsibility of the piling contractor. An allowance for probing of pile positions and/or drilling of obstructions should be allocated. The carrying capacity of the actual pile

groups will in part depend on the number, type and size of pile chosen by the contractor and the quality of workmanship.

The piles should be designed based on the requirements of Eurocode 7.

The influence of the overlying Made Ground should be ignored in the pile capacity calculations. During detailed pile design the choice of factors of safety should ensure that appropriate safe working loads and settlement tolerances are met.

Subject to any piling trials, an acceptable percentage of piles should be load tested to at least twice working load. All piles should be integrity tested.

Buried concrete was encountered in isolated areas during the site investigation, the pile design should allow for the presence of any such obstructions.

On significantly contaminated sites, the Environment Agency may object to the use of piles on the basis that they can introduce pathways for contaminant migration. Such objections can usually be overcome if piles are designed in accordance with the EA's advice "Piling and Penetrative Ground Improvement Methods on Land Affected by contamination: Guidance on Pollution Prevention. NC/99/73.

Consideration should be given to the re-use of pile arisings if bored piles are used. It may be possible to re-use pile arisings subject to risk assessment, however certainty of use and volume should be confirmed in accordance with the requirements of CL:AIRE waste protocol.

Given the proximity of existing structures, the effects of noise and vibration (e.g. from piling plant) should be addressed as part of the contractors method statement.

Regarding the intended development piled foundation may need to be adopted for residential buildings over four storeys. Piling may also be required for the Hotel complex subject to a more detailed loading assessment.

11.7 Earthworks / Pavement Design

The results of compaction testing undertaken on samples of Made Ground (granular) indicate that, in its current condition, it could not be recompacted to achieve either 95% Maximum Dry Density or less than 5% air voids. However, the Particle Size Distribution testing suggests that these materials should be suitable for re-use as either Class 1A/1B or Class 6F2 Engineered Fill. Based upon the results obtained it is considered that Made Ground (Granular) would require some processing (e.g. selection, screening, crushing) and wetting prior to re-use as an Engineered Fill. It should be noted that suitability for compaction is highly dependent on the initial moisture content of the material to be compacted.

Where Made Ground is to be reused as an engineered fill, it would be sensible to select granular fills only and subject them to a confirmatory testing regime where they were required to achieve a compaction specification as a structural fill.

Construction plant should be provided with an adequate working platform in line with the requirements of BRE report, "BR 470: Working Platforms for Tracked Plant". Again, further advice should be sought from the temporary works designer. However, the following factors should be considered.

The natural subgrade has CBR values in the range 2.7% to 6.1% and it is recommended that a value of 3% is used for the purposes of pavement design and temporary works design. Subgrade strength may vary considerably across the site, especially where affected by variations in moisture content. Made Ground and softened London Clay Formation may have to be removed and replaced with suitable Engineered Fill.

During construction, the in-situ CBR value must be checked against the Design CBR value, to confirm design requirements are being met.

In-situ CBR testing results are included in Appendix F.

11.8 Floor Slabs

Given that current results indicate that the Site is not affected by any significant sources of hazardous gas, the natural subgrade beneath the proposed floor slabs has consistent CBR values, there is no identified risk of heave, and ground conditions are relatively uniform across the proposed building footprints, ground bearing floor slabs are potentially viable for the proposed development. However, to enable ground bearing slabs to be adopted, existing Made Ground would have to be re-engineered or ground improvement techniques (such as vibro-compaction) adopted to provide an adequate CBR value at formation level, given that the CBR results from the existing Made Ground suggest that this material is variable in nature. Specialist advice will be need to be sought to determine the most suitable ground improvement technique for the site.

Within the area intended for residential development made ground will need to be heavily compacted to provide a suitable bearing strata for floor slabs failing this suspended floor slabs such as beam and block slabs could be adopted.

The exploratory hole logs and geotechnical laboratory testing suggest that the granular Made Ground may be suitable for re-use as Engineered Fill, however, the material may require wetting prior to re-use. The selection and processing of Made Ground materials should be carefully monitored on-site.

The design of floor slabs should only be finalised when gas monitoring has been completed and assessed, as the recommendations of the gas monitoring report will influence the final choice of floor slab design. The above advice is provided for guidance only at this stage.

11.9 Groundwater / Stability of Excavations

Comments relating to the stability of excavations (i.e. trial pits) and groundwater seepages are included in the logs in Appendix C. The groundwater level monitored following fieldwork was in the range 0.49m to 5.55m below ground level.

Based on observations made during fieldwork, shallow excavations (<1.2m) are likely to be stable in the short term. However, the presence of unstable/water bearing Made Ground in areas of the Site not subjected to ground investigation cannot be entirely ruled out. Simple sump pumping may be required to control moderate groundwater seepages in granular materials.

Consideration should be given to the re-use of arisings from foundation trenches / drainage runs etc. Where contamination has been encountered, it may be possible to reuse foundation arisings subject to risk assessment; however, certainty of use and volume should be confirmed in accordance with the requirements of the CL:AIRE waste protocol.

In line with BS6031, all excavations should be examined daily by a competent person to ensure that they remain safe. Where the sides cannot be sloped back to a safe angle, as approved by a competent and experienced person, their continued stability should not be taken for granted. Vertical or steep faces should be provided with support unless instructed otherwise by a competent person.

11.10 Soakaway Drainage

2No. falling head tests were undertaken as part of the site investigation, in order to assess the potential for soakaway drainage to be utilised as part of the development. One of the tests, undertaken in borehole

BH04, did not give a result, as the London Clay was found to be of low permeability in this location and the water used for the test did not infiltrate the surrounding ground, resulting in no reduction in head over 30 minutes, the test was subsequently abandoned. The second test, undertaken in a coarser grained horizon in borehole BH3, suggests a permeability of 6.49×10^{-5}m/s, however, generally the permeability of the London Clay Formation beneath the Site is likely to be considerably lower than this.

Soakaway drainage is unlikely to be suitable for the proposed development due to the low permeability of the natural strata, unless coarser grained (granular) horizons, such as that encountered in borehole BH03, can be targeted in the drainage design. It should be noted that the lateral extent of granular horizons in the London Clay is likely to be limited.

12. Environmental Assessment

Following the implementation of the ground investigation, the pollutant linkages identified during the Preliminary Environmental Risk Assessment have been re-evaluated and reclassified in relation to the additional information obtained. The results of the reassessment are summarised in Table 31 below:

Table 31: Estimation of environmental risks associated with site ground conditions

Receptor	Sources	Pathway	Risk	Justification/ mitigation	Risk after mitigation
Human Health					
Existing and future site users	Elevated concentrations of arsenic and barium were recorded in the shallow soils	Dermal contact, ingestion, inhalation	Low - Medium	A few localised elevated contaminants were identified within the proposed residential development area of the Site. The development design is not yet known, however If identified locations of contaminants are within soft landscaped areas, remedial measures will be required to mitigate against potential risk to human health. It is anticipated that these 'hot spot' areas of isolated exceedances could be excavated and placed under areas of hardstanding. Therefore not posing a risk to human health from landscaped areas.	Low
	Ground gas	Inhalation, accumulation in confined spaces	Low	No risk associated with recorded concentrations of methane and carbon dioxide. No remedial measures required based on results to date. Requirement for remedial measures to be reviewed on completion of ground gas risk assessment.	Low
Construction workers	Elevated concentrations of arsenic and barium were recorded in the shallow soils	Dermal contact, ingestion, inhalation	Low	Adoption of good working practice & appropriate health & safety measures to control the level of exposure as a matter of course, including use of PPE, hygiene facilities, dust control measures and the adoption of appropriate confined space best practice.	Low
	Ground gas	Inhalation, accumulation in confined spaces	Low	No risk associated with recorded concentrations of methane and carbon dioxide. No remedial measures required based on results to date. Requirement for remedial measures to be reviewed on completion of ground gas risk assessment.	Low
Adjacent properties	Off site migration of soil dust	Dermal contact/ inhalation/ ingestion	Low	Appropriate dust control measures should be adopted throughout the duration of the works.	Low

Receptor	Sources	Pathway	Risk	Justification/ mitigation	Risk after mitigation
Property					
Building structures and potable water pipes	Aggressive soil contaminants	Direct contact/ leaching	Medium	Design of concrete to requirements of BRE Special Digest 1 It is recommended that barrier pipes are used for this development. Discussions should be held with the utilities provider prior to installation.	Low
Plants/ landscaping	Single elevated concentration of arsenic identified	Direct plant uptake	Low	No phytotoxic risk has been identified. Conformation should be sought from the landscape architect	Low
Controlled Waters					
Surface Waters (Brook along southeastern boundary)	Arsenic, chromium and phenol recorded to be in a mobile state	Leaching / migration of contaminants		Elevated concentrations of contaminants were recorded to be in a mobile state, however, the presence of London Clay beneath the site acting as a barrier and no significantly elevated concentrations of these contaminants recorded within the soils or groundwater, it is considered that these concentrations do not pose a significant risk to the wider environment.	Low
Groundwater	No significant concentrations of contaminants identified in the groundwater.	Leaching / migration	Low	Although a marginally elevated concentration of phenol has been recorded in the groundwater at the Site, corresponding contamination has not been identified in the overlying soils. Consequently, the recorded exceedance is considered not to pose a risk to controlled waters.	Low

13. Recommendations

The phase of ground investigation undertaken at the Site has highlighted two potential pollutant linkages:

- The potential localised risk to human health within the residential area of the Site associated with elevated concentrations of arsenic and barium; and
- The risk to buried water supply pipes and buried concrete.

Topsoil may be required to be imported as a growing medium in soft landscaping areas, this will need to be confirmed with the landscape architect.

Given the proposed end use of a mixed commercial and residential development the overall environmental risk rating for the Site is assessed as **Low**.

13.1 Environmental Remedial Measures

Measures will be required to break the pollutant linkages identified above. In order to minimise the need to dispose of material off-Site, it is recommended that material is re-used where possible, subject to suitable mitigation measures being in place.

13.1.1 Human Health

The current investigation identified elevated concentrations of arsenic and barium within the shallow made ground within localised areas of the proposed residential development area of the Site, these exceedences are classified as 'hot spots' and are not consistent across the entire site. The proposed development design is not yet known and therefore there is the possibility that these locations can be encapsulated by building footprint or roads infrastructure and therefore would not be considered a risk to future site users and construction workers. However, if this changes mitigation measures such as excavation of these hot spot areas would be deemed adequate. The excavated soils could then be placed under areas of hardstanding as part of the development design. There were no exceedances above the commercial screening criteria.

It is recommended that construction personnel follow standard health and safety procedures during Site work including the utilisation of appropriate Personal Protective equipment (PPE) commensurate with the contaminants present and the activities being undertaken. Appropriate hygiene practices and use of appropriate welfare facilities should also be adopted. This information should be made available to all Site personnel during any Site inductions.

Good working practices, including the damping down of soils, should also be employed during construction to minimise the potential for offsite migration of dust.

13.1.2 Ground Gas

Using the guidance contained within CIRIA report C665, results to date place the site as Characteristic Situation 1. However, recommendations relating to gas protective measures should be considered provisional until issue of our hazardous gas risk assessment at the end of the monitoring period.

The Site has been identified as being in a non-Radon affected area. Consequently radon protection measures would not have been installed historically. However, current advice from the Health Protection Agency (first issued is 2008 and reiterated in 2010 HPA Press Release) is that all new buildings should include basic radon protective measures as a minimum whether they are in a radon affected area or not. The guidance stated that "Building Regulations and supporting documents should be amended to ensure that all new buildings, extensions, conversions and refurbished buildings in the UK include basic Radon protective measures". It is therefore recommended that the requirements for radon protection are confirmed with the Local Authority.

13.1.3 Buried Services and Structures

The Design Sulphate and Aggressive Chemical Environment for Concrete classifications are considered to be: DS1 AC-1 for concrete in contact with Made Ground and DS3 AC3 for concrete in contact with London Clay.

Barrier pipes should offer sufficient protection to the drinking water supply at the Site. It is recommended that this approach is discussed and agreed in advance with the utilities supplier.

13.2 Geotechnical Considerations

Medium strength cohesive deposits (i.e. London Clay Formation) have been identified as a suitable bearing stratum, with a design bearing resistance of approximately 150kPa. This stratum has been encountered at depths of less than 2.5m below proposed ground level across the site and as such shallow foundations (strip / pad foundations) could be adopted. Deeper Made Ground (2.8m thick) has been identified in borehole BH05, in the southwest of the Site, However this location was positioned within a landscaped bund therefore is of a significantly higher elevation than remaining site.

Within the area of site intended for commercial development shallow pad or strip foundations would need to be approximately 1.5m depth extending to 2.0m depth in areas of TP5 and BH3. Within the area intended for residential development shallow pad or strip foundations would need to be approximately 1.0m in depth extending to 1.5-2.0m depth in areas of TP11 and TP4.

Identification of the appropriate founding stratum on site must be undertaken by an experienced engineer. If necessary, Waterman EED should be contacted to provide further advice.

Foundations placed on shrinkable soils should be deepened where necessary to accommodate the effects of trees and hedgerows.

Should foundation loads be significantly in excess of the design bearing resistance of the shallow soils, it is recommended that piled foundations could be utilised and the advice of a specialist piling contractor should be obtained to confirm the suitability of piling and the most appropriate pile type. However, based on the site investigation information, frictional piles could derive support from the London Clay Formation, present from depths of between 0.3m bgl and 2.8m bgl to a minimum of 15m bgl (maximum drilled depth).

Piled foundations may need to be adopted for residential buildings over four storeys. Piling may also be required for the Hotel complex subject to a more detailed loading assessment.

The natural subgrade has CBR values in the range 2.7% to 6.1% and it is recommended that a value of 3% is used for the purposes of pavement design and temporary works design. Subgrade strength may vary considerably across the site, especially where affected by variations in moisture content. Made Ground and softened London Clay Formation may have to be removed and replaced with suitable Engineered Fill. During construction, the in-situ CBR value must be checked against the Design CBR value, to confirm design requirements are being met.

The results of compaction testing undertaken on samples of Made Ground (granular) indicate that, in its current condition, it could not be recompacted to achieve either 95% Maximum Dry Density or less than 5% air voids. However, the Particle Size Distribution testing suggests that these materials should be suitable for re-use as either Class 1A/1B or Class 6F2 Engineered Fill. Based upon the results obtained it is considered that Made Ground (Granular) would require some processing (e.g. selection, screening, crushing) and wetting prior to re-use as an Engineered Fill. It should be noted that suitability for compaction is highly dependent on the initial moisture content of the material to be compacted.

Where Made Ground is to be reused as an engineered fill, it would be sensible to select granular fills only and subject them to a confirmatory testing regime where they were required to achieve a compaction specification as a structural fill.

Given that current results indicate that the Site is not affected by any significant sources of hazardous gas, the natural subgrade beneath the proposed floor slabs has consistent CBR values, there is no identified risk of heave and ground conditions are relatively uniform across the proposed building footprints, ground bearing floor slabs are potentially viable for the proposed development. However, to enable ground bearing slabs to be adopted, existing Made Ground would have to be re-engineered or ground improvement techniques (such as vibro-compaction) adopted to provide an adequate CBR value at formation level, given that the CBR results from the existing Made Ground suggest that this material is variable in nature. Specialist advice will be need to be sought to determine the most suitable ground improvement technique for the site.

Within the area intended for residential development made ground will need to be heavily compacted to provide a suitable bearing strata for floor slabs failing this suspended floor slabs such as beam and block slabs could be adopted.

Based on observations made during fieldwork, shallow excavations (<1.2m) likely to be stable in the short term. However, the presence of unstable/water bearing Made Ground in areas of the Site not subjected to ground investigation cannot be entirely ruled out. Simple sump pumping may be required to control moderate groundwater seepages in granular materials.

Soakaway drainage is unlikely to be suitable for the proposed development due to the low permeability of the natural strata, unless coarser grained (granular) horizons, such as that encountered in borehole BH03, can be targeted in the drainage design. It should be noted that the lateral extent of granular horizons in the London Clay is likely to be limited.

Consideration should be given to the re-use of arisings from foundation trenches / drainage runs etc. Where contamination has been encountered, it may be possible to re-use foundation arisings subject to risk assessment, however certainty of use and volume should be confirmed in accordance with the requirements of the CL:AIRE waste protocol.

13.3 Regulatory Approvals

A copy of this report, should be submitted to the local authority for review and approval

The protection measures required for buried water supply pipes should also be agreed with the utilities provider, so a copy of this report should also be submitted to them for approval.

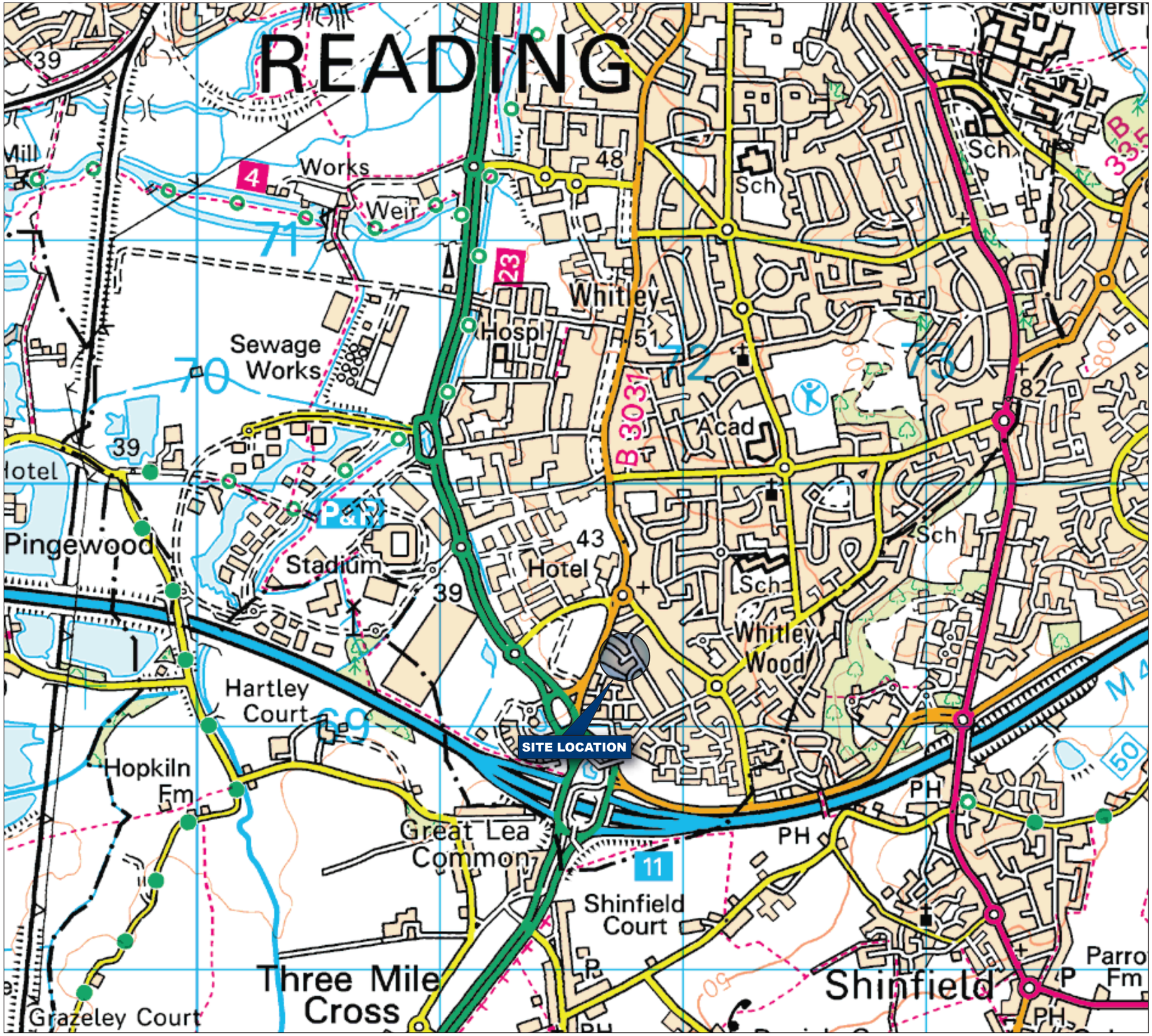
The re-use of any site won material and imported deposits should be demonstrated using a Materials Management Plan. This document would record the origin of material used, the location of its deposition within the Site boundary and demonstration that the material would be considered suitable for its intended use. This document is required by the CL:AIRE waste protocol.

The scope of adopted ground gas protection measures, if required, should be agreed with the building control department and independent validation should also be undertaken and reported within the site validation report.

APPENDICES

Appendix A. Site Plans

- Site Location Plan (Fig. A1)
- Site Plan (Fig. A2)
- Ground Investigation Plan (Fig. A3)



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TN

Project Details	EED14723-100: Worton Grange, Imperial Way, Reading
Figure Title	Figure A1: Site Location Plan
Figure Ref	EED14723-100_GR_PERA_A1A
Date	July 2014
File Location	\\nt-lncs\weedl\projects\eed14723\100\graphics\pera\issued figures

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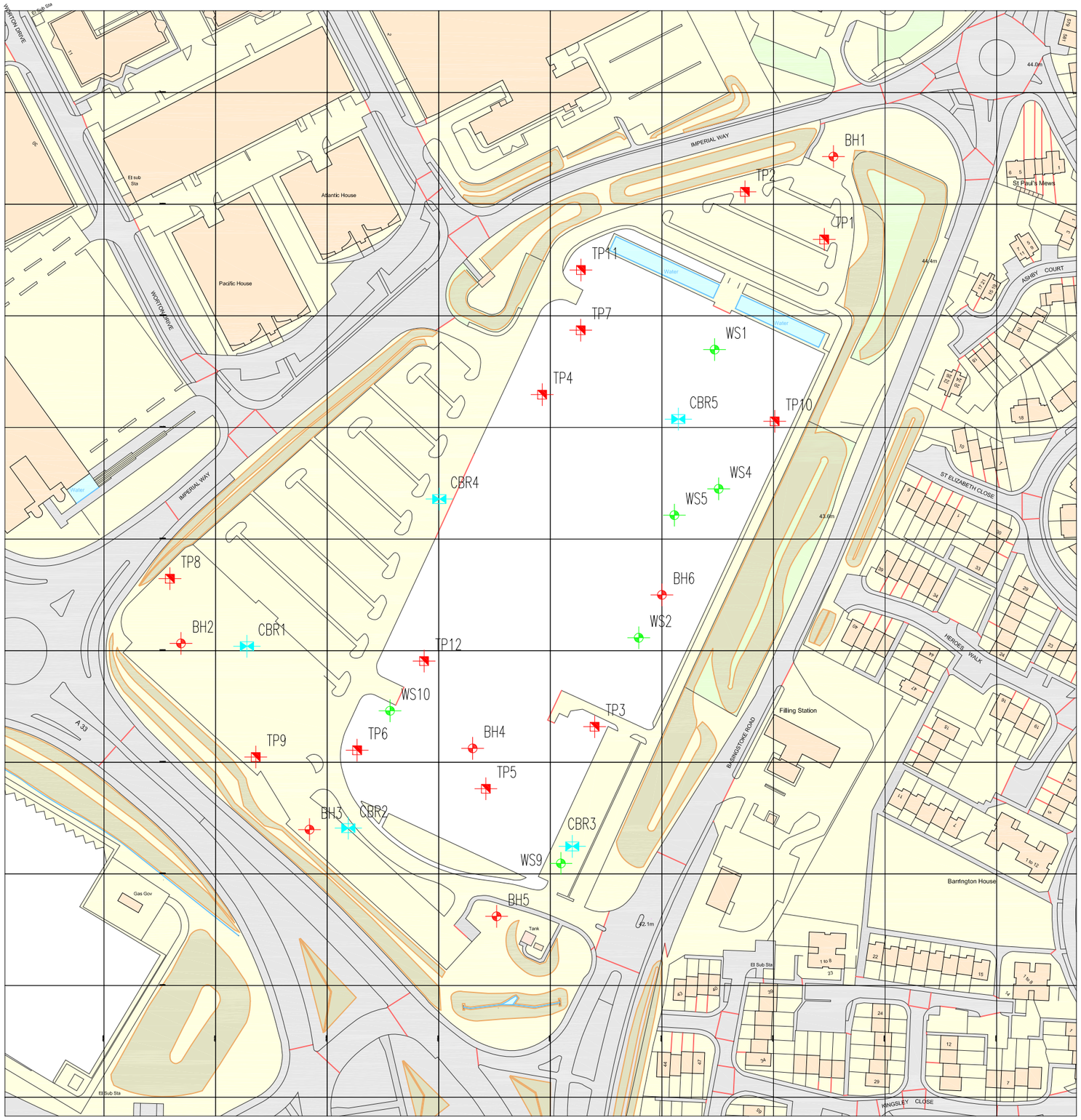
Site Boundary

N

Project Details	EED14723-100: Worton Grange, Imperial Way, Reading
Figure Title	Figure A2: Site Plan
Figure Ref	EED14723-100_GR_PERA_A2A
Date	July 2014
File Location	\\nt-lncs\weedl\projects\eed14723\100\graphics\pera\issued figures

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Rev	Date	Description	By
A01	15:08:14	PRELIMINARY ISSUE	MC

Amendments

Project
READING

Title
GROUND INVESTIGATION PLAN

(FIGURE A3)

Client

Waterman
Pickfords Wharf Clink Street London SE1 9DG
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Drawing Status
PRELIMINARY

Designed by	GH	Checked by	GH	Project No	EED14723-100
Drawn by	MC	Date	August 2014		
Scales @ A3 work to figured dimensions only		1:2000 @ A3		Work Order No	100

Publisher	Zone	Category	Number	Revision
EED	100	80	001	A01

A3-Waterman-T

Appendix B. Desk Study Information

- Site Walkover Photographs (1 page)
- Landmark Envirocheck Report (110 Pages)
- Agency Responses (1 Pages)



Plate 1: Hardstanding within central area



Plate 2: Stockpiled demolition material



Plate 3: Soft Landscaping along eastern border



Plate 4: Unknown below ground structure



Plate 5: View of the onsite Swale

Project Details	EED14723-100: Worton Grange, Imperial Way, Reading
Figure Title	Figure B1: Site Photographs
Figure Ref	EED14723-100_GR_PERA_B1A
Date	July 2014
File Location	\\nt-lncs\weedl\projects\eed14723\100\graphics\pera\issued figures

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Envirocheck® Report:

Datasheet

Order Details:

Order Number:
57690165_1_1

Customer Reference:
EED14723-100

National Grid Reference:
471480, 169270

Slice:
A

Site Area (Ha):
2.97

Search Buffer (m):
1000

Site Details:

11 Ashby Court
READING
RG2 8PG

Client Details:

Ms C Wilkinson
Waterman Energy Environment & Design Ltd
Clink Street
Pickfords Wharf
London
SE1 9DG

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Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Report Version v47.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1			5	6
Enforcement and Prohibition Notices					
Integrated Pollution Controls	pg 3		4		
Integrated Pollution Prevention And Control	pg 4		10	2	
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 7			1	8
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 8	Yes			
Pollution Incidents to Controlled Waters	pg 8		1	8	12
Prosecutions Relating to Authorised Processes	pg 12				1
Prosecutions Relating to Controlled Waters					
Registered Radioactive Substances					
River Quality	pg 12				1
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 12			9	11 (*26)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 23	Yes	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 23	Yes	n/a	n/a	n/a
Superficial Aquifer Designations			n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences	pg 24		Yes	n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
Detailed River Network Lines	pg 24	Yes	Yes	Yes	n/a
Detailed River Network Offline Drainage	pg 29			Yes	n/a

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites	pg 30				1
Historical Landfill Sites	pg 30				2
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)	pg 30				1
Licensed Waste Management Facilities (Locations)	pg 30				7
Local Authority Recorded Landfill Sites	pg 32				1
Registered Landfill Sites	pg 32				2
Registered Waste Transfer Sites	pg 33				4
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 36	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 36	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites					
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
Brine Compensation Area			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 40	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 40	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards				n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 40	Yes		n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Industrial Land Use					
Contemporary Trade Directory Entries	pg 41		12	14	n/a
Fuel Station Entries	pg 43		1	1	
Sensitive Land Use					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 44		1		
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**Discharge Consents** Operator: Scottish Courage Brewing Ltd Property Type: Brewing & Malting Location: The Berkshire Brewery, Imperialway, Reading, Berks Authority: Environment Agency, Thames Region Catchment Area: Not Given Reference: CATM.3207 Permit Version: 1 Effective Date: 15th April 1998 Issued Date: 15th April 1998 Revocation Date: 25th April 2002 Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Smallmead Ditch **Status: Revoked (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A13SW (SW)	273	1	471270 169000
2	**Discharge Consents** Operator: Scottish Courage Brewing Ltd Property Type: Brewing & Malting Location: Berkshire Brewery, Imperial Way, Reading, Berkshire Authority: Environment Agency, Thames Region Catchment Area: Not Given Reference: CATM.3206 Permit Version: 1 Effective Date: 15th April 1998 Issued Date: 15th April 1998 Revocation Date: 10th March 2014 Discharge Type: Trade Discharge - Process Water Discharge Environment: Freshwater Stream/River Receiving Water: Three Mile Cross Stream **Status: Surrendered under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A12SE (SW)	381	1	471120 169000
2	**Discharge Consents** Operator: Scottish Courage Brewing Ltd Property Type: Brewing & Malting Location: Berkshire Brewery, Imperial Way, Reading, Berkshire Authority: Environment Agency, Thames Region Catchment Area: Not Given Reference: Cntm.1061 Permit Version: 1 Effective Date: 10th September 1993 Issued Date: 10th September 1993 Revocation Date: 1st October 1996 Discharge Type: Miscellaneous Discharges - Mine / Groundwater As Raised Discharge Environment: Freshwater Stream/River Receiving Water: Three Mile Cross Stream **Status: Lapsed (under Environment Act 1995, Schedule 23)** Positional Accuracy: Located by supplier to within 100m	A12SE (SW)	395	1	471100 169000
2	**Discharge Consents** Operator: Courage Brewery Ltd Property Type: Brewing & Malting Location: Berkshire Brewery, Imperial Way, Reading, Berkshire Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Ctcr.2233 Permit Version: 1 Effective Date: 29th January 1985 Issued Date: 29th January 1985 Revocation Date: 10th September 1993 Discharge Type: Trade Effluent Discharge Environment: Freshwater Stream/River Receiving Water: Three Mile Cross Stream **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A12SE (SW)	395	1	471100 169000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
3	**Discharge Consents** Operator: Heineken Uk Limited Property Type: Brewing & Malting Location: Scottish Courage Ltd The Berkshire Brewery Imperial Way Reading Rg2 0pn Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Cawm.0867 Permit Version: 1 Effective Date: 26th August 2004 Issued Date: 15th November 2004 Revocation Date: 10th January 2011 Discharge Type: Trade Effluent Discharge-Site Drainage Discharge Environment: Freshwater Stream/River Receiving Water: The Smallmead Ditch **Status: Revoked under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A17SE (NW)	451	1	471050 169650
4	**Discharge Consents** Operator: Scottish Courage Brewing Ltd Property Type: Brewing & Malting Location: The Berkshire Brewery, Imperialway, Reading, Berks Authority: Environment Agency, Thames Region Catchment Area: Not Given Reference: Ctwc.1558 Permit Version: 1 Effective Date: 27th March 1987 Issued Date: 27th March 1987 Revocation Date: 1st October 1996 Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Smallmead Ditch **Status: Lapsed (under Environment Act 1995, Schedule 23)** Positional Accuracy: Located by supplier to within 100m	A12NE (NW)	537	1	470900 169600
5	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: Sewerage Network - Pumping Station - Water Company Location: Great Lea Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp.1044 Permit Version: 2 Effective Date: 3rd September 2010 Issued Date: 3rd September 2010 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Lea Dairy Stream **Status: Varied under EPR 2010** Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	745	1	471000 168600
5	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: Sewerage Network - Pumping Station - Water Company Location: Great Lea Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp.1044 Permit Version: 1 Effective Date: 2nd November 1989 Issued Date: 2nd November 1989 Revocation Date: 2nd September 2010 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Lea Dairy Stream **Status: Temporary Consents (Water Act 1989, Section 113)** Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	745	1	471000 168600

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
6	**Discharge Consents** Operator: Thames Water Utilities Ltd Property Type: Sewerage Network - Pumping Station - Water Company Location: Reading, Lower Whitleyreadinglower Whitley Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Temp.1774 Permit Version: 1 Effective Date: 2nd November 1989 Issued Date: 2nd November 1989 Revocation Date: 27th January 1997 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge Environment: Freshwater Stream/River Receiving Water: Foundry Brook **Status: Authorisation revokedRevoked** Positional Accuracy: Located by supplier to within 100m	A18NW (N)	831	1	471200 170200
7	**Discharge Consents** Operator: Agmet Limited Property Type: Industrial Parks & Estates Location: Agmet Limited 8 Commercial Road Reading Berkshire Rg2 0qz Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Npswqd009614 Permit Version: 2 Effective Date: 3rd June 2013 Issued Date: 12th March 2010 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Cooling Water Discharge Environment: Freshwater Stream/River Receiving Water: Tributary Of Foudry Brook **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A17NE (NW)	850	1	470982 170122
7	**Discharge Consents** Operator: Agmet Limited Property Type: Industrial Parks & Estates Location: Agmet Limited 8 Commercial Road Reading Berkshire Rg2 0qz Authority: Environment Agency, Thames Region Catchment Area: Not Supplied Reference: Npswqd009614 Permit Version: 1 Effective Date: 12th March 2010 Issued Date: 12th March 2010 Revocation Date: 2nd June 2013 Discharge Type: Trade Discharges - Cooling Water Discharge Environment: Freshwater Stream/River Receiving Water: Tributary Of Foudry Brook **Status: New Consent (Water Resources Act 1991, Section 88 & Schedule 10 as amended by Environment Act 1995)** Positional Accuracy: Located by supplier to within 10m	A17NE (NW)	850	1	470982 170122
8	**Integrated Pollution Controls** Name: Scottish And Newcastle Uk Ltd Location: Berkshire Brewery, Imperial Way, READING, Berkshire, RG2 0PN Authority: Environment Agency, Thames Region Permit Reference: AU9608 Dated: 6th March 1996 Process Type: IPC minor (non-substantial) variation to previous variation Description: 1.3 A (A) Combustion processes within the Fuel & Power Industry **Status: Authorisation superseded by a substantial or non substantial variationSuperseded** Positional Accuracy: Automatically positioned in the proximity of the address	A13NW (W)	57	1	471305 169289
8	**Integrated Pollution Controls** Name: Scottish And Newcastle Uk Ltd Location: Berkshire Brewery, Imperial Way, READING, Berkshire, RG2 0PN Authority: Environment Agency, Thames Region Permit Reference: BD5194 Dated: 24th November 1998 Process Type: IPC minor (non-substantial) variation to previous variation Description: 1.3 A (A) Combustion processes within the Fuel & Power Industry **Status: Revoked - Now IPPC** Positional Accuracy: Automatically positioned in the proximity of the address	A13NW (W)	60	1	471300 169294

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
8	**Integrated Pollution Controls** Name: Courage Ltd Location: Berkshire Brewery, Imperial Way, READING, RG2 0PN Authority: Environment Agency, Thames Region Permit Reference: AG1441 Dated: 3rd August 1992 Process Type: IPC minor (non-substantial) variation to previous variation Description: 1.3 A (A) Combustion processes within the Fuel & Power Industry **Status:** **Application received by HMIP but is not yet authorisedNot Yet Authorised** Positional Accuracy: Automatically positioned in the proximity of the address	A13NW (W)	60	1	471300 169294
8	**Integrated Pollution Controls** Name: Scottish And Newcastle Uk Ltd Location: Berkshire Brewery, Imperial Way, READING, Berkshire, RG2 0PN Authority: Environment Agency, Thames Region Permit Reference: AA8508 Dated: 29th May 1992 Process Type: IPC new application Description: 1.3 A (A) Combustion processes within the Fuel & Power Industry **Status:** **Authorisation superseded by a substantial or non substantial variationSuperseded** Positional Accuracy: Automatically positioned in the proximity of the address	A13NW (W)	61	1	471300 169289
9	**Integrated Pollution Prevention And Control** Name: Heineken Uk Ltd Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency - South East Region, West Thames Area Permit Reference: NP3339FS Original Permit Ref: Bp5344ih Effective Date: 25th July 2011 **Status:** **Surrender Effective** Application Type: Surrender App. Sub Type: Whole Positional Accuracy: Automatically positioned to the address Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: N Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: Y Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: N	A13NW (W)	145	1	471212 169338
9	**Integrated Pollution Prevention And Control** Name: Heineken Uk Ltd Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency - South East Region, West Thames Area Permit Reference: NP3539FX Original Permit Ref: Tp3834tj Effective Date: 25th July 2011 **Status:** **Surrender Effective** Application Type: Surrender App. Sub Type: Whole Positional Accuracy: Automatically positioned to the address Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: N Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: Y	A13NW (W)	145	1	471212 169338

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
9	**Integrated Pollution Prevention And Control** Name: Heineken Uk Ltd Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency - South East Region, West Thames Area Permit Reference: TP3834TJ Original Permit Ref: Tp3834tj Effective Date: 15th June 2010 **Status: Superseded By Variation** Application Type: Transfer App. Sub Type: Whole limited change in management Positional Accuracy: Automatically positioned to the address Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: Y Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: N	A13NW (W)	145	1	471212 169338
9	**Integrated Pollution Prevention And Control** Name: Heineken Uk Ltd Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency, Thames Region Permit Reference: TP3834TJ Original Permit Ref: Tp3834tj Effective Date: 15th June 2010 **Status: Superseded By Variation** Application Type: Transfer App. Sub Type: Whole limited change in management Positional Accuracy: Automatically positioned to the address Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: Y Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: N	A13NW (W)	145	1	471212 169338
9	**Integrated Pollution Prevention And Control** Name: Dalkia Utilities Services Plc Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency - South East Region, West Thames Area Permit Reference: ZP3339XK Original Permit Ref: Zp3635sb Effective Date: 20th December 2007 **Status: Superseded By Variation** Application Type: Variation App. Sub Type: Minor Positional Accuracy: Automatically positioned to the address Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: Y Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: N	A13NW (W)	145	1	471212 169338
9	**Integrated Pollution Prevention And Control** Name: Dalkia Utilities Services Plc Location: Berkshire Brewery, Imperial Way, Reading, RG2 0PN Authority: Environment Agency, Thames Region Permit Reference: ZP3339XK Original Permit Ref: Zp3635sb Effective Date: 20th December 2007 **Status: Superseded By Variation** Application Type: Variation App. Sub Type: Minor Positional Accuracy: Automatically positioned to the address Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: N Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: Y	A13NW (W)	145	1	471212 169338

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
9	**Integrated Pollution Prevention And Control** Name: Scottish & Newcastle Uk Limited Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency - South East Region, West Thames Area Permit Reference: BP5344IH Original Permit Ref: Bp5344ih Effective Date: 20th February 2006 **Status:** **Superseded By Variation** Application Type: Application App. Sub Type: New Positional Accuracy: Automatically positioned to the address Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: N Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: N Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: Y	A13NW (W)	145	1	471212 169338
9	**Integrated Pollution Prevention And Control** Name: Dalkia Utilities Services Plc Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency - South East Region, West Thames Area Permit Reference: ZP3635SB Original Permit Ref: Zp3635sb Effective Date: 20th February 2006 **Status:** **Superseded By Variation** Application Type: Application App. Sub Type: New Positional Accuracy: Automatically positioned to the address Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: Y	A13NW (W)	145	1	471212 169338
9	**Integrated Pollution Prevention And Control** Name: Scottish & Newcastle Uk Limited Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency, Thames Region Permit Reference: Bp5344ih Original Permit Ref: Bp5344ih Effective Date: 20th February 2006 **Status:** **Superseded By Variation** Application Type: Application App. Sub Type: New Positional Accuracy: Automatically positioned to the address Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: N Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: N Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: Y	A13NW (W)	145	1	471212 169338
9	**Integrated Pollution Prevention And Control** Name: Dalkia Utilities Services Plc Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency, Thames Region Permit Reference: Zp3635sb Original Permit Ref: Zp3635sb Effective Date: 20th February 2006 **Status:** **Superseded By Variation** Application Type: Application App. Sub Type: New Positional Accuracy: Automatically positioned to the address Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: Y	A13NW (W)	145	1	471212 169338

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
10	**Integrated Pollution Prevention And Control** Name: Heineken Uk Ltd Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency, Thames Region Permit Reference: NP3539FX Original Permit Ref: Tp3834tj Effective Date: 25th July 2011 **Status: Surrender Effective** Application Type: Surrender App. Sub Type: Whole Positional Accuracy: Located by supplier to within 100m Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: N Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: Y	A12NE (W)	356	1	471000 169330
10	**Integrated Pollution Prevention And Control** Name: Heineken Uk Ltd Location: Berkshire Brewery, Reading, Imperial Way, Basingstoke Road,,, Reading, Berkshire, RG2 0PN Authority: Environment Agency, Thames Region Permit Reference: NP3339FS Original Permit Ref: Bp5344ih Effective Date: 25th July 2011 **Status: Surrender Effective** Application Type: Surrender App. Sub Type: Whole Positional Accuracy: Located by supplier to within 100m Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: Y Activity Code: 1.1 A(1) (A) Activity Description: Combustion; Any Fuel Greater Or Equal To 50Mw Primary Activity: N Activity Code: 6.8 A(1) (D) (II) Activity Description: Animal, Vegetable & Food; Treating Etc. Vegetable Raw Materials For Food Greater Than 300T/Day Primary Activity: N	A12NE (W)	356	1	471000 169330
11	**Local Authority Pollution Prevention and Controls** Name: Fairfield Service StationShell Location: 585 Basingstoke Road, READING, Berkshire, RG2 0HZ Authority: Reading Borough Council, Environmental Health Department Permit Reference: EPA/PAR.B/37/98/P2 Dated: 19th July 1999 Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A18SE (NE)	402	2	471792 169617
12	**Local Authority Pollution Prevention and Controls** Name: Renault Trucks South Location: Bennet Road, Reading, Berkshire, RG2 0QX Authority: Reading Borough Council, Environmental Health Department Permit Reference: EPA/PAR.B/20/95/P1 Dated: 25th January 1996 Process Type: Local Authority Pollution Prevention and Control Description: PG6/34 Respraying of road vehicles **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	741	2	471378 170142
13	**Local Authority Pollution Prevention and Controls** Name: Fraikin Ltd Location: 34 Bennet Road, READING, Berkshire, RG2 0QX Authority: Reading Borough Council, Environmental Health Department Permit Reference: EPA/PAR.B/15/93 Dated: 16th November 1992 Process Type: Local Authority Air Pollution Control Description: PG1/1Waste oil burners, less than 0.4MW net rated thermal input **Status: Authorisation revokedRevoked** Positional Accuracy: Manually positioned to the address or location	A17NE (NW)	773	2	471131 170114

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
14	**Local Authority Pollution Prevention and Controls** Name: Cellulair Location: Bennet Road, READING, Berkshire, RG2 0QT Authority: Reading Borough Council, Environmental Health Department Permit Reference: Epa/Par.B/8/92 Dated: 4th January 1996 Process Type: Local Authority Air Pollution Control Description: PG6/32 Adhesive coating **Status: Authorisation revokedRevoked** Positional Accuracy: Manually positioned to the road within the address or location	A18NW (N)	804	2	471214 170176
15	**Local Authority Pollution Prevention and Controls** Name: Jewson Ltd Location: 468 Basingstoke Road, READING, Berkshire, RG2 0QQ Authority: Reading Borough Council, Environmental Health Department Permit Reference: EPA/PAR.B/a/91 Dated: 27th November 1992 Process Type: Local Authority Air Pollution Control Description: PG6/2 Manufacture of timber and wood-based products **Status: Authorisation revokedRevoked** Positional Accuracy: Automatically positioned to the address	A18NE (N)	871	2	471617 170256
16	**Local Authority Pollution Prevention and Controls** Name: National Car Rental Location: 6-8 Commercial Road, Reading, Berkshire, RG2 0QZ Authority: Reading Borough Council, Environmental Health Department Permit Reference: EPA/PAR.B/51/03/P1 Dated: Not Supplied Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	872	2	471374 170273
17	**Local Authority Pollution Prevention and Controls** Name: Clydebridge Chemicals Ltd Location: 7 Darwin Close, READING, Berkshire, RG2 0TB Authority: Reading Borough Council, Environmental Health Department Permit Reference: EPA/PAR.B/7/92/P1 Dated: 3rd March 1993 Process Type: Local Authority Pollution Prevention and Control Description: PG6/42 Bitumen and tar processes **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	884	2	471319 170280
17	**Local Authority Pollution Prevention and Controls** Name: Clydebridge Chemicals Ltd Location: 7 Darwin Close, Reading, Berkshire, RG2 0TB Authority: Reading Borough Council, Environmental Health Department Permit Reference: EPA/PAR.B/7/92/P2 Dated: 3rd March 1993 Process Type: Local Authority Pollution Prevention and Control Description: PG6/44 Manufacture of coating materials **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A18NW (N)	884	2	471319 170280
18	**Local Authority Pollution Prevention and Controls** Name: Reading Accident Repair Centre Location: 10 Commercial Road, READING, Berkshire, RG2 0QZ Authority: Reading Borough Council, Environmental Health Department Permit Reference: EPA/PAR.B/49/00/P1 Dated: 22nd August 2000 Process Type: Local Authority Pollution Prevention and Control Description: PG6/34 Respraying of road vehicles **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A23SW (N)	907	2	471411 170310
	Nearest Surface Water Feature	A13SE (S)	0	-	471533 169141
19	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Whitley Wood, Whitley, READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: No Pollution Found Incident Date: 10th March 1998 Incident Reference: 38152 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13SE (SE)	149	1	471600 169000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
20	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 28th May 1992 Incident Reference: WE920324 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NE (N)	251	1	471600 169595
20	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Chemicals - Unknown Note: Confirmed As A Pollution Incident Incident Date: 9th May 1992 Incident Reference: WE920278 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A13NE (N)	255	1	471600 169600
21	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 2nd June 1994 Incident Reference: WE940179 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18SE (NE)	326	1	471650 169650
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 8th October 1990 Incident Reference: WE900584 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18SE (N)	334	1	471600 169695
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 11th January 1991 Incident Reference: WE910023 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18SE (N)	336	1	471605 169695
22	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 12th May 1990 Incident Reference: WE900352 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18SE (N)	338	1	471600 169700

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
23	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Alongside Lower, READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 12th April 1998 Incident Reference: 38271 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18SE (NE)	393	1	471700 169695
23	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Not Supplied Incident Date: 1st June 1998 Incident Reference: 38903 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18SE (NE)	396	1	471700 169700
24	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 3rd August 1990 Incident Reference: WE900493 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SE (NW)	520	1	471100 169800
25	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 18th September 1995 Incident Reference: WE950381 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SE (NW)	556	1	471000 169750
26	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 14th October 1993 Incident Reference: WE930350 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A12NW (W)	556	1	470800 169300
27	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 26th October 1993 Incident Reference: WE930363 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17SE (NW)	661	1	471000 169900

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
28	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Unknown Sewage Note: Confirmed As A Pollution Incident Incident Date: 3rd December 1992 Incident Reference: WE920641 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	774	1	471100 170100
29	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Smallmead Reading Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 17th February 1992 Incident Reference: WE920120 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	879	1	470900 170100
30	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: THREE MILE CROSS Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 27th November 1992 Incident Reference: WE920651 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A3NE (S)	892	1	471500 168250
31	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Storm Sewage Note: Confirmed incident Incident Date: 2nd March 1999 Incident Reference: THWE1999042221 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 10m	A23SW (N)	897	1	471400 170300
32	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Stadium Bridge, READING Authority: Environment Agency, Thames Region Pollutant: Oils - Unknown Note: Confirmed As A Pollution Incident Incident Date: 29th October 1991 Incident Reference: WE910588 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	932	1	470970 170210
32	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: READING Authority: Environment Agency, Thames Region Pollutant: Storm Sewage Note: Not Supplied Incident Date: 18th November 1998 Incident Reference: THWE1998041134 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	968	1	470950 170240

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
33	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: Reading Area Authority: Environment Agency, Thames Region Pollutant: Miscellaneous - Unknown Note: Confirmed As A Pollution Incident Incident Date: 10th August 1990 Incident Reference: WE900491 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	961	1	470900 170200
34	**Pollution Incidents to Controlled Waters** Property Type: Not Given Location: M4 Junction 11, A33 Road Authority: Environment Agency, Thames Region Pollutant: Storm Sewage Note: Not Supplied Incident Date: 11th February 1997 Incident Reference: THWE1997031380 Catchment Area: Not Given Receiving Water: Not Given Cause of Incident: Not Given Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A3NW (S)	966	1	471300 168200
35	**Prosecutions Relating to Authorised Processes** Location: Commercial Road, Reading, Berkshire, Rg2 Prosecution Text: Failing to store clinical waste correctly Prosecution Act: Epa90 S33 Hearing Date: 13th February 2007 Verdict: Guilty Fine: 8000 Costs: 1204 Positional Accuracy: Manually positioned to the road within the address or location	A23SW (N)	905	1	471431 170309
	River Quality Name: Foudry Bk GQA Grade: River Quality B Reach: Stratfield Mortimer Stw - Kennet Estimated Distance (km): 10.5 Flow Rate: Flow less than 0.31 cumecs Flow Type: River Year: 2000	A17NW (NW)	946	1	470787 170092
36	**Water Abstractions** Operator: Akeler Developments Ltd Licence Number: 28/39/22/0601 Permit Version: 1 Location: Reading International Business Park Authority: Environment Agency, Thames Region Abstraction: Business Parks: Make-Up or Top Up Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Reading International Business Park Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 10th November 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A8NW (S)	358	1	471320 168840
37	**Water Abstractions** Operator: Heineken Uk Ltd Licence Number: 28/39/22/0614 Permit Version: 4 Location: Berkshire Brewery - Point 'A' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 23rd November 2009 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SE (SW)	381	1	471130 168990

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
37	**Water Abstractions** Operator: Scottish & Newcastle Uk Limited Licence Number: 28/39/22/0614 Permit Version: 3 Location: Berkshire Brewery - Point 'A' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 18th August 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SE (SW)	381	1	471130 168990
37	**Water Abstractions** Operator: Scottish & Newcastle Uk Limited Licence Number: 28/39/22/0614 Permit Version: 2 Location: Berkshire Brewery - Point 'A' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 31st January 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SE (SW)	381	1	471130 168990
37	**Water Abstractions** Operator: Scottish Courage Brewing Ltd Licence Number: 28/39/22/0614 Permit Version: 1 Location: Berkshire Brewery - Point 'A' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st January 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SE (SW)	381	1	471130 168990
37	**Water Abstractions** Operator: Courage Ltd Licence Number: 28/39/22/0483 Permit Version: Not Supplied Location: Berkshire Brewery, READING Authority: Environment Agency, Thames Region Abstraction: Brewery Abstraction Type: Not Supplied Source: Groundwater Daily Rate (m3): 9550 Yearly Rate (m3): 3000000 Details: Also Process (2186500) Assessment Of Water (1). Chalk (Undifferentiated); Status: Expired Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A12SE (SW)	395	1	471100 169000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
38	**Water Abstractions** Operator: Heineken Uk Ltd Licence Number: 28/39/22/0614 Permit Version: 4 Location: Berkshire Brewery - Point 'E' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 23rd November 2009 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A17SE (NW)	415	1	471100 169650
38	**Water Abstractions** Operator: Scottish & Newcastle Uk Limited Licence Number: 28/39/22/0614 Permit Version: 3 Location: Berkshire Brewery - Point 'E' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 18th August 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A17SE (NW)	415	1	471100 169650
39	**Water Abstractions** Operator: Scottish Courage Brewing Ltd Licence Number: 28/39/22/0556 Permit Version: 100 Location: Berkshire Brewery Point 'A' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 9550 Yearly Rate (m3): 3000000 Details: Berkshire Brewery Imperial Way Reading Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 9th May 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	465	1	471100 168900
40	**Water Abstractions** Operator: Heineken Uk Ltd Licence Number: 28/39/22/0614 Permit Version: 4 Location: Berkshire Brewery - Point 'C' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 23rd November 2009 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SE (W)	511	1	470890 169100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
40	**Water Abstractions** Operator: Scottish & Newcastle Uk Limited Licence Number: 28/39/22/0614 Permit Version: 3 Location: Berkshire Brewery - Point 'C' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 18th August 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SE (W)	511	1	470890 169100
40	**Water Abstractions** Operator: Scottish & Newcastle Uk Limited Licence Number: 28/39/22/0614 Permit Version: 2 Location: Berkshire Brewery - Point 'C' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 31st January 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SE (W)	511	1	470890 169100
40	**Water Abstractions** Operator: Scottish Courage Brewing Ltd Licence Number: 28/39/22/0614 Permit Version: 1 Location: Berkshire Brewery - Point 'C' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st January 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SE (W)	511	1	470890 169100
41	**Water Abstractions** Operator: Scottish Courage Brewing Ltd Licence Number: 28/39/22/0556 Permit Version: 100 Location: Berkshire Brewery Point 'C' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Berkshire Brewery Imperial Way Reading Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 9th May 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SW (W)	595	1	470800 169100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
42	**Water Abstractions** Operator: Heineken Uk Ltd Licence Number: 28/39/22/0614 Permit Version: 4 Location: Berkshire Brewery Point 'D' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 23rd November 2009 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SW (W)	624	1	470740 169220
42	**Water Abstractions** Operator: Scottish & Newcastle Uk Limited Licence Number: 28/39/22/0614 Permit Version: 3 Location: Berkshire Brewery Point 'D' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 18th August 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SW (W)	624	1	470740 169220
42	**Water Abstractions** Operator: Scottish & Newcastle Uk Limited Licence Number: 28/39/22/0614 Permit Version: 2 Location: Berkshire Brewery Point 'D' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 31st January 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SW (W)	624	1	470740 169220
42	**Water Abstractions** Operator: Scottish Courage Brewing Ltd Licence Number: 28/39/22/0614 Permit Version: 1 Location: Berkshire Brewery Point 'D' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Berkshire Brewery Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st January 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SW (W)	624	1	470740 169220

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
42	**Water Abstractions** Operator: Scottish Courage Brewing Ltd Licence Number: 28/39/22/0556 Permit Version: 100 Location: Berkshire Brewery Point 'D' Authority: Environment Agency, Thames Region Abstraction: Breweries/Wine: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Berkshire Brewery Imperial Way Reading Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 9th May 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A12SW (W)	666	1	470700 169200
43	**Water Abstractions** Operator: Reading Football Club Plc Licence Number: 28/39/22/0644 Permit Version: 1 Location: Madejski Stadium Complex - 424 Wellpoints Authority: Environment Agency, Thames Region Abstraction: Environmental: Pump & Treat: General Use (Low Loss) Abstraction Type: Water may be abstracted from any point within an area Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 28th July 2008 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A17NW (NW)	945	1	470720 170020
	Water Abstractions Operator: Clean Linen Services Ltd Licence Number: 28/39/22/0525 Permit Version: 101 Location: Darwin Close, Whitley, Reading Authority: Environment Agency, Thames Region Abstraction: Industrial; Commercial And Public Services: Laundry Use Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 655 Yearly Rate (m3): 181840 Details: Darwin Close, Whitley Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st April 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A23SW (N)	1006	1	471300 170400
	Water Abstractions Operator: Clean Linen Services Ltd Licence Number: 28/39/22/0612 Permit Version: 1 Location: Darwin Close, Whitley, Reading, Berkshire Authority: Environment Agency, Thames Region Abstraction: Industrial; Commercial And Public Services: Laundry Use Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Land At Darwin Close Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st January 2002 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A23SW (N)	1009	1	471360 170410

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Reading Football Club Plc Licence Number: 28/39/22/0578 Permit Version: 100 Location: Madejski Stadium Wellpoints Authority: Environment Agency, Thames Region Abstraction: Environmental: Pump & Treat: General Use (Low Loss) Abstraction Type: Water may be abstracted from any point within an area Source: Groundwater Daily Rate (m3): 518 Yearly Rate (m3): 189734 Details: Madejski Staium, Reading Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 8th June 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A17SW (NW)	1019	1	470520 169900
	Water Abstractions Operator: Mr D J B Hewison Licence Number: 28/39/22/0166 Permit Version: 100 Location: Hartley Court Farm, Three Mile Cross Authority: Environment Agency, Thames Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 14 Yearly Rate (m3): 4023 Details: Hartley Court Farm, Three Mile Cross, Reading Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 21st November 1985 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A6NE (W)	1133	1	470300 168900
	Water Abstractions Operator: Mr D J B Hewison Licence Number: 28/39/22/0232 Permit Version: 100 Location: Foudry Brook At Hartley Court Farm Authority: Environment Agency, Thames Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a river or stream reach, or a row of wellpoints Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Foudry & Burghfield Brook At Hartley Court Farm, Three Mile Cross Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 10th March 1969 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A6NE (SW)	1355	1	470200 168600
	Water Abstractions Operator: The Prudential Assur. Com. Ltd Licence Number: 28/39/22/0276 Permit Version: 101 Location: Smallmead Farm, Pingewood Authority: Environment Agency, Thames Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 23 Yearly Rate (m3): 8501 Details: Smallmead Farm, Pingewood Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 30th July 1999 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A16SW (NW)	1407	1	470090 169930

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: In Force - No Licence Holder Licence Number: 28/39/22/0076 Permit Version: Not Supplied Location: Shinfield, READING, Berkshire Authority: Environment Agency, Thames Region Abstraction: Private Water Supplies (Domestic) Abstraction Type: Not Supplied Source: Groundwater Daily Rate (m3): 273 Yearly Rate (m3): 1 Details: Also Staff Welfare And Agric. Annual Aggregated To Another Licence; Status: Expired Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A10SE (SE)	1579	1	472900 168300
	Water Abstractions Operator: University Of Reading Licence Number: 28/39/22/0499 Permit Version: Not Supplied Location: Shinfield, READING Authority: Environment Agency, Thames Region Abstraction: Laboratory Abstraction Type: Not Supplied Source: Groundwater Daily Rate (m3): 455 Yearly Rate (m3): 81830 Details: Additional Purposes - Agriculture (36368) Private Water Supply (1136). Chalk (Undifferentiated) Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A5NE (SE)	1635	1	472900 168200
	Water Abstractions Operator: Kennet Valley Park Ltd Licence Number: 28/39/22/0463 Permit Version: 101 Location: Pingewood Business Estate, Smallmead Road, Reading Authority: Environment Agency, Thames Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 23 Yearly Rate (m3): 6819 Details: Pingewood Business Park Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st April 2008 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A16NW (NW)	1692	1	469900 170180
	Water Abstractions Operator: Kennet Valley Park Ltd Licence Number: 28/39/22/0463 Permit Version: 101 Location: Pingewood Business Estate, Smallmead Road, Reading Authority: Environment Agency, Thames Region Abstraction: Household Private Water Undertaking: Drinking; Cooking; Sanitary; Washing; (Small Garden) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Pingewood Business Estate Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st April 2008 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A16NW (NW)	1692	1	469900 170180

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Wyncote Developments Plc Licence Number: 28/39/22/0555 Permit Version: Not Supplied Location: Rose Kiln Lane, READING, Berkshire Authority: Environment Agency, Thames Region Abstraction: General Industrial Abstraction Type: Not Supplied Source: Groundwater Daily Rate (m3): 864 Yearly Rate (m3): 315360 Details: Chalk (Undifferentiated) Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(N)	1797	1	471400 171200
	Water Abstractions Operator: Thames Water Utilities Ltd Licence Number: 28/39/22/0132 Permit Version: 101 Location: Fobney Pumping Station 'Bh D' Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 1st January 2013 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(N)	1817	1	470970 171160
	Water Abstractions Operator: Thames Water Utilities Ltd Licence Number: 28/39/22/0132 Permit Version: 100 Location: Fobney Pumping Station Bh 'D' Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 11th June 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(N)	1817	1	470970 171160
	Water Abstractions Operator: Thames Water Utilities Ltd Licence Number: 28/39/22/0132 Permit Version: 101 Location: Fobney Pumping Station 'Bh A' Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 1st January 2013 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(N)	1874	1	470840 171180

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Thames Water Utilities Ltd Licence Number: 28/39/22/0132 Permit Version: 100 Location: Fobney Pumping Station Bh 'A' Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 30000 Yearly Rate (m3): 1500000 Details: Annual Abstraction Total Aggregated To Another Licence For Quantity Purposes. Chalk (Undifferentiate Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 11th June 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(N)	1890	1	470850 171200
	Water Abstractions Operator: Thames Water Utilities Ltd Licence Number: 28/39/22/0132 Permit Version: 101 Location: Fobney Pumping Station 'Bh H' Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 1st January 2013 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(NW)	1893	1	470660 171130
	Water Abstractions Operator: Thames Water Utilities Ltd Licence Number: 28/39/22/0132 Permit Version: 100 Location: Fobney Pumping Station Bh 'H' Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 11th June 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(NW)	1893	1	470660 171130
	Water Abstractions Operator: Thames Water Utilities Ltd Licence Number: 28/39/22/0132 Permit Version: 101 Location: Fobney Pumping Station 'Bh B' Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 1st January 2013 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(N)	1897	1	470770 171180

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Thames Water Utilities Ltd Licence Number: 28/39/22/0132 Permit Version: 100 Location: Fobney Pumping Station Bh 'B' Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 11th June 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(N)	1916	1	470770 171200
	Water Abstractions Operator: Mr D J B Hewison Licence Number: 28/39/22/0232 Permit Version: 100 Location: Burghfield Brook At Hartley Court Farm Authority: Environment Agency, Thames Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a river or stream reach, or a row of wellpoints Source: Surface Daily Rate (m3): 682 Yearly Rate (m3): 18184 Details: Foudry & Burghfield Brook At Hartley Court Farm, Three Mile Cross Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 10th March 1969 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(W)	1926	1	469500 168800
	Water Abstractions Operator: University Of Reading Licence Number: 28/39/24/0008 Permit Version: 100 Location: Reading University Horticultural Station Borehole Authority: Environment Agency, Thames Region Abstraction: Schools and Colleges: General Farming & Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 273 Yearly Rate (m3): 863 Details: Reading University Horticultural Station - Agriculture Authorised Start: 01 October Authorised End: 30 September Permit Start Date: 13th May 1968 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(E)	1936	1	473400 168500
	Water Abstractions Operator: University Of Reading Licence Number: 28/39/24/0008 Permit Version: 100 Location: Reading University Horticultural Station Borehole Authority: Environment Agency, Thames Region Abstraction: Schools and Colleges: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Reading University Horticultural Station, Shinfield Authorised Start: 01 February Authorised End: 30 September Permit Start Date: 13th May 1968 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(E)	1936	1	473400 168500

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: University Of Reading Licence Number: 28/39/24/0008 Permit Version: 100 Location: Reading University Horticultural Station Borehole Authority: Environment Agency, Thames Region Abstraction: Schools and Colleges: Spray Irrigation - Spray Irrigation Definition Order Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Reading University Horticultural Station, Shinfield (Glasshouses) Authorised Start: 01 October Authorised End: 30 September Permit Start Date: 13th May 1968 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(E)	1936	1	473400 168500
	Water Abstractions Operator: Thames Water Utilities Ltd Licence Number: 28/39/22/0132 Permit Version: 101 Location: Fobney Pumping Station 'Bh C' Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 April Authorised End: 31 March Permit Start Date: 1st January 2013 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(N)	1977	1	470680 171230
	Water Abstractions Operator: Thames Water Utilities Ltd Licence Number: 28/39/22/0132 Permit Version: 100 Location: Fobney Pumping Station Bh 'C' Authority: Environment Agency, Thames Region Abstraction: Public Water Supply: Potable Water Supply - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Not Supplied Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 11th June 1998 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(N)	1977	1	470680 171230
	Water Abstractions Operator: Environment Agency Licence Number: 28/39/22/0527 Permit Version: 101 Location: Kennet And Avon Canal At Fobney Fish Farm Intakes Authority: Environment Agency, Thames Region Abstraction: Aquaculture: Fish Farm/Cress Pond Throughflow Abstraction Type: Water may be abstracted from a river or stream reach, or a row of wellpoints Source: Surface Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Fobney Mead, Reading Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 10th October 2006 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	(NW)	1984	1	470460 171130
	Groundwater Vulnerability Soil Classification: Not classified Map Sheet: Sheet 39 West London Scale: 1:100,000	A13SE (SW)	0	1	471483 169268
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Desination: Unproductive Strata	A13SE (SW)	0	3	471483 169268

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Superficial Aquifer Designations No Data Available				
	Extreme Flooding from Rivers or Sea without Defences Type: Extent of Extreme Flooding from Rivers or Sea without Defences Flood Plain Type: Fluvial Models Boundary Accuracy: As Supplied	A13SW (W)	21	1	471355 169230
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
44	**Detailed River Network Lines** River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A13SE (S)	0	1	471533 169141
45	**Detailed River Network Lines** River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A13SE (S)	1	1	471528 169141
46	**Detailed River Network Lines** River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A13SE (S)	1	1	471511 169140
47	**Detailed River Network Lines** River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A13SW (S)	2	1	471449 169160

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
48	**Detailed River Network Lines** River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Flood Risk Management Indicative/Statutory Main River Water Course Name: Kingsley Close Ditch Water Course Reference: 22KC	A13SW (SW)	52	1	471408 169174
49	**Detailed River Network Lines** River Type: Primary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Currently Undefined Flood Risk Management Status: Flood Risk Management Indicative/Statutory Main River Water Course Name: Kingsley Close Ditch Water Course Reference: 22KC	A13SW (W)	91	1	471275 169267
50	**Detailed River Network Lines** River Type: Secondary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A13NW (W)	128	1	471238 169367
51	**Detailed River Network Lines** River Type: Primary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Currently Undefined Flood Risk Management Status: Flood Risk Management Indicative/Statutory Main River Water Course Name: Kingsley Close Ditch Water Course Reference: 22KC	A13NW (W)	142	1	471226 169373
52	**Detailed River Network Lines** River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk Management Status: Flood Risk Management Indicative/Statutory Main River Water Course Name: Kingsley Close Ditch Water Course Reference: 22KC	A13NW (NW)	149	1	471223 169383
53	**Detailed River Network Lines** River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A13SW (W)	167	1	471204 169236

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
54	**Detailed River Network Lines** River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A13NW (W)	171	1	471186 169341
55	**Detailed River Network Lines** River Type: Secondary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A13SW (SW)	194	1	471291 169092
56	**Detailed River Network Lines** River Type: Primary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Currently Undefined Flood Risk Management Status: Flood Risk Management Indicative/Statutory Main River Water Course Name: Kingsley Close Ditch Water Course Reference: 22KC	A13NW (NW)	214	1	471218 169483
57	**Detailed River Network Lines** River Type: Tertiary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NE (S)	334	1	471528 168808
58	**Detailed River Network Lines** River Type: Secondary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NW (S)	355	1	471378 168810
59	**Detailed River Network Lines** River Type: Secondary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NW (SW)	376	1	471267 168854

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
60	**Detailed River Network Lines** River Type: Secondary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NW (SW)	376	1	471297 168834
61	**Detailed River Network Lines** River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A18SE (N)	384	1	471554 169769
62	**Detailed River Network Lines** River Type: Tertiary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A18SE (N)	384	1	471652 169735
63	**Detailed River Network Lines** River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A18SE (N)	389	1	471544 169778
64	**Detailed River Network Lines** River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A18SE (N)	392	1	471549 169779
65	**Detailed River Network Lines** River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NW (S)	398	1	471297 168807

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
66	**Detailed River Network Lines** River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NW (SW)	400	1	471185 168905
67	**Detailed River Network Lines** River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A12SE (SW)	404	1	471132 168954
68	**Detailed River Network Lines** River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A17SE (NW)	418	1	471067 169620
69	**Detailed River Network Lines** River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A17SE (NW)	458	1	471042 169652
70	**Detailed River Network Lines** River Type: Secondary River River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A17SE (NW)	458	1	471044 169654
71	**Detailed River Network Lines** River Type: Secondary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A8NW (SW)	467	1	471260 168748

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
72	**Detailed River Network Lines** River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A18SW (N)	472	1	471286 169851
73	**Detailed River Network Lines** River Type: Tertiary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A18SW (N)	473	1	471372 169873
74	**Detailed River Network Lines** River Type: Tertiary River River Name: Drain Hydrographic Area: D006 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk Management Status: Other Rivers Water Course Name: Not Supplied Water Course Reference: Not Supplied	A18SW (NW)	478	1	471217 169828
75	**Detailed River Network Offline Drainage** River Type: Secondary River Hydrographic Area: D006	A8NE (S)	405	1	471565 168738
76	**Detailed River Network Offline Drainage** River Type: Secondary River Hydrographic Area: D006	A8NE (S)	408	1	471567 168735
77	**Detailed River Network Offline Drainage** River Type: Secondary River Hydrographic Area: D006	A8NE (S)	408	1	471567 168735
78	**Detailed River Network Offline Drainage** River Type: Secondary River Hydrographic Area: D006	A8NE (S)	411	1	471613 168736
79	**Detailed River Network Offline Drainage** River Type: Secondary River Hydrographic Area: D006	A8NE (S)	428	1	471607 168717
80	**Detailed River Network Offline Drainage** River Type: Tertiary River Hydrographic Area: D006	A8NE (SE)	479	1	471732 168695

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
81	**BGS Recorded Landfill Sites** Site Name: Smallmead Tip Location: Smallmead Road, READING, Berkshire Authority: British Geological Survey, National Geoscience Information Service Ground Water: Information not available Surface Water: Information not available Geology: N/A Positional Accuracy: Positioned by the supplier Boundary Accuracy: Derived	A17SE (NW)	613	3	471008 169842
82	**Historical Landfill Sites** Licence Holder: Berkshire County Council WDA Location: Smallmead Road, Reading, Berkshire Name: Smallmead Tip Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD32400 First Input Date: 22nd March 1972 Last Input Date: 31st March 1981 Specified Waste Type: Deposited Waste included Inert, Industrial, Commercial, Household and Special Waste, and Liquid Sludge EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 0345/0273 BGS Ref: 566 Other Ref: 54/12/5/5	A17NE (NW)	803	1	470982 170066
83	**Historical Landfill Sites** Licence Holder: Not Supplied Location: Reading, Berkshire Name: Smallmead Stadium Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD13768 First Input Date: Not Supplied Last Input Date: Not Supplied Specified Waste Type: Deposited Waste included Inert Waste EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 0345/0241 BGS Ref: Not Supplied Other Ref: TP0166, RDG5, 54/12/4/43	A17NE (NW)	981	1	470923 170239
84	**Licensed Waste Management Facilities (Landfill Boundaries)** Name: Reading Football Club Licence Number: 86039 Location: Reading Football Club, Smallmead, Bennet road, Reading, Berkshire, RG2 0JL Licence Holder: Reading Football Club Authority: Environment Agency - South East Region, West Thames Area Site Category: Household, Commercial And Industrial Waste Landfills Max Input Rate: Not Supplied **Licence Status: Closure** Issued Not Supplied Positional Accuracy: Positioned by the supplier Boundary Accuracy: As Supplied	A17SW (NW)	785	1	470677 169711
85	**Licensed Waste Management Facilities (Locations)** Licence Number: 86039 Location: Smallmead, Bennet road, Reading, Berkshire, RG2 0JL Operator Name: Reading Football Club Operator Location: Not Supplied Authority: Environment Agency - South East Region, West Thames Area Site Category: Household, Commercial And Industrial Waste Landfills **Licence Status: Closed** Issued: 3rd June 1997 Last Modified: Not Supplied Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Approximate location provided by supplier	A17NE (NW)	739	1	471000 170000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
86	**Licensed Waste Management Facilities (Locations)** Licence Number: 86204 Location: 6 Darwin Close, Reading, Berkshire, RG2 0SG Operator Name: Reading Borough Council Operator Location: Not Supplied Authority: Environment Agency - South East Region, West Thames Area Site Category: Clinical Waste Transfer Stations **Licence Status: Issued** Issued: 19th October 1998 Last Modified: 30th August 2005 Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 100m	A18NW (N)	808	1	471300 170200
86	**Licensed Waste Management Facilities (Locations)** Licence Number: 86011 Location: 6 Darwin Close, Reading, Berkshire, RG2 0SG Operator Name: Reading Borough Council Operator Location: Not Supplied Authority: Environment Agency - South East Region, West Thames Area Site Category: Household, Commercial And Industrial Transfer Stations **Licence Status: Modified** Issued: 29th June 1992 Last Modified: 28th September 2001 Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 100m	A18NW (N)	808	1	471300 170200
87	**Licensed Waste Management Facilities (Locations)** Licence Number: 100913 Location: 5 - 7 Bennet Road, Reading, Berkshire, RG2 0QX Operator Name: Select Environmental Services Ltd Operator Location: Not Supplied Authority: Environment Agency - South East Region, West Thames Area Site Category: Clinical Waste Transfer Station **Licence Status: Issued** Issued: 21st May 2009 Last Modified: Not Supplied Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 10m	A18NW (N)	827	1	471463 170230
88	**Licensed Waste Management Facilities (Locations)** Licence Number: 86277 Location: 6 Commercial Road, Reading, Berkshire, RG2 0QZ Operator Name: Daniels Corporation International Ltd Operator Location: Not Supplied Authority: Environment Agency - South East Region, West Thames Area Site Category: Clinical Waste Transfer Stations **Licence Status: Modified** Issued: 10th January 2003 Last Modified: 12th July 2011 Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 10m	A18NW (N)	858	1	471361 170258
89	**Licensed Waste Management Facilities (Locations)** Licence Number: 86005 Location: Smallmead Farm Landfill, Bennet Road, Reading, Berkshire, RG2 0RP Operator Name: SITA Operator Location: Not Supplied Authority: Environment Agency - South East Region, West Thames Area Site Category: Household, Commercial And Industrial Transfer Stations **Licence Status: Surrendered** Issued: 28th April 1993 Last Modified: 16th January 1997 Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: 29th October 1999 IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 100m	A17NE (NW)	908	1	471000 170200

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
90	**Licensed Waste Management Facilities (Locations)** Licence Number: 86410 Location: Unit 1, Smallmead Road, Reading, Berkshire, RG2 0QS Operator Name: Clements Austin Leslie Operator Location: Not Supplied Authority: Environment Agency - Thames Region, West Area Site Category: Household, Commercial And Industrial Transfer Stations **Licence Status: Expired** Issued: 15th December 2006 Last Modified: Not Supplied Expires: Not Supplied Suspended: Not Supplied Revoked: Not Supplied Surrendered: Not Supplied IPPC Reference: Not Supplied Positional Accuracy: Located by supplier to within 10m	A22SE (N)	976	1	471112 170324
	Local Authority Landfill Coverage Name: Reading Unitary Council - Has supplied landfill data		0	4	471483 169268
	Local Authority Landfill Coverage Name: Wokingham District Council - Has supplied landfill data		427	8	470964 169130
91	**Local Authority Recorded Landfill Sites** Location: Refuse Tip Reference: Not Supplied Authority: Reading Borough Council, Planning **Last Reported Status: Unknown** Types of Waste: Not Supplied Date of Closure: Not Supplied Positional Accuracy: Positioned by the supplier Boundary Quality: Moderate	A17SE (NW)	609	4	471003 169831
92	**Registered Landfill Sites** Licence Holder: Berkshire C.C. Licence Reference: 54/12/5/ 5 Site Location: Smallmead Road, Reading, Berkshire Licence Easting: 470900 Licence Northing: 170100 Operator Location: As Site Address Authority: Environment Agency - Thames Region, West Area Site Category: Landfill Max Input Rate: Undefined Waste Source Restrictions: No known restriction on source of waste Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: Not Supplied Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste Local Authority Collected Waste	A17NE (NW)	879	1	470900 170100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
93	**Registered Landfill Sites** Licence Holder: Reading Football Club Plc Licence Reference: T/W/54/12/4/436 Site Location: Smallmead, Bennet Road, READING, Berkshire, RG2 0JL Licence Easting: 470550 Licence Northing: 169800 Operator Location: Madjeski Stadium, Acre Road, Reading, Berkshire, Rg3 2ef Authority: Environment Agency - Thames Region, West Area Site Category: Landfill Max Input Rate: Medium (Equal to or greater than 25,000 and less than 75,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Status: Site Closed Dated: 3rd June 1997 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Not Applicable Authorised Waste: Berks Type A 'Non-Decomp.' Max.Waste Permitted By Licence Prev. Deposited H'Hold/Com/Ind.Waste Prohibited Waste: Asbestos Clinical Wastes Radioactive Subs Spec.Waste (Epa'90:S62/1996 Regs) Waste N.O.S.	A17SW (NW)	940	1	470550 169800
94	**Registered Waste Transfer Sites** Licence Holder: Reading Borough Council Licence Reference: Wml86204 Site Location: Darwin Close (2), 6 Darwin Close, READING, Berkshire, RG2 0SG Operator Location: As Site Address Authority: Environment Agency - Thames Region, West Area Site Category: Transfer Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: May not be working (licence suspended)Suspended Dated: 19th October 1998 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Positioned by the supplier Boundary Quality: Good Authorised Waste: Clin.Grps A,B,E - As In Hsc '92 Fluorescent Tubes Max.Waste Permitted By Licence Prohibited Waste: Liquid Wastes Mat'L Containing Pcbs Mat'L React Violently Air Or Water Percussive/Explosive/Similar Waste Sludge Wastes Spec.Waste (Epa'90:S62/1996 Regs) Sub'S Control. Radioactive Subs Act'60 Waste N.O.S.	A18NW (N)	838	1	471163 170196

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
95	**Registered Waste Transfer Sites** Licence Holder: Reading Borough Council Licence Reference: 54/12/4/266 Site Location: 6 Darwin Close, Reading, Berkshire, Rg2 0sg Operator Location: The Civic Centre, Po Box 17, Reading, Berkshire, Rg1 7td Authority: Environment Agency - Thames Region, West Area Site Category: Transfer Max Input Rate: Medium (Equal to or greater than 25,000 and less than 75,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Operational as far as is knownOperational Dated: 28th September 2001 Preceded By Licence: 54/12/4/266 Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Quality: Not Supplied Authorised Waste: Degradable Household/Commercial/Industrial Waste Inert Materials (As In Post'98 E.A.Lics And Equivalent To 21.00.00) Maximum Waste Permitted By Licence Ukw 22.00.00 General & Biodegradable Waste - Including Waste From Roadsweeping / Gulley Emptyings Prohibited Waste: Other Waste / Waste Not Otherwise Specified Special Waste (As In Epa 1990:S62 Of 1996 Regs) Ukw 23.00.00 Metals & Discarded/Scrap Composite Equipment Exceot As Items In Cat.22 Waste Ukw 24.00.00 Contaminated General Waste	A18NW (N)	862	1	471160 170220
95	**Registered Waste Transfer Sites** Licence Holder: Reading Borough Council Licence Reference: 54/12/4/266 Site Location: 6 Darwin Close, READING, Berkshire, RG2 0SG Operator Location: As Site Address Authority: Environment Agency - Thames Region, West Area Site Category: Transfer Max Input Rate: Medium (Equal to or greater than 25,000 and less than 75,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Record supersededSuperseded Dated: 29th June 1992 Preceded By Licence: Not Given Superseded By Licence: 54/12/4/266 Positional Accuracy: Manually positioned to the address or location Boundary Quality: Not Supplied Authorised Waste: House, Com + Ind.Waste Max.Waste Permitted By Licence Prohibited Waste: Clinical - As In Coll/Disp.Regs Of '88 Contaminated Soil Liquid/Sludge Wastes Sewage Or Sewage Sludge Special Wastes Waste N.O.S. Waste With Flash Pt < 40 C	A18NW (N)	862	1	471160 170220

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
96	**Registered Waste Transfer Sites** Licence Holder: Sita Wastecare Ltd Licence Reference: 54/12/4/274 Site Location: C.A.Site At Smallmead Farm Landfill, Bennet Road, Reading, Berkshire Operator Location: The Pickeridge, Stoke Common Road, FULMER, Buckinghamshire, SL3 6HA Authority: Environment Agency - Thames Region, West Area Site Category: Civic Amenity - with transfer Max Input Rate: Medium (Equal to or greater than 25,000 and less than 75,000 tonnes per year) Waste Source Restrictions: No known restriction on source of waste Licence Status: Licence has completion certificateSurrendered Dated: 28th April 1993 Preceded By Licence: Not Given Superseded By Licence: Not Given Positional Accuracy: Manually positioned to the address or location Boundary Quality: Not Supplied Authorised Waste: Contaminated Rubbish/Bags/Sacks; Empty Used Containers; Hard Asbestos; House, Com & Ind.Waste; Household Waste Deliv.By Public; Polymeric Material, Products/Scrap; Recyclables Deliv.By Public; Scrap Metal; Waste Treated Timber Prohibited Waste: Difficult Waste N.O.S.; Liquid/Sludge Waste N.O.S.; Waste N.O.S. Except By P.App.	A17NE (NW)	977	1	470950 170250

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: London Clay	A13SE (SW)	0	3	471483 169268
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13SE (SW)	0	5	471483 169268
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A13SE (S)	142	5	471483 169000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A12NE (W)	267	5	471100 169394
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A12SE (W)	356	5	471000 169268
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14SW (E)	394	5	472000 169268
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14SW (SE)	454	5	472000 169000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A12SE (SW)	466	5	471004 169000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A12SE (SW)	469	5	471000 169000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A12SE (SW)	479	5	471000 168984
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A12NE (NW)	494	5	470936 169577
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A17SE (NW)	547	5	471000 169737
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A18NE (N)	596	5	471483 170000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A18NW (N)	620	5	471210 169981
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A18NW (NW)	621	5	471187 169972
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A18NW (N)	622	5	471260 170000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7NE (SW)	623	5	471000 168729
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A18NW (N)	638	5	471209 170000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A17SE (NW)	647	5	471000 169880

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7NE (SW)	733	5	470832 168783
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A17NE (NW)	739	5	471000 170000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A17SW (NW)	795	5	470707 169777
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A19NW (NE)	820	5	472000 170000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A17NW (NW)	908	5	470751 170000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A17NW (NW)	941	5	470707 170000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A17NW (NW)	962	5	470714 170039
	BGS Measured Urban Soil Chemistry No data available				
	BGS Urban Soil Chemistry Averages No data available				
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SW)	0	3	471483 169268
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (SW)	0	3	471483 169268
	Potential for Ground Dissolution Stability Hazards No Hazard				
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SW)	0	3	471483 169268
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13SE (SW)	0	3	471483 169268
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13SE (SW)	0	3	471483 169268
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13SE (SW)	0	3	471483 169268
	Radon Potential - Radon Affected Areas Affected Area: The property is in a lower probability radon area, as less than 1% of homes are above the action level Source: British Geological Survey, National Geoscience Information Service	A13SE (SW)	0	3	471483 169268

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
97	**Contemporary Trade Directory Entries** Name: Rhm Foodservice Location: Imperial Way, Reading, Berkshire, RG2 0QW Classification: Food Products - Manufacturers **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A13NW (N)	62	-	471478 169450
97	**Contemporary Trade Directory Entries** Name: Forward Bird Control Location: 2 Imperial Way, Reading, Berkshire, RG2 0TD Classification: Pest & Vermin Control **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A13NE (N)	70	-	471484 169455
97	**Contemporary Trade Directory Entries** Name: Forward Bird Control Location: 2 Imperial Way, Reading, Berkshire, RG2 0TD Classification: Pest & Vermin Control **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A13NE (N)	73	-	471486 169458
98	**Contemporary Trade Directory Entries** Name: Motorola Ltd Location: Imperium, Imperial Way, Reading, RG2 0TD Classification: Cable & Wire Equipment Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	84	-	471308 169388
99	**Contemporary Trade Directory Entries** Name: Home Is Location: Atlantic House, Imperial Way, Reading, RG2 0TD Classification: Cleaning Services - Domestic **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NW (N)	96	-	471454 169498
99	**Contemporary Trade Directory Entries** Name: Impact Fork Trucks Ltd Location: Atlantic House, Imperial Way, Reading, RG2 0TD Classification: Fork Lift Trucks **Status: Inactive** Positional Accuracy: Manually positioned to the address or location	A13NW (N)	103	-	471457 169505
100	**Contemporary Trade Directory Entries** Name: Scottish Courage Brewing Ltd Location: Berkshire Brewery, Imperial Way, Reading, RG2 0PN Classification: Brewers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (W)	145	-	471212 169338
100	**Contemporary Trade Directory Entries** Name: Hoyers (Uk) Ltd Location: Berkshire Brewery, Imperial Way, Reading, RG2 0PN Classification: Road Haulage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (W)	145	-	471212 169338
101	**Contemporary Trade Directory Entries** Name: Rhm Location: Imperial Way, Reading, Berkshire, RG2 0QW Classification: Food Products - Manufacturers **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A13NE (N)	163	-	471561 169510
102	**Contemporary Trade Directory Entries** Name: Static Control Components Ltd Location: Unit 30, Worton Drive, Reading, RG2 0TG Classification: Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	192	-	471284 169522
102	**Contemporary Trade Directory Entries** Name: Static Control Components Location: Unit 30, Worton Drive, Reading, Berkshire, RG2 0TG Classification: Printing Equipment Manufacturers **Status: Active** Positional Accuracy: Automatically positioned to the address	A13NW (NW)	192	-	471284 169522
103	**Contemporary Trade Directory Entries** Name: Eddie Stobart Ltd Location: Unit 5 Worton Grange Indust Est,Worton Dr, Reading, Berkshire, RG2 0TG Classification: Road Haulage Services **Status: Inactive** Positional Accuracy: Manually positioned to the road within the address or location	A18SW (N)	212	-	471440 169616

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
104	**Contemporary Trade Directory Entries** Name: Frost Electronics Ltd Location: 4a, Woodside Business Park, Whitley Wood Lane, Reading, RG2 8LW Classification: Electronic Engineers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14NW (E)	268	-	471855 169327
104	**Contemporary Trade Directory Entries** Name: Communications Solutions Uk Ltd Location: 5, Woodside Business Park, Whitley Wood Lane, Reading, Berkshire, RG2 8LW Classification: Telecommunications Equipment & Systems **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A14NW (E)	270	-	471860 169320
105	**Contemporary Trade Directory Entries** Name: Kuehne & Nagel Ltd Location: Worton Drive, Reading, RG2 0TH Classification: Freight Forwarders **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18SW (NW)	311	-	471226 169632
105	**Contemporary Trade Directory Entries** Name: Kuehne & Nagel Ltd Location: Worton Drive, Reading, Berkshire, RG2 0TH Classification: Freight Forwarders **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18SW (NW)	311	-	471226 169632
105	**Contemporary Trade Directory Entries** Name: Kuehne & Nagel Location: Worton Drive, Reading, RG2 0TH Classification: Freight Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18SW (NW)	311	-	471226 169632
105	**Contemporary Trade Directory Entries** Name: Kuehne & Nagel Location: Worton Drive, Reading, RG2 0TH Classification: Road Haulage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18SW (NW)	311	-	471226 169632
105	**Contemporary Trade Directory Entries** Name: Kuehne & Nagel Ltd Location: Worton Drive, Reading, Berkshire, RG2 0TH Classification: Road Haulage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18SW (NW)	311	-	471226 169632
106	**Contemporary Trade Directory Entries** Name: Mmc Ltd Location: Unit 5, Worton Drive, Reading, RG2 0TG Classification: Distribution Services **Status: Active** Positional Accuracy: Automatically positioned to the address	A18SW (N)	313	-	471464 169716
107	**Contemporary Trade Directory Entries** Name: The Glass Peach Location: Unit C11,Acre Road, Reading, Berkshire, RG2 0SL Classification: Stained Glass Designers & Producers **Status: Inactive** Positional Accuracy: Manually positioned within the geographical locality	A18SE (NE)	345	-	471680 169649
108	**Contemporary Trade Directory Entries** Name: Shell Ltd Location: 585 Basingstoke Rd, Reading, Berkshire, RG2 0EL Classification: Petrol Filling Stations - 24 Hour **Status: Active** Positional Accuracy: Manually positioned to the road within the address or location	A13NE (NE)	348	-	471759 169574
109	**Contemporary Trade Directory Entries** Name: Independent Project Analysis Location: Worton Dr, Reading, Berkshire, RG2 0TG Classification: Oil & Gas Exploration Supplies & Services **Status: Active** Positional Accuracy: Manually positioned within the geographical locality	A18SW (NW)	379	-	471278 169748

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
110	**Contemporary Trade Directory Entries** Name: Paul Layzell Foods Ltd Location: A1, Worton Drive, Reading, RG2 0TG Classification: Food Products - Manufacturers **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18SW (NW)	400	-	471204 169729
111	**Contemporary Trade Directory Entries** Name: Whichford Peugeot Location: 569-575, Basingstoke Road, Reading, RG2 0SJ Classification: Garage Services **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18SE (NE)	423	-	471818 169623
111	**Contemporary Trade Directory Entries** Name: Valley Motor Group Location: 569-575, Basingstoke Road, Reading, RG2 0SJ Classification: Petrol Filling Stations **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A18SE (NE)	423	-	471818 169623
112	**Fuel Station Entries** Name: Shell Fairfield Location: Basingstoke Road, Reading, Berkshire, RG2 0TA Brand: SHELL Premises Type: Petrol Station **Status: Open** Positional Accuracy: Automatically positioned to the address	A13SE (E)	52	-	471655 169246
113	**Fuel Station Entries** Name: Whitley Wood Garage Location: 569-576 Basingstoke Road, Whiteley Wood, READING, Berkshire, RG2 0SJ Brand: Obsolete Premises Type: Not Applicable **Status: Obsolete** Positional Accuracy: Automatically positioned to the address	A18SE (NE)	423	-	471818 169623

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
114	**Nitrate Vulnerable Zones** Name: Not Supplied Description: NVZ Area Source: Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	A13NW (NW)	12	7	471387 169375

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
Wokingham District Council - Environmental Health Department	February 2013	Annual Rolling Update
West Berkshire Council - Environmental Health Department	July 2013	Annual Rolling Update
Hart District Council - Environmental Health Department	March 2013	Annual Rolling Update
South Oxfordshire District Council - Environmental Health Department	March 2013	Annual Rolling Update
Reading Borough Council - Environmental Health Department	October 2012	Annual Rolling Update
Basingstoke And Deane Borough Council - Environmental Health	September 2013	Annual Rolling Update
Discharge Consents		
Environment Agency - Thames Region	May 2014	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - Thames Region	March 2013	As notified
Integrated Pollution Controls		
Environment Agency - Thames Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control		
Environment Agency - South East Region - West Thames Area	May 2014	Quarterly
Environment Agency - Thames Region	May 2014	Quarterly
Local Authority Integrated Pollution Prevention And Control		
Basingstoke And Deane Borough Council - Environmental Health	June 2014	Annual Rolling Update
South Oxfordshire District Council - Environmental Health Department	June 2014	Annual Rolling Update
Wokingham District Council - Environmental Health Department	June 2014	Annual Rolling Update
Reading Borough Council - Environmental Health Department	March 2013	Annual Rolling Update
West Berkshire Council - Environmental Health Department	March 2014	Annual Rolling Update
Hart District Council - Environmental Health Department	November 2012	Annual Rolling Update
Local Authority Pollution Prevention and Controls		
South Oxfordshire District Council - Environmental Health Department	February 2013	Annual Rolling Update
Wokingham District Council - Environmental Health Department	February 2013	Annual Rolling Update
Reading Borough Council - Environmental Health Department	March 2013	Annual Rolling Update
West Berkshire Council - Environmental Health Department	March 2014	Bi-Annually
Basingstoke And Deane Borough Council - Environmental Health	November 2012	Annual Rolling Update
Hart District Council - Environmental Health Department	November 2012	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements		
Basingstoke And Deane Borough Council - Environmental Health	June 2014	Annual Rolling Update
South Oxfordshire District Council - Environmental Health Department	June 2014	Annual Rolling Update
Wokingham District Council - Environmental Health Department	June 2014	Annual Rolling Update
Reading Borough Council - Environmental Health Department	March 2013	Annual Rolling Update
West Berkshire Council - Environmental Health Department	March 2014	Annual Rolling Update
Hart District Council - Environmental Health Department	November 2012	Annual Rolling Update
Nearest Surface Water Feature		
Ordnance Survey	July 2012	Quarterly
Pollution Incidents to Controlled Waters		
Environment Agency - Thames Region	September 1999	Not Applicable
Prosecutions Relating to Authorised Processes		
Environment Agency - Thames Region	March 2013	As notified
Prosecutions Relating to Controlled Waters		
Environment Agency - Thames Region	March 2013	As notified
Registered Radioactive Substances		
Environment Agency - Thames Region	May 2014	Quarterly
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points		
Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points		
Environment Agency - Head Office	July 2012	Annually

Agency & Hydrological	Version	Update Cycle
Substantiated Pollution Incident Register		
Environment Agency - Thames Region - South East Area	May 2014	Quarterly
Environment Agency - Thames Region - West Area	May 2014	Quarterly
Water Abstractions		
Environment Agency - Thames Region	April 2014	Quarterly
Water Industry Act Referrals		
Environment Agency - Thames Region	May 2014	Quarterly
Groundwater Vulnerability		
Environment Agency - Head Office	January 2011	Not Applicable
Drift Deposits		
Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations		
British Geological Survey - National Geoscience Information Service	October 2012	Annually
Superficial Aquifer Designations		
British Geological Survey - National Geoscience Information Service	October 2012	Annually
Source Protection Zones		
Environment Agency - Head Office	April 2014	Quarterly
Extreme Flooding from Rivers or Sea without Defences		
Environment Agency - Head Office	May 2014	Quarterly
Flooding from Rivers or Sea without Defences		
Environment Agency - Head Office	May 2014	Quarterly
Areas Benefiting from Flood Defences		
Environment Agency - Head Office	May 2014	Quarterly
Flood Water Storage Areas		
Environment Agency - Head Office	May 2014	Quarterly
Flood Defences		
Environment Agency - Head Office	February 2014	Quarterly
Detailed River Network Lines		
Environment Agency - Head Office	March 2012	Annually
Detailed River Network Offline Drainage		
Environment Agency - Head Office	March 2012	Annually

Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites		
Environment Agency - South East Region - Kent & South London Area	February 2014	Quarterly
Environment Agency - South East Region - North East Thames Area	February 2014	Quarterly
Environment Agency - South East Region - Solent & South Downs Area	February 2014	Quarterly
Environment Agency - South East Region - West Thames Area	February 2014	Quarterly
Environment Agency - Thames Region - South East Area	February 2014	Quarterly
Environment Agency - Thames Region - West Area	February 2014	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - Thames Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - South East Region - Kent & South London Area	February 2014	Quarterly
Environment Agency - South East Region - North East Thames Area	February 2014	Quarterly
Environment Agency - South East Region - Solent & South Downs Area	February 2014	Quarterly
Environment Agency - South East Region - West Thames Area	February 2014	Quarterly
Environment Agency - Thames Region - South East Area	February 2014	Quarterly
Environment Agency - Thames Region - West Area	February 2014	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - South East Region - West Thames Area	February 2014	Quarterly
Environment Agency - Thames Region - South East Area	February 2014	Quarterly
Environment Agency - Thames Region - West Area	February 2014	Quarterly
Local Authority Landfill Coverage		
Basingstoke And Deane Borough Council - Environmental Health	May 2000	Not Applicable
Hampshire County Council - Minerals and Waste Planning	May 2000	Not Applicable
Hart District Council - Environmental Services	May 2000	Not Applicable
Oxfordshire County Council	May 2000	Not Applicable
Reading Borough Council - Planning	May 2000	Not Applicable
South Oxfordshire District Council - Environmental Health Department	May 2000	Not Applicable
West Berkshire Council - Environmental Health Department	May 2000	Not Applicable
Wokingham District Council - Environmental Health Department	May 2000	Not Applicable
Local Authority Recorded Landfill Sites		
Basingstoke And Deane Borough Council - Environmental Health	May 2000	Not Applicable
Hampshire County Council - Minerals and Waste Planning	May 2000	Not Applicable
Hart District Council - Environmental Services	May 2000	Not Applicable
Oxfordshire County Council	May 2000	Not Applicable
Reading Borough Council - Planning	May 2000	Not Applicable
South Oxfordshire District Council - Environmental Health Department	May 2000	Not Applicable
West Berkshire Council - Environmental Health Department	May 2000	Not Applicable
Wokingham District Council - Environmental Health Department	October 2005	Not Applicable
Registered Landfill Sites		
Environment Agency - Thames Region - South East Area	March 2003	Not Applicable
Environment Agency - Thames Region - West Area	March 2003	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - Thames Region - South East Area	March 2003	Not Applicable
Environment Agency - Thames Region - West Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites		
Environment Agency - Thames Region - South East Area	March 2003	Not Applicable
Environment Agency - Thames Region - West Area	March 2003	Not Applicable

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH)		
Health and Safety Executive	March 2014	Bi-Annually
Explosive Sites		
Health and Safety Executive	November 2013	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS)		
Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements		
Reading Borough Council - Planning	April 2013	Annual Rolling Update
West Berkshire Council	August 2013	Annual Rolling Update
South Oxfordshire District Council - Planning Department (West)	January 2013	Annual Rolling Update
Basingstoke And Deane Borough Council	November 2012	Annual Rolling Update
Oxfordshire County Council	November 2012	Annual Rolling Update
Hart District Council - Environmental Services	November 2013	Annual Rolling Update
Hampshire County Council - Minerals and Waste Planning	September 2013	Annual Rolling Update
Wokingham District Council	September 2013	Annual Rolling Update
Planning Hazardous Substance Consents		
Reading Borough Council - Planning	April 2013	Annual Rolling Update
West Berkshire Council	August 2013	Annual Rolling Update
South Oxfordshire District Council - Planning Department (West)	January 2013	Annual Rolling Update
Basingstoke And Deane Borough Council	November 2012	Annual Rolling Update
Oxfordshire County Council	November 2012	Annual Rolling Update
Hart District Council - Environmental Services	November 2013	Annual Rolling Update
Hampshire County Council - Minerals and Waste Planning	September 2013	Annual Rolling Update
Wokingham District Council	September 2013	Annual Rolling Update

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	August 1996	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	January 2010	Variable
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	April 2014	Bi-Annually
Brine Compensation Area Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Mining Report Service	December 2013	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	February 2011	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified
Industrial Land Use	**Version**	**Update Cycle**
Contemporary Trade Directory Entries Thomson Directories	May 2014	Quarterly
Fuel Station Entries Catalist Ltd - Experian	March 2014	Quarterly

Sensitive Land Use	Version	Update Cycle
Areas of Adopted Green Belt		
Basingstoke And Deane Borough Council	May 2014	As notified
South Oxfordshire District Council	May 2014	As notified
Wokingham District Council	May 2014	As notified
Areas of Unadopted Green Belt		
Basingstoke And Deane Borough Council	May 2014	As notified
South Oxfordshire District Council	May 2014	As notified
Wokingham District Council	May 2014	As notified
Areas of Outstanding Natural Beauty		
Natural England	January 2014	Bi-Annually
Environmentally Sensitive Areas		
Natural England	July 2013	Annually
Forest Parks		
Forestry Commission	April 1997	Not Applicable
Local Nature Reserves		
Natural England	March 2014	Bi-Annually
Marine Nature Reserves		
Natural England	July 2013	Bi-Annually
National Nature Reserves		
Natural England	March 2014	Bi-Annually
National Parks		
Natural England	January 2014	Bi-Annually
Nitrate Sensitive Areas		
Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2012	Not Applicable
Nitrate Vulnerable Zones		
Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2013	Annually
Ramsar Sites		
Natural England	March 2014	Bi-Annually
Sites of Special Scientific Interest		
Natural England	March 2014	Bi-Annually
Special Areas of Conservation		
Natural England	March 2014	Bi-Annually
Special Protection Areas		
Natural England	March 2014	Bi-Annually

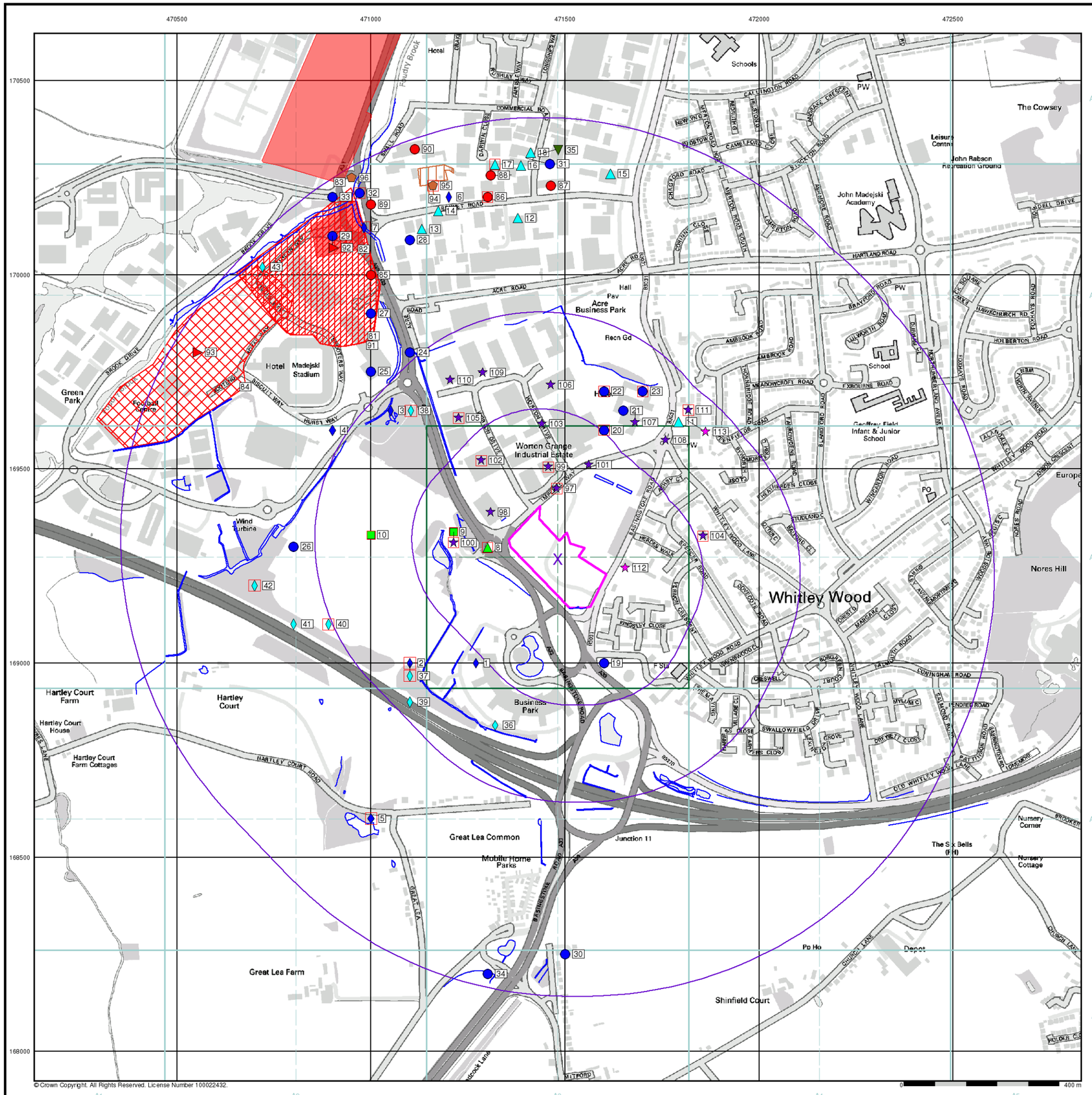
Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Countryside Council for Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Contact	Name and Address	Contact Details
1	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 08708 506 506 Email: enquiries@environment-agency.gov.uk
2	**Reading Borough Council - Environmental Health Department** Civic Centre, Reading, Hampshire, RG1 7DT	Telephone: 0118 939 9099 Fax: 0118 958 9770 Website: www.reading.gov.uk
3	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
4	**Reading Borough Council - Planning** Civic Centre, READING, Hampshire, RG1 7TD	Telephone: 0118 939 0900 Fax: 0118 958 9770 Website: www.reading.gov.uk
5	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmark.co.uk Website: www.landmarkinfo.co.uk
6	**Natural England** Suite D, Unex House, Bourges Boulevard, Peterborough, Cambridgeshire, PE1 1NG	Telephone: 0845 600 3078 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
7	**Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)** Government Buildings, Otley Road, Lawnswood, Leeds, West Yorkshire, LS16 5QT	Telephone: 0113 2613333 Fax: 0113 230 0879
8	**Wokingham District Council - Environmental Health Department** Council Offices, Shute End, Wokingham, Surrey, RG40 1BN	Telephone: 0118 974 6000 Fax: 0118 974 5053 Website: www.wokingham.gov.uk
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / SEPA have a charging policy in place for enquiries.



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Waterman

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

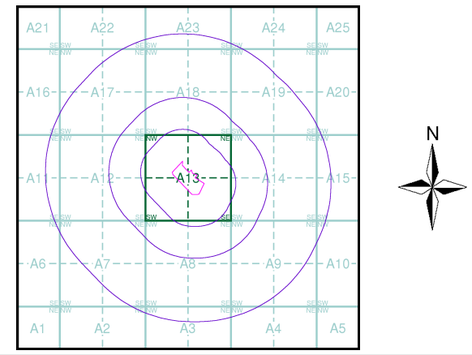
Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Slice A



Order Details

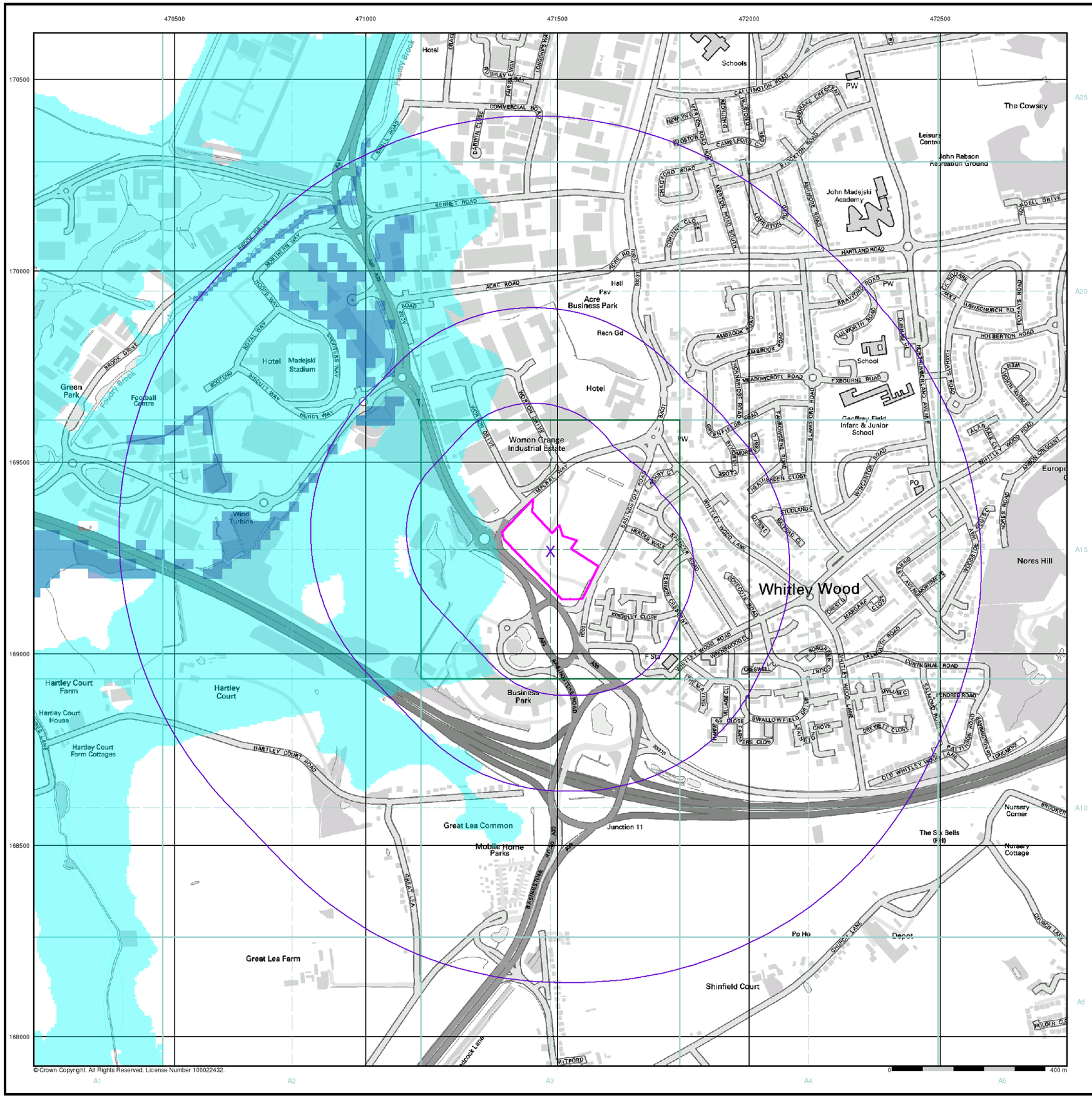
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Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
Search Buffer (m):	1000

Site Details

11 Ashby Court, READING, RG2 8PG

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



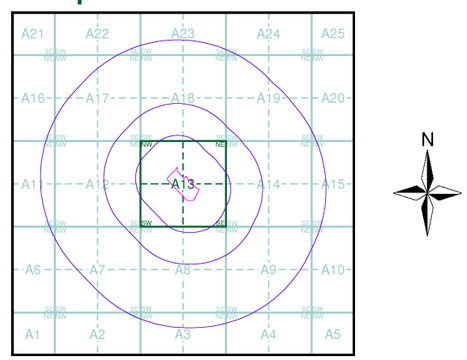
General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

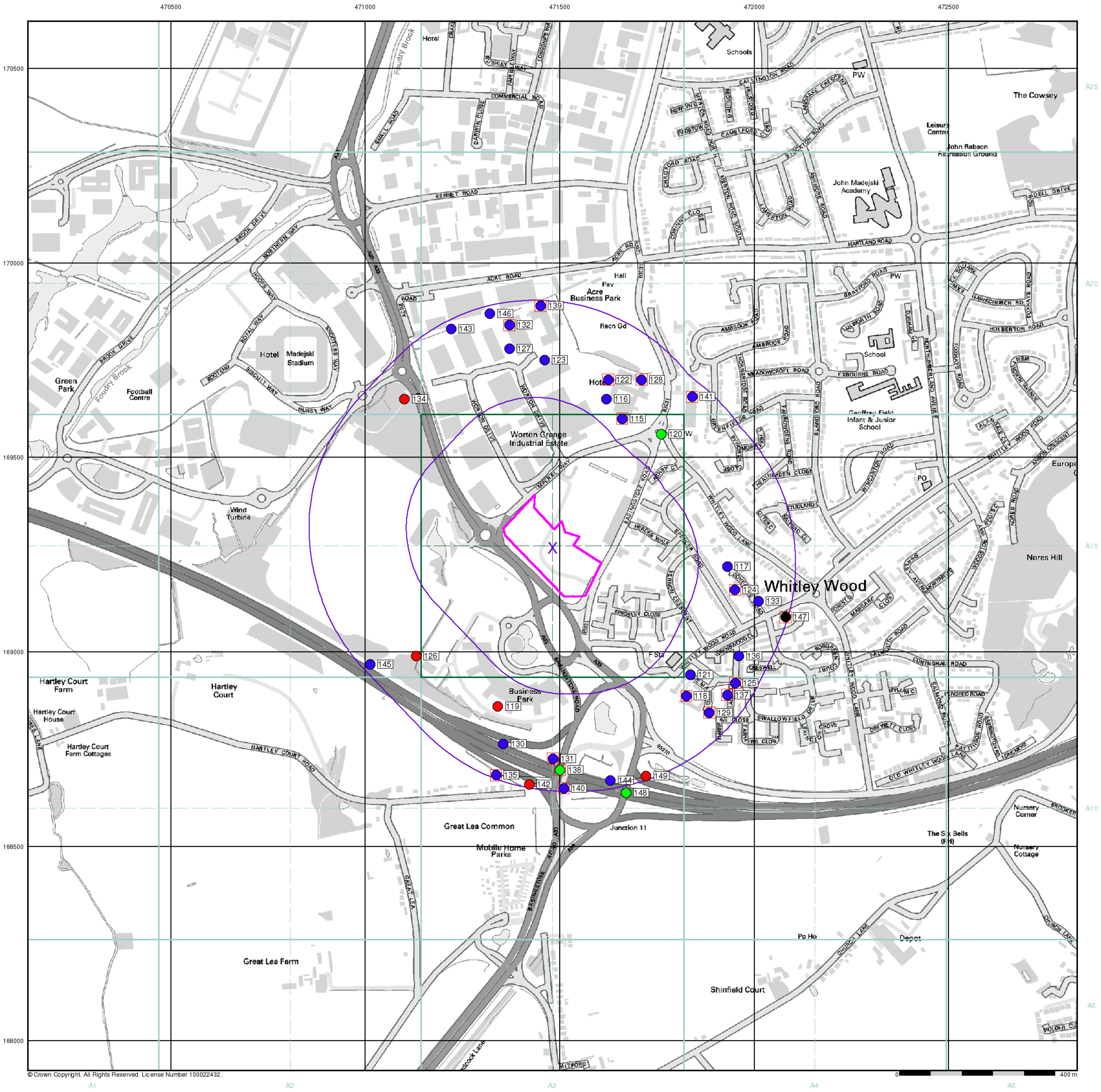
Order Number:	57690165_1_1
Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
Search Buffer (m):	1000

Site Details

11 Ashby Court, READING, RG2 8PG

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point
- Map ID
- Several of Type at Location

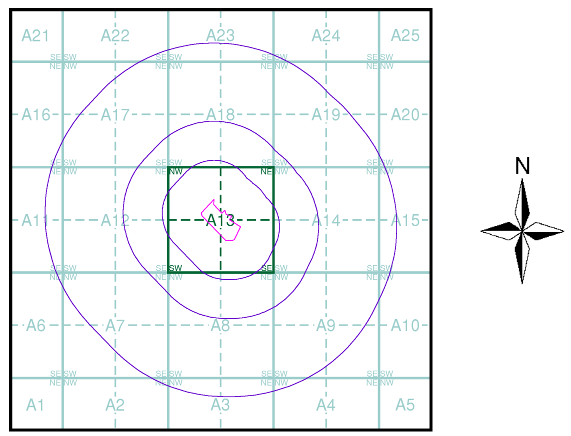
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



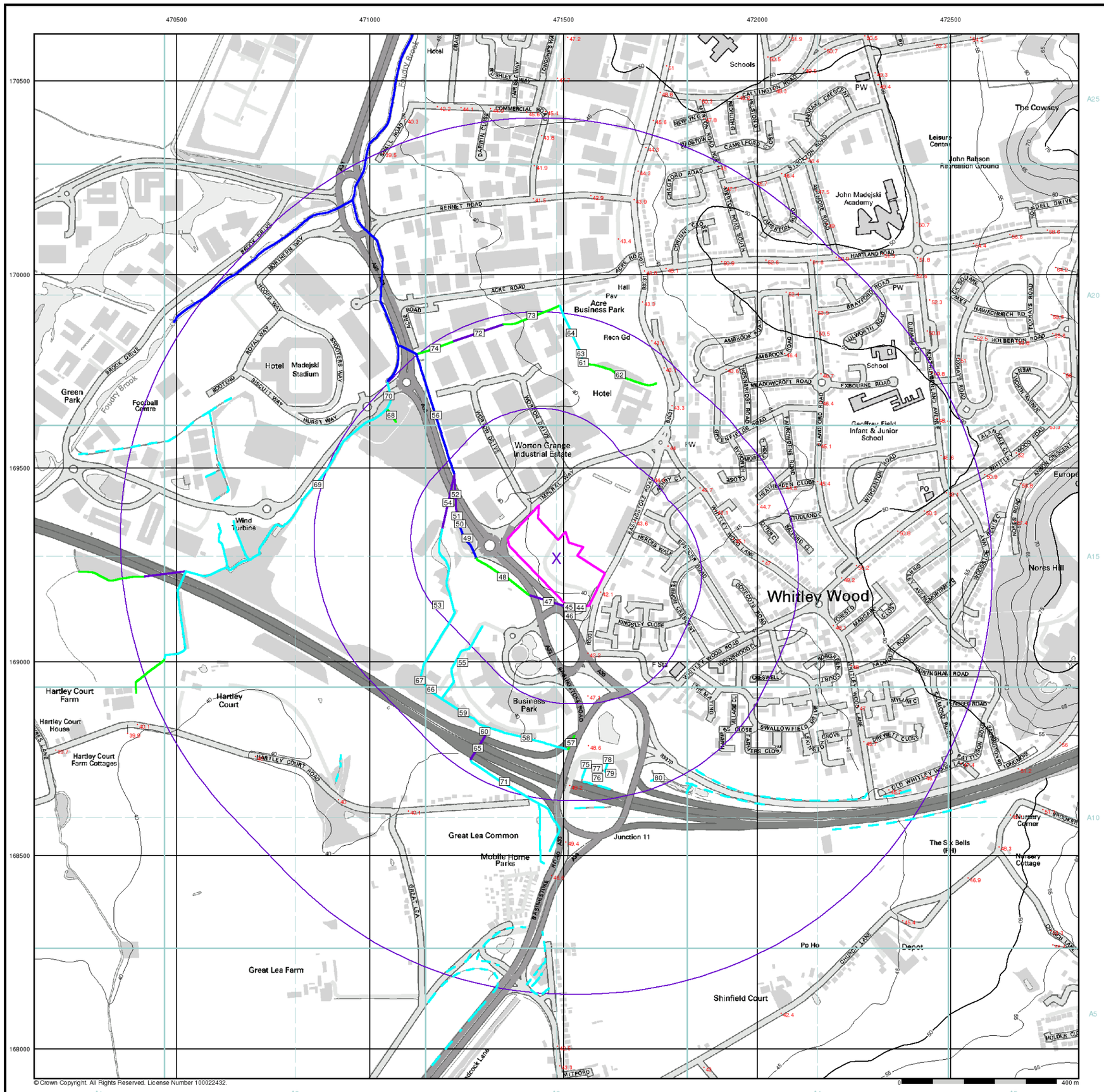
Order Details

Order Number: 57690165_1_1
Customer Ref: EED14723-100
National Grid Reference: 471480, 169270
Slice: A
Site Area (Ha): 2.97
Search Buffer (m): 1000

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General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID

EA Detailed River Network Data

- Primary River
- Secondary River
- Tertiary River
- Canal
- Canal Tunnel
- Undefined River
- Lake/Reservoir
- Offline Drainage Feature
- Extended Culvert (greater than 50m
- Underground River (inferred)
- Underground River (local knowledge
- Downstream of High Water Mark
- Downstream of Seaward Extension
- Not assigned River feature

Contours (height in metres)

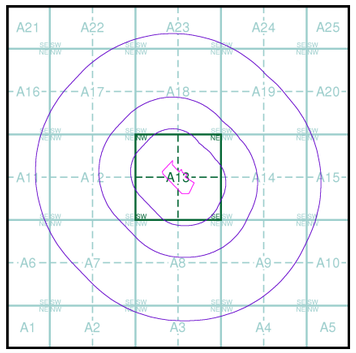
Standard Contour — 105 — 100 — 95

Index Contour

167.3 Spot Height

45.8 Air Height

EA Detailed River Network Map - Slice A



Order Details

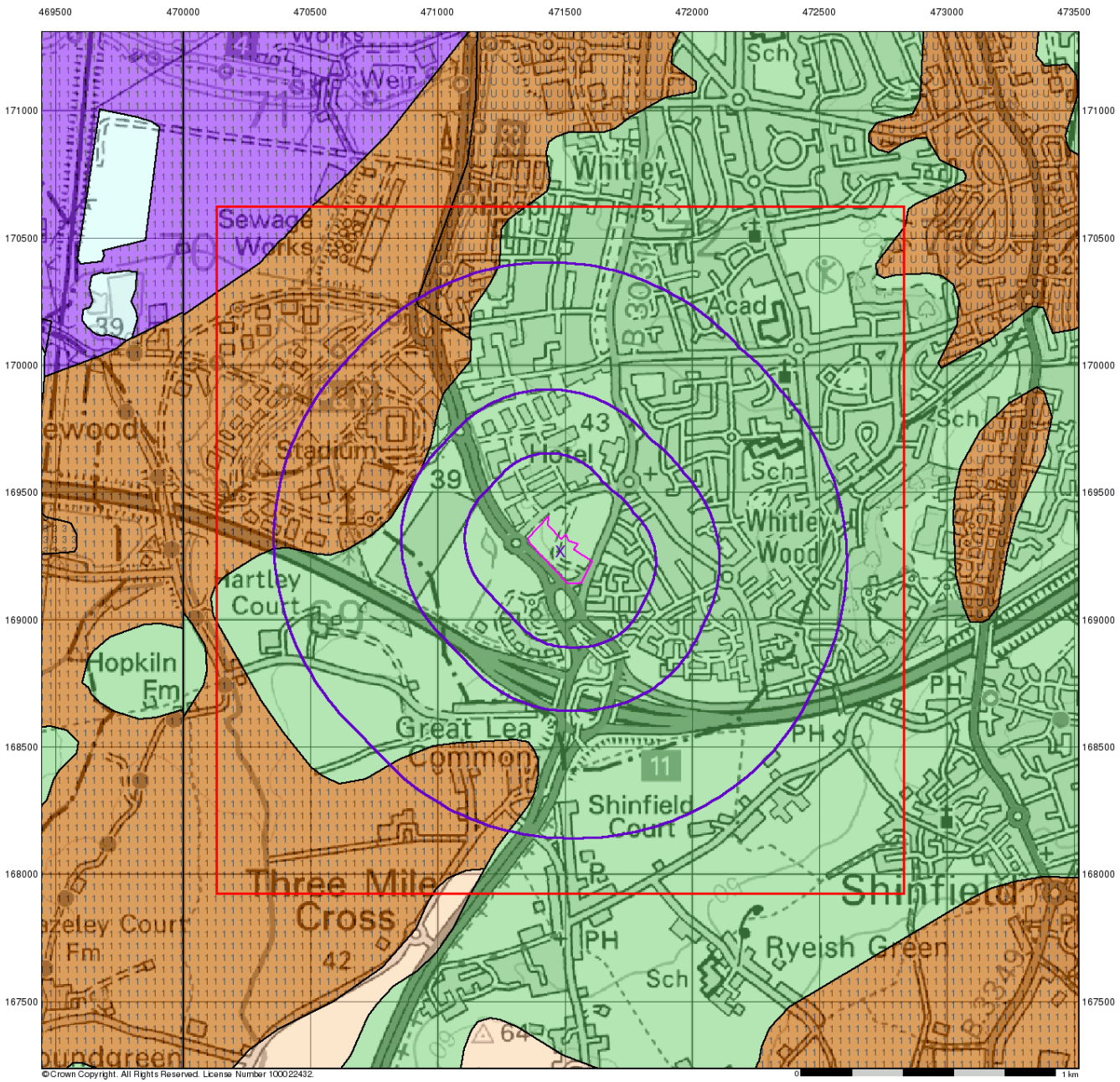
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Groundwater Vulnerability

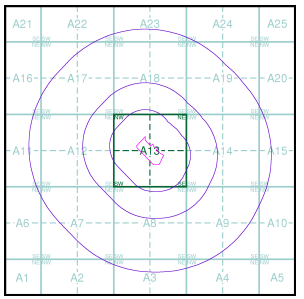
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Non Aquifer (Negligibly Permeable)	
Water or Sea	
Drift Deposit	

Site Sensitivity Context Map - Slice A



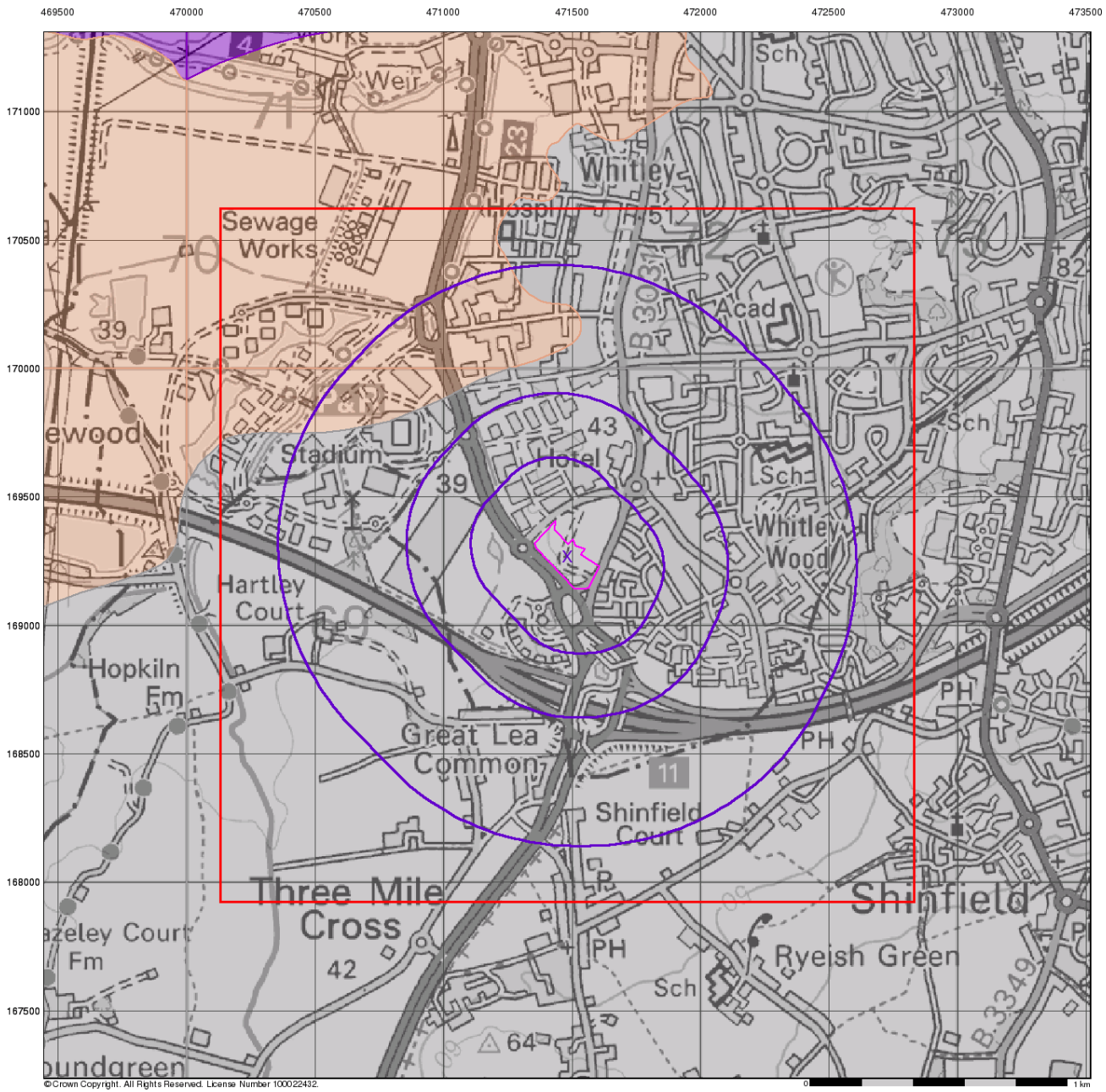
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Bedrock Aquifer Designation

General

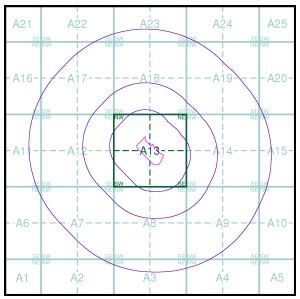
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



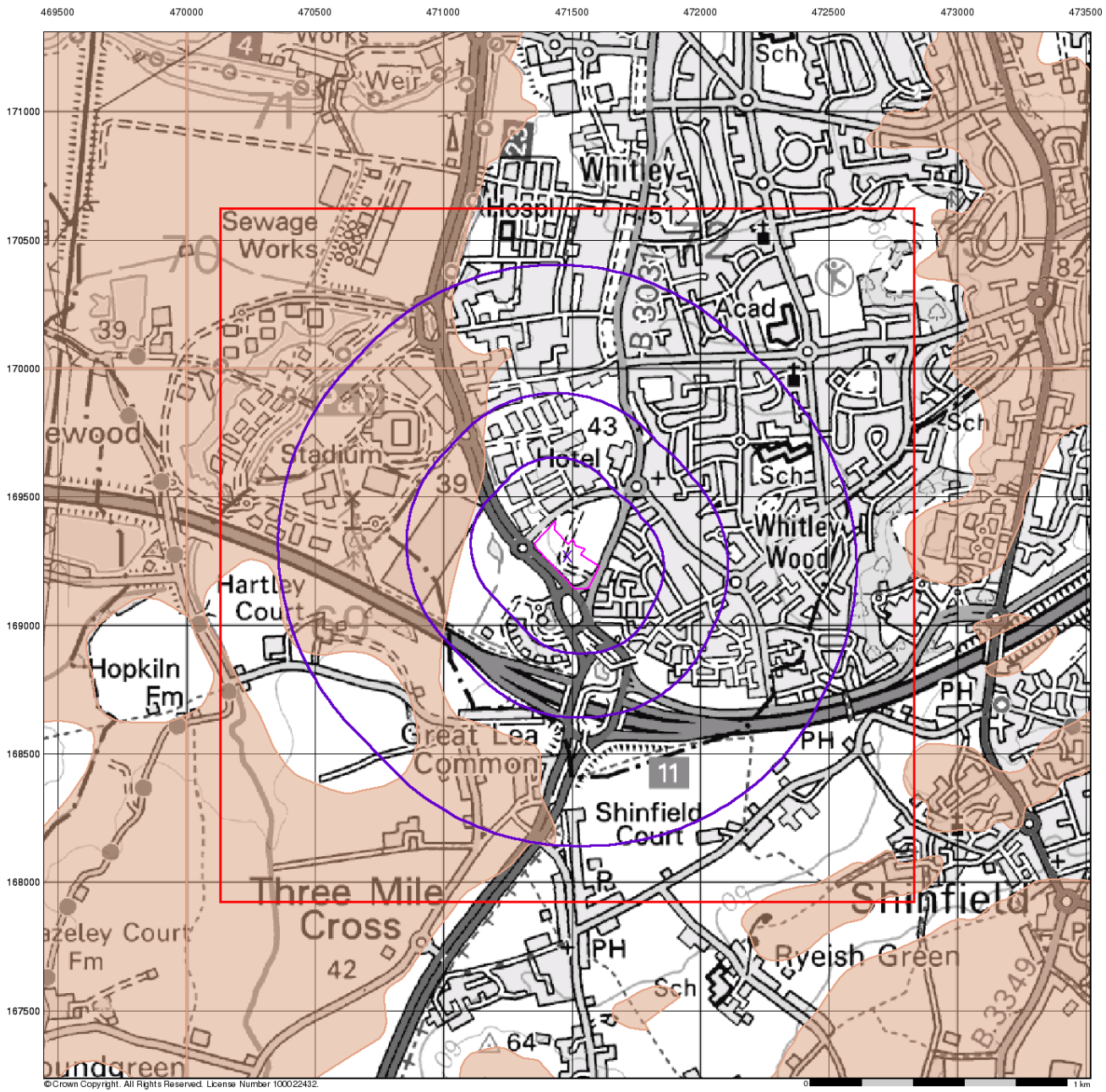
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Superficial Aquifer Designation

General

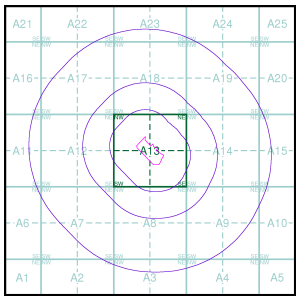
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



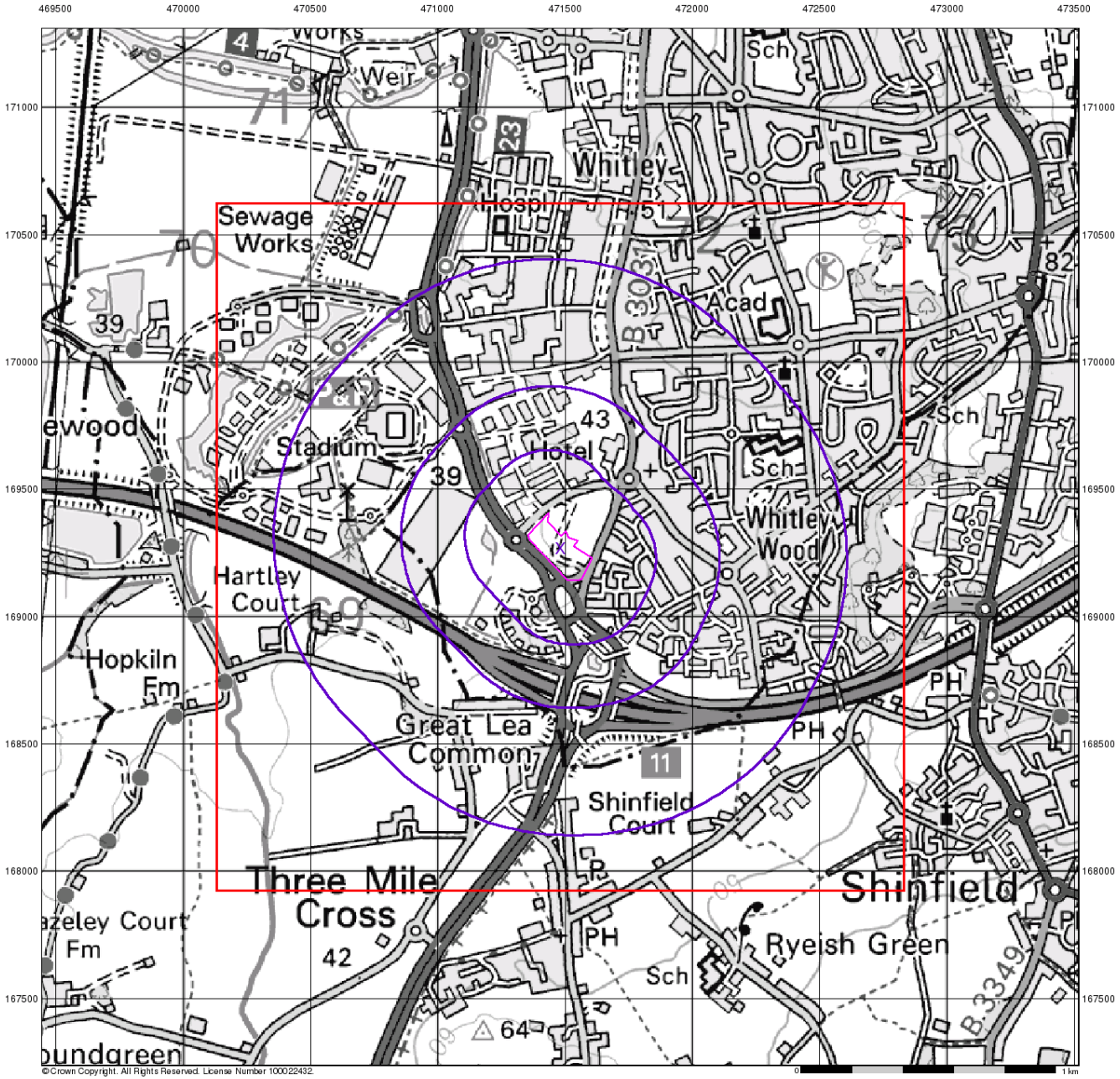
Order Details

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Source Protection Zones

General

Specified Site | Specified Buffer(s) | Bearing Reference Point

Slice | Map ID

Agency and Hydrological

Source Protection Zone I

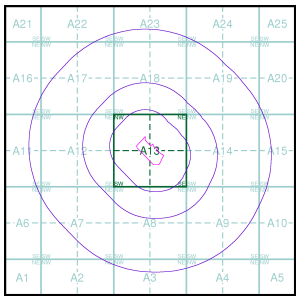
Source Protection Zone II

Source Protection Zone III

Zone of Special Interest

Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



Order Details

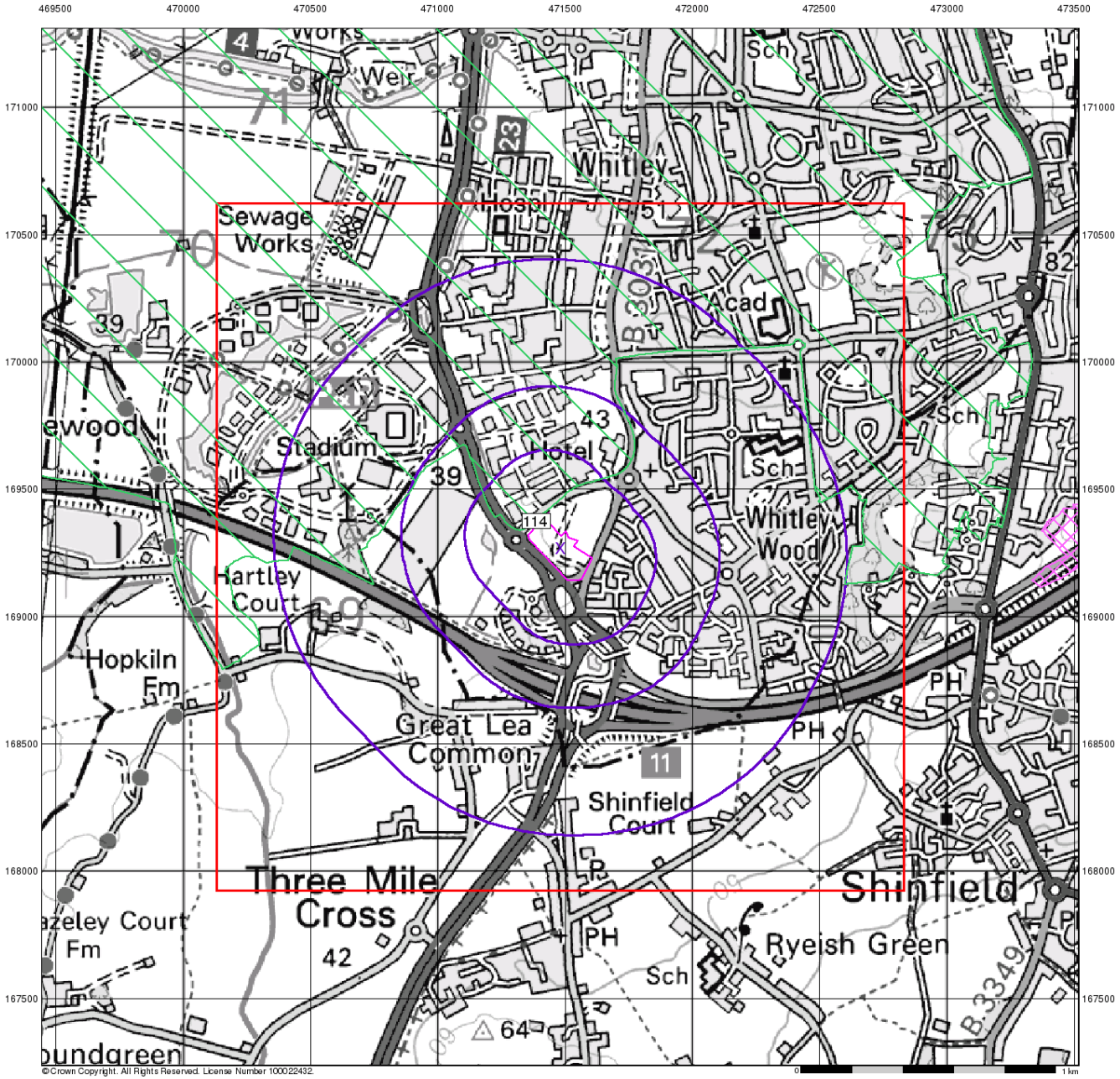
Order Number:	57690165_1_1
Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
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Sensitive Land Uses

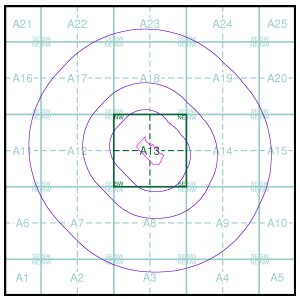
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Sensitive Land Uses

- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area

Site Sensitivity Context Map - Slice A



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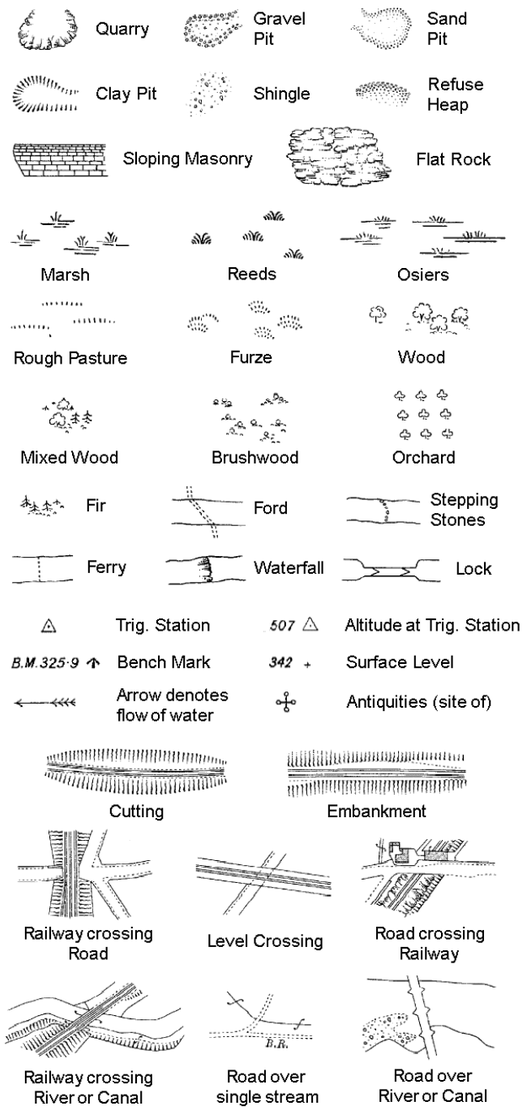
Site Details

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Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



County Boundary (Geographical)

County & Civil Parish Boundary

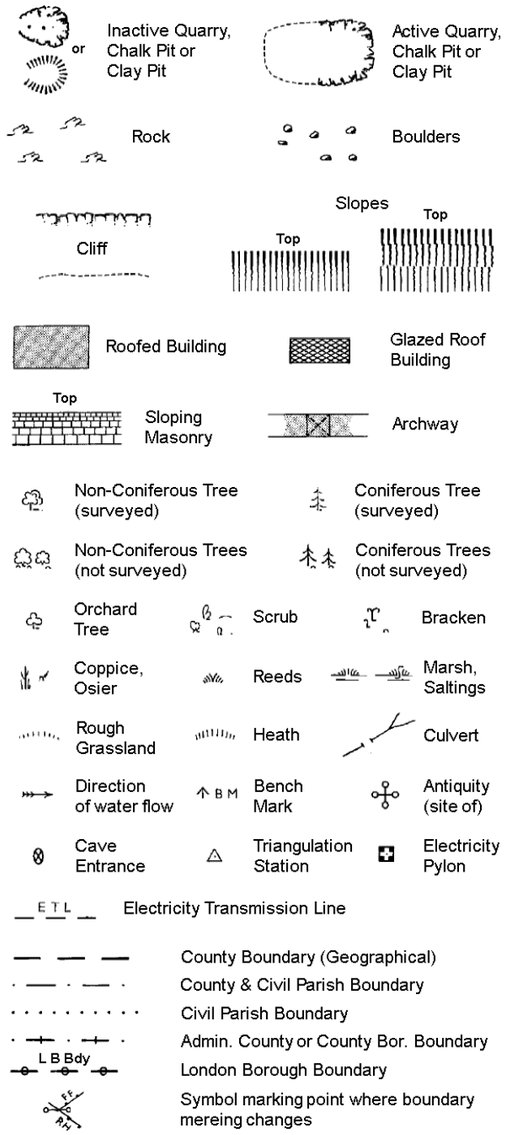
Administrative County & Civil Parish Boundary

Co. Boro. Bdy. County Borough Boundary (England)

Co. Burgh Bdy. County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



County Boundary (Geographical)

County & Civil Parish Boundary

Civil Parish Boundary

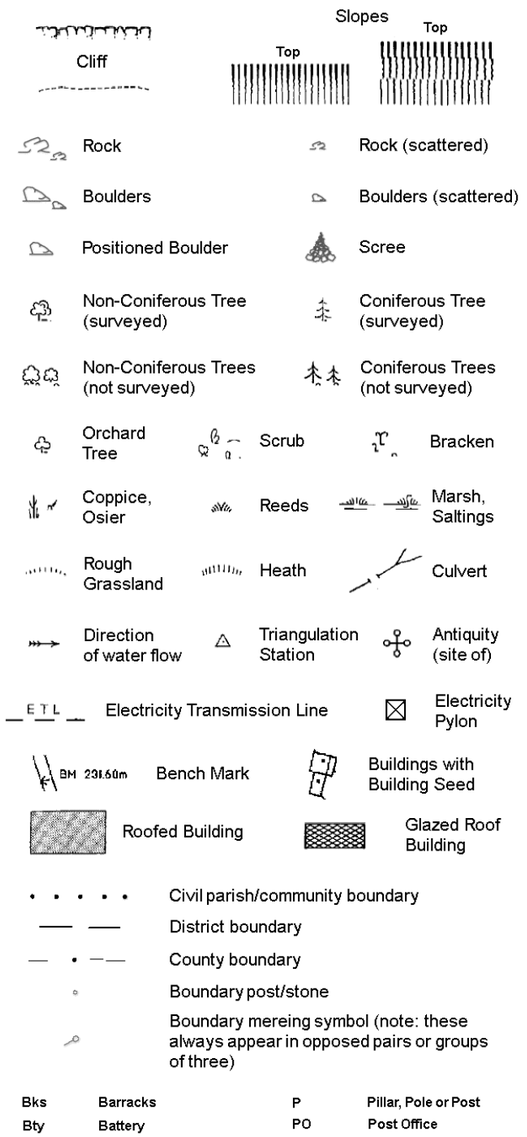
Admin. County or County Bor. Boundary

L B Bdy London Borough Boundary

Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



Civil parish/community boundary

District boundary

County boundary

Boundary post/stone

Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

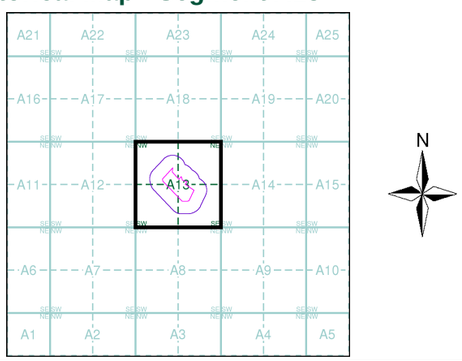
Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

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Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Berkshire	1:2,500	1878 - 1879	2
Berkshire	1:2,500	1899	3
Berkshire	1:2,500	1911	4
Berkshire	1:2,500	1936 - 1937	5
Ordnance Survey Plan	1:1,250	1958 - 1980	6
Additional SIMs	1:1,250	1958 - 1986	7
Ordnance Survey Plan	1:2,500	1959 - 1965	8
Additional SIMs	1:2,500	1972	9
Ordnance Survey Plan	1:1,250	1974 - 1985	10
Supply of Unpublished Survey Information	1:2,500	1974	11
Supply of Unpublished Survey Information	1:1,250	1974	12
Supply of Unpublished Survey Information	1:2,500	1974	13
Ordnance Survey Plan	1:2,500	1975	14
Additional SIMs	1:1,250	1980	15
Additional SIMs	1:2,500	1980	16
Ordnance Survey Plan	1:1,250	1983 - 1985	17
Additional SIMs	1:1,250	1985	18
Large-Scale National Grid Data	1:1,250	1994	19
Large-Scale National Grid Data	1:1,250	1994 - 1995	20
Large-Scale National Grid Data	1:1,250	1996	21

Historical Map - Segment A13



Order Details

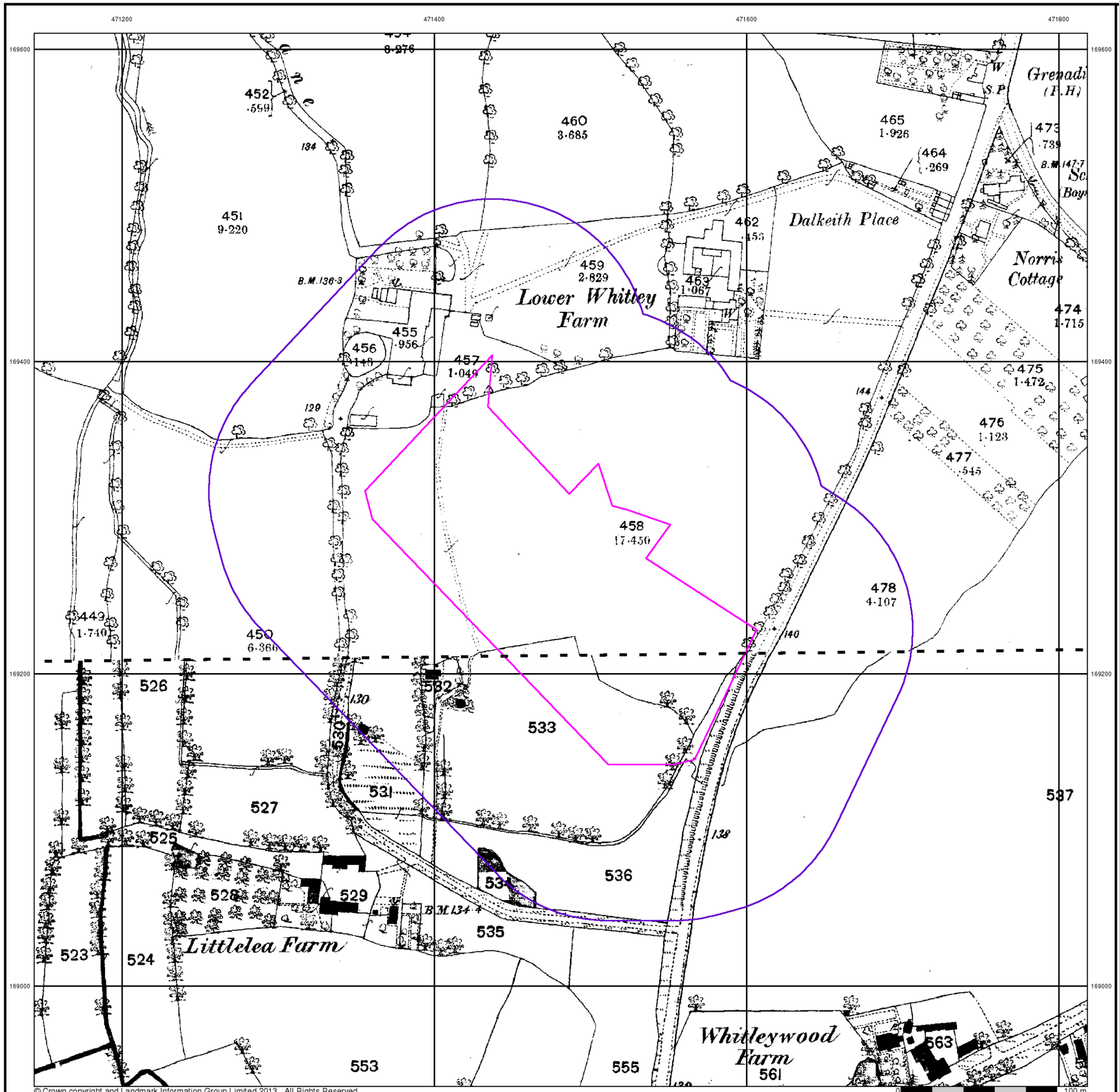
Order Number: 57690165_1_1
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Slice: A
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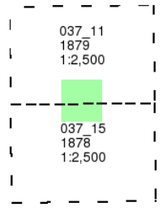
Berkshire

Published 1878 - 1879

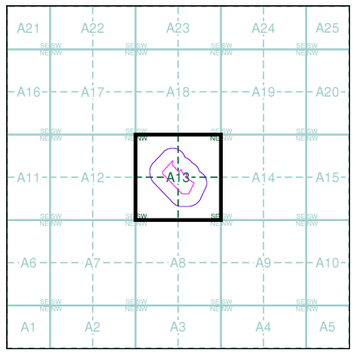
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



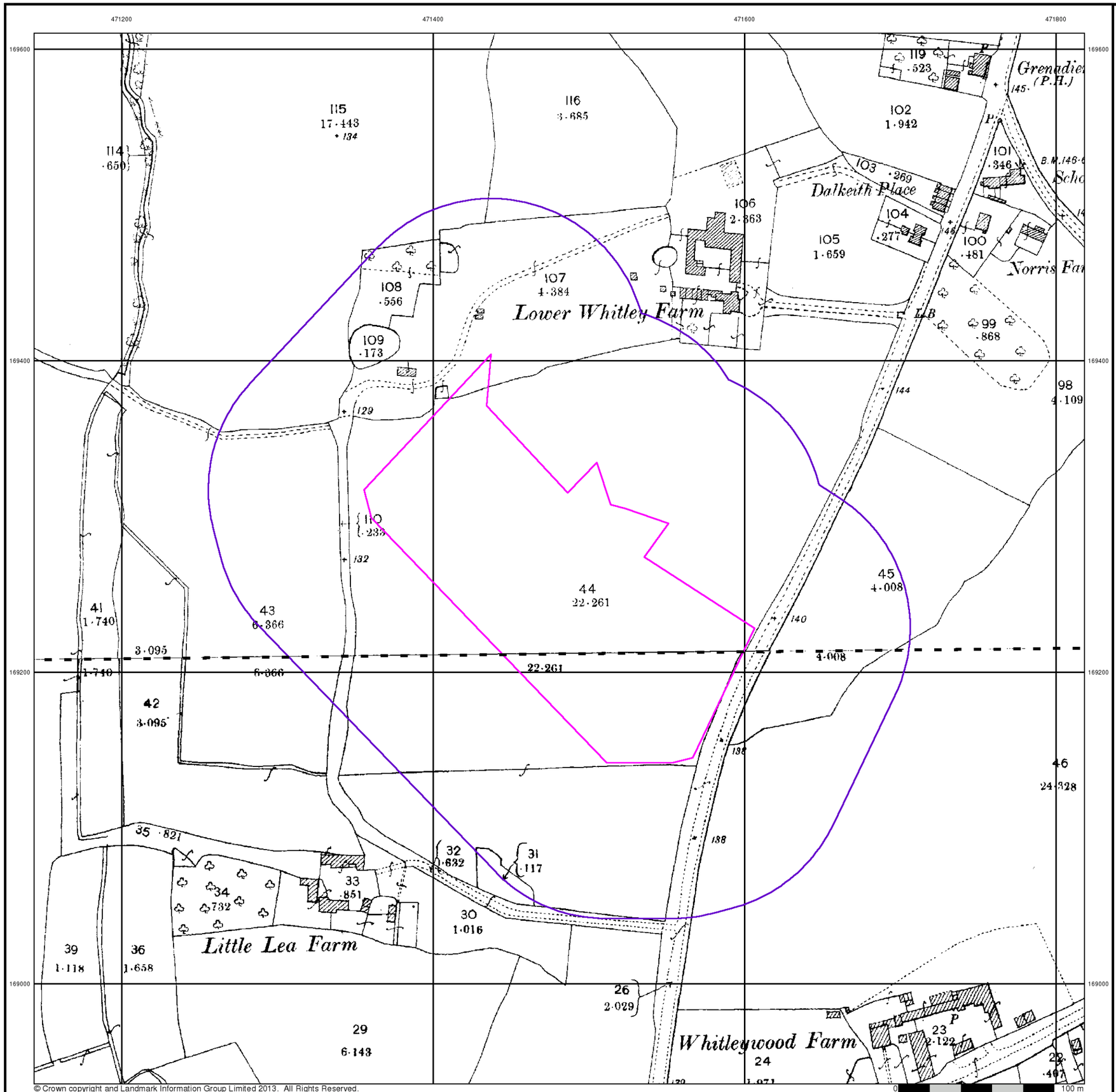
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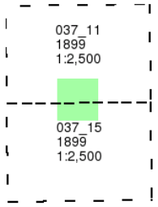
Berkshire

Published 1899

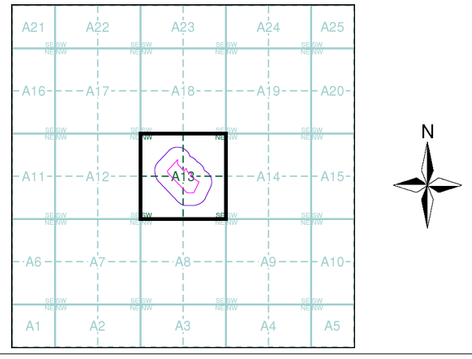
Source map scale - 1:2,500

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Map Name(s) and Date(s)



Historical Map - Segment A13



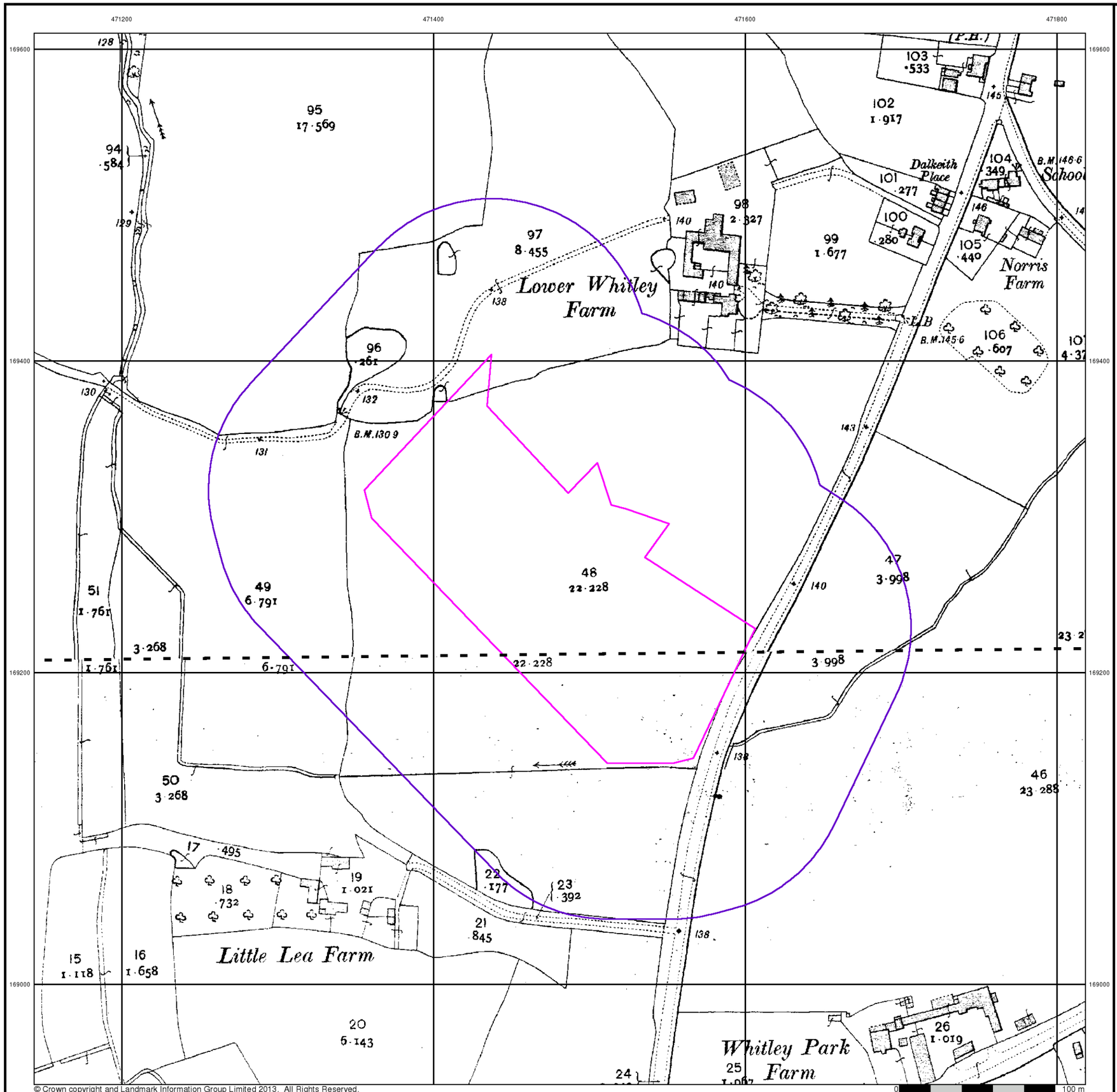
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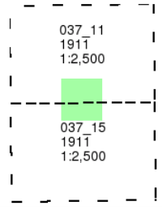
Berkshire

Published 1911

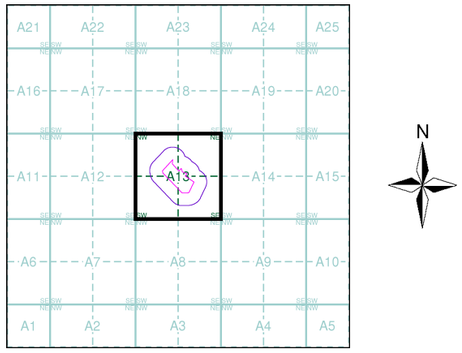
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



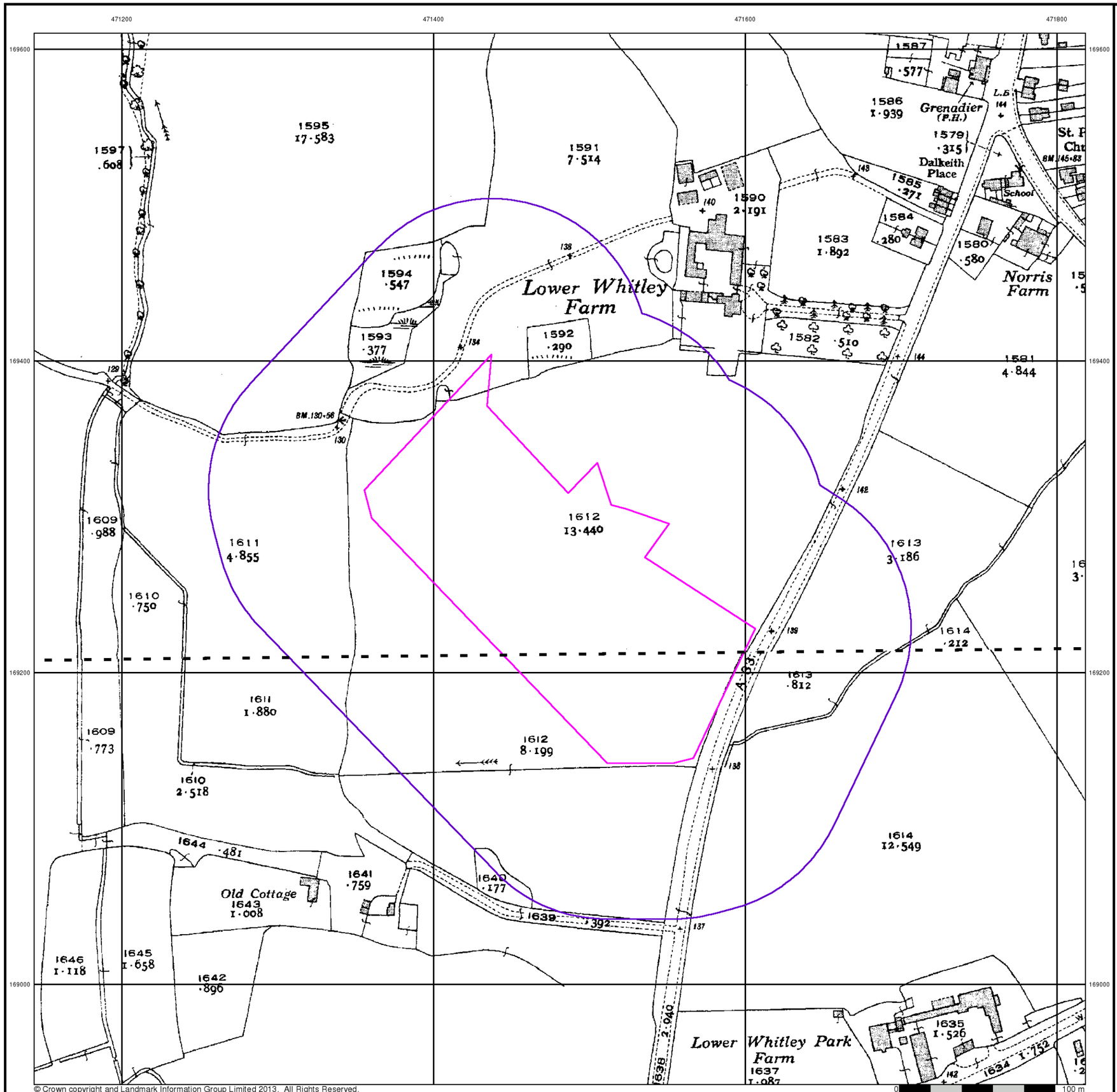
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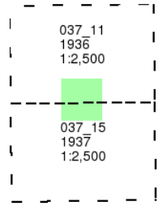
Berkshire

Published 1936 - 1937

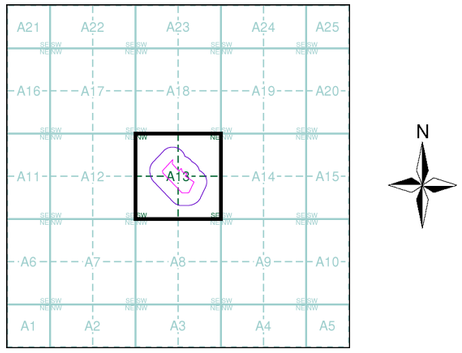
Source map scale - 1:2,500

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Map Name(s) and Date(s)



Historical Map - Segment A13



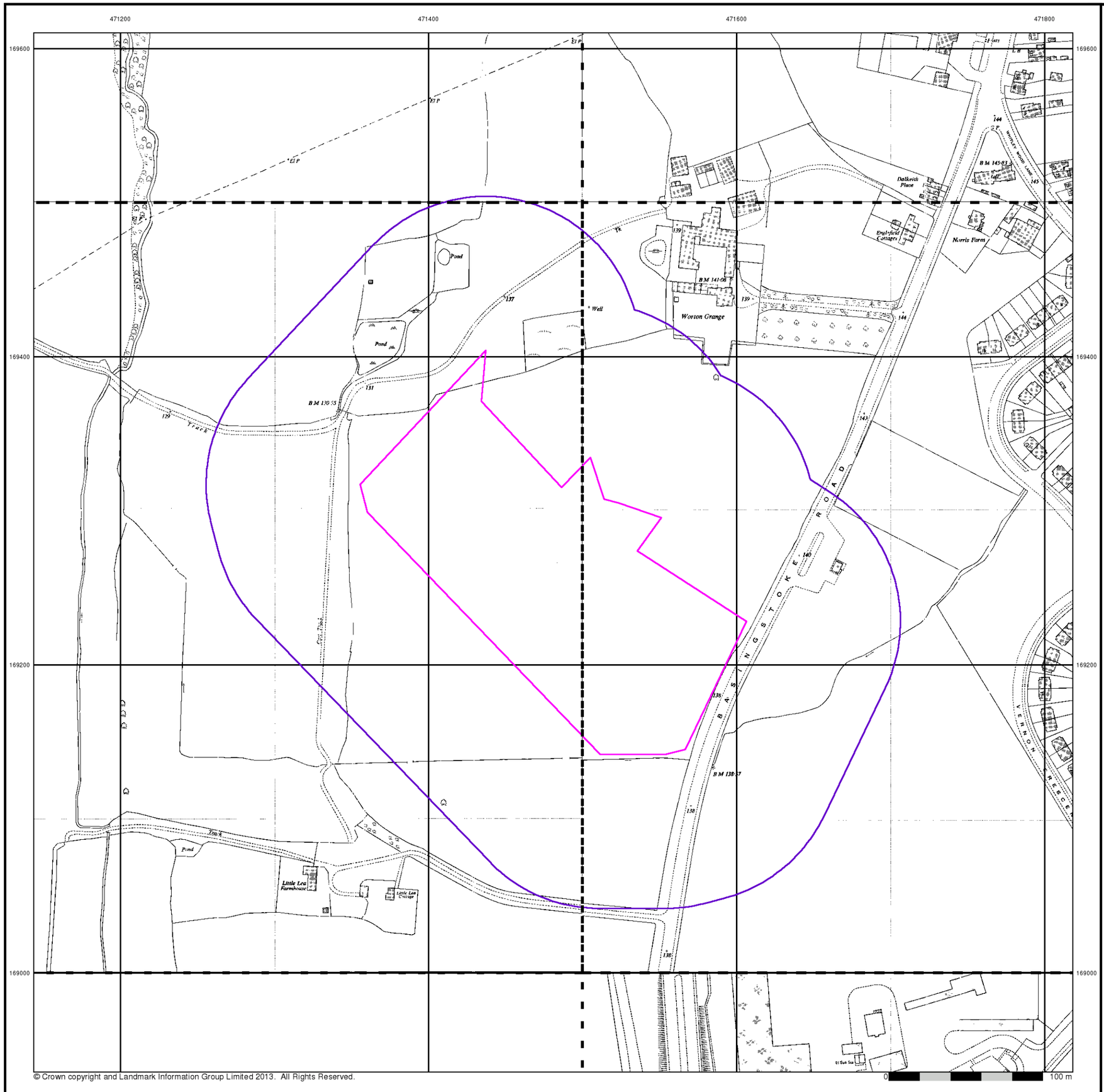
Order Details

Order Number:	57690165_1_1
Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
Search Buffer (m):	100

Site Details

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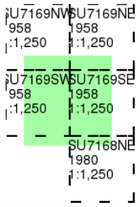
Ordnance Survey Plan

Published 1958 - 1980

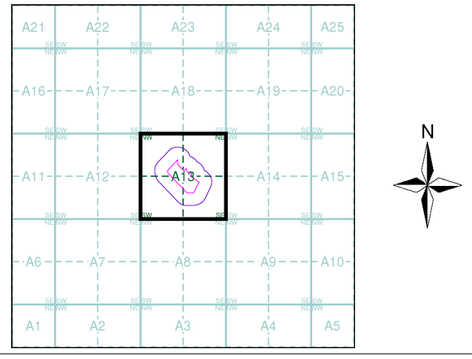
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



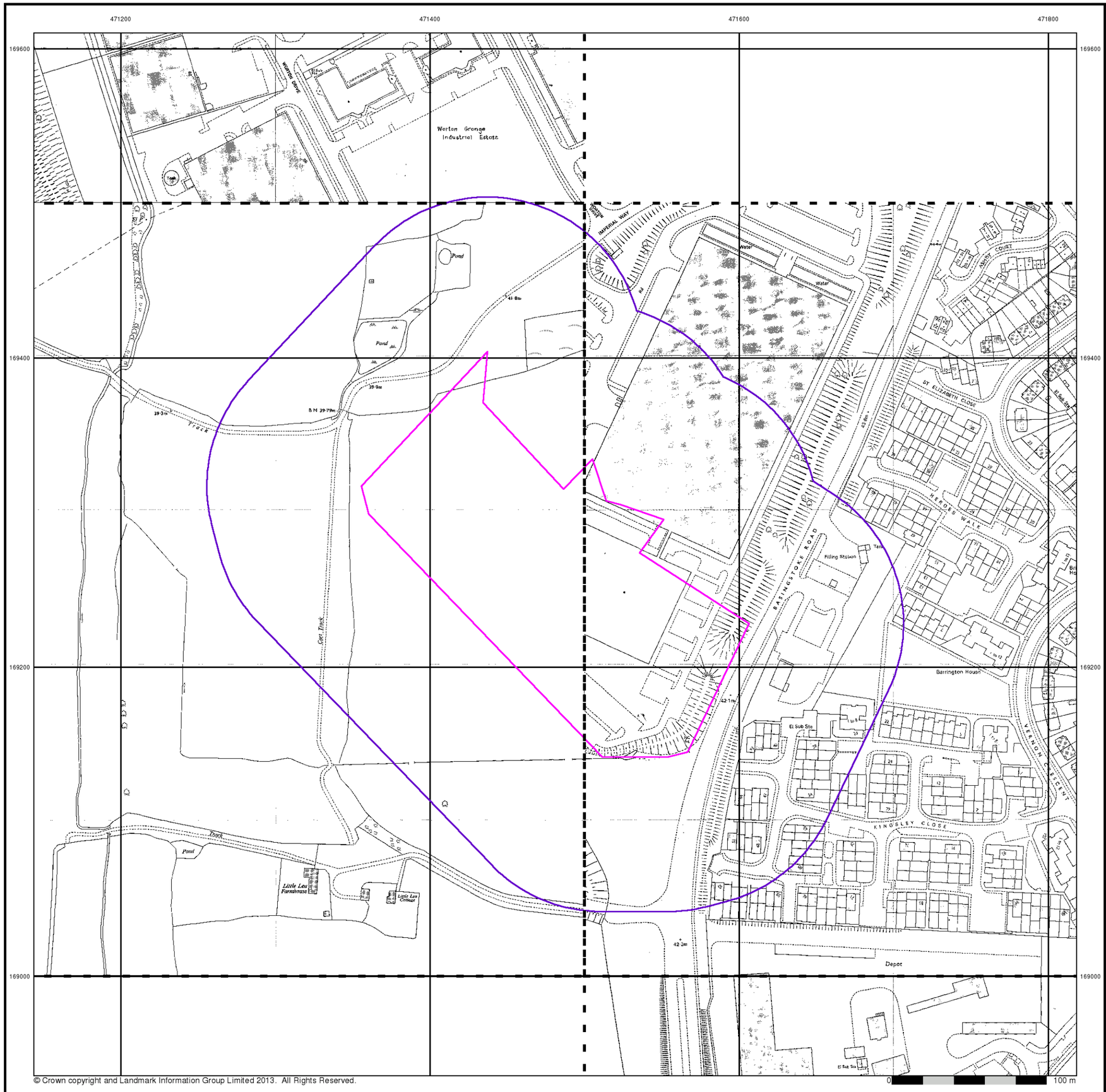
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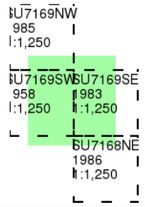
Additional SIMs

Published 1958 - 1986

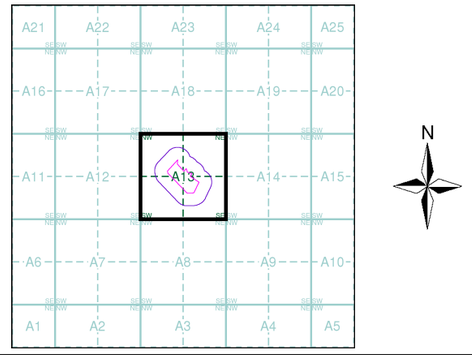
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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Ordnance Survey Plan

Published 1959 - 1965

Source map scale - 1:2,500

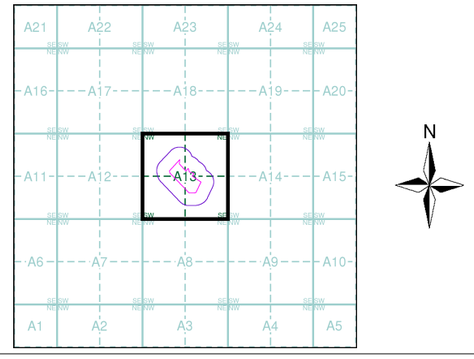
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SU7169
1959
1:2,500

SU7168
1965
1:2,500

Historical Map - Segment A13



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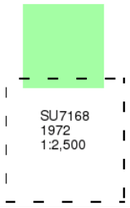
Additional SIMs

Published 1972

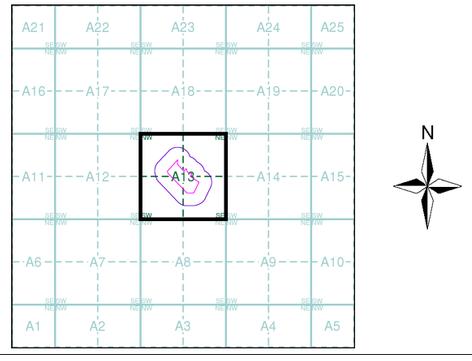
Source map scale - 1:2,500

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Map Name(s) and Date(s)



Historical Map - Segment A13



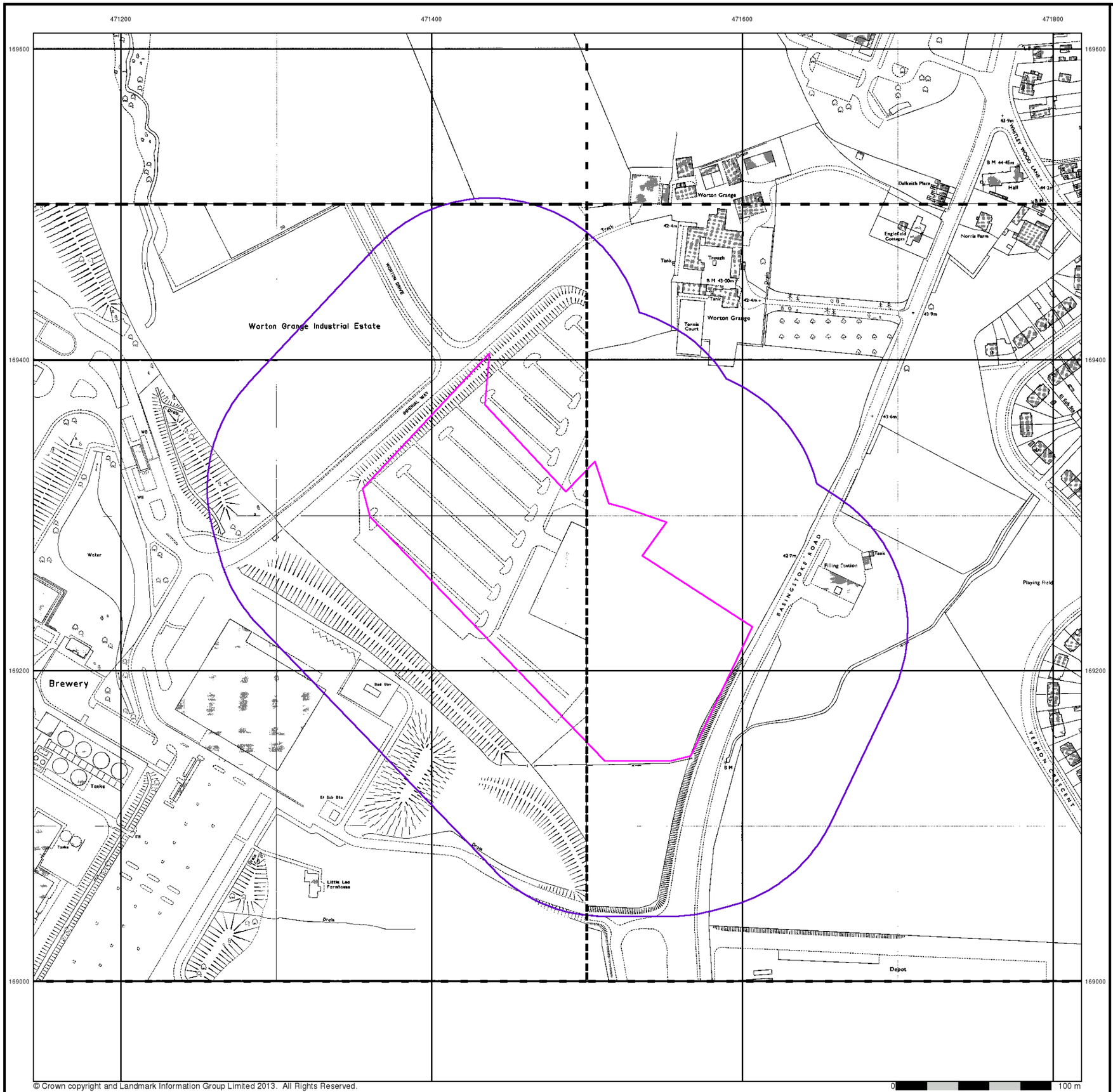
Order Details

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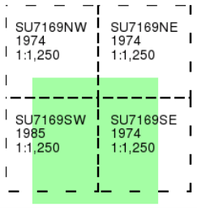
Ordnance Survey Plan

Published 1974 - 1985

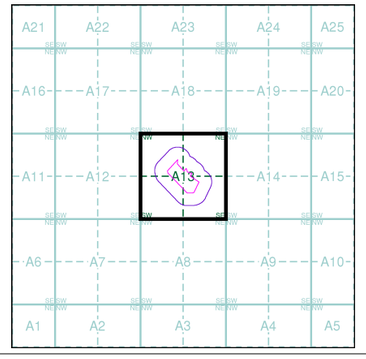
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



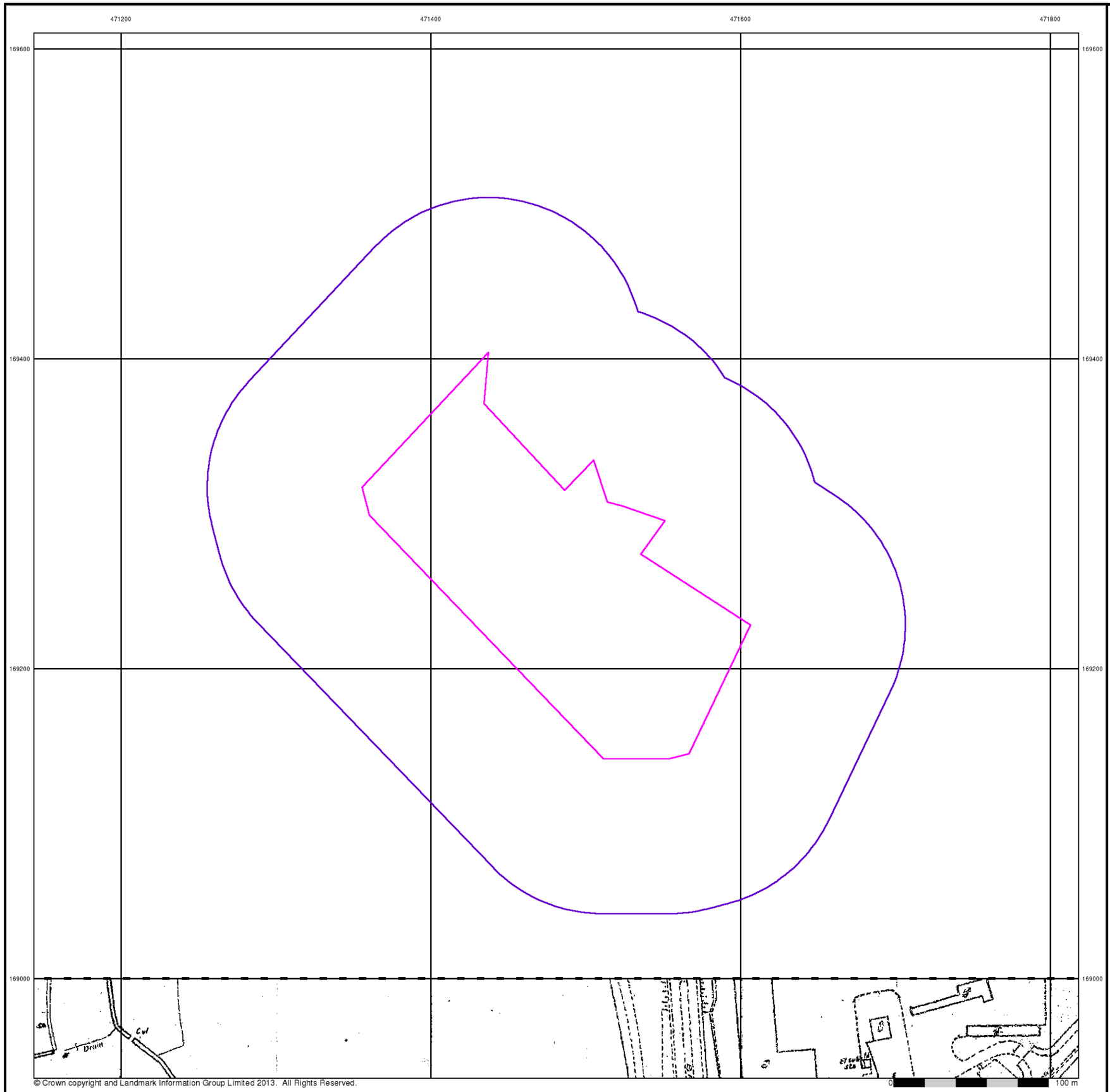
Order Details

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Slice:	A
Site Area (Ha):	2.97
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Site Details

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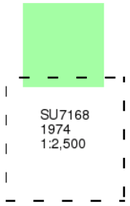
Supply of Unpublished Survey Information

Published 1974

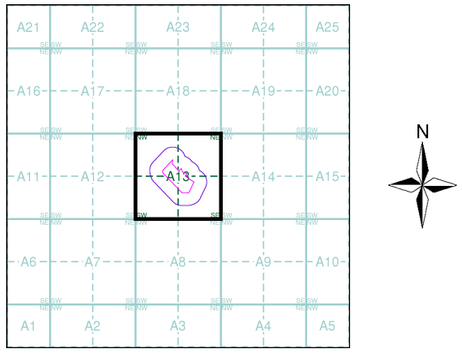
Source map scale - 1:2,500

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a `work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



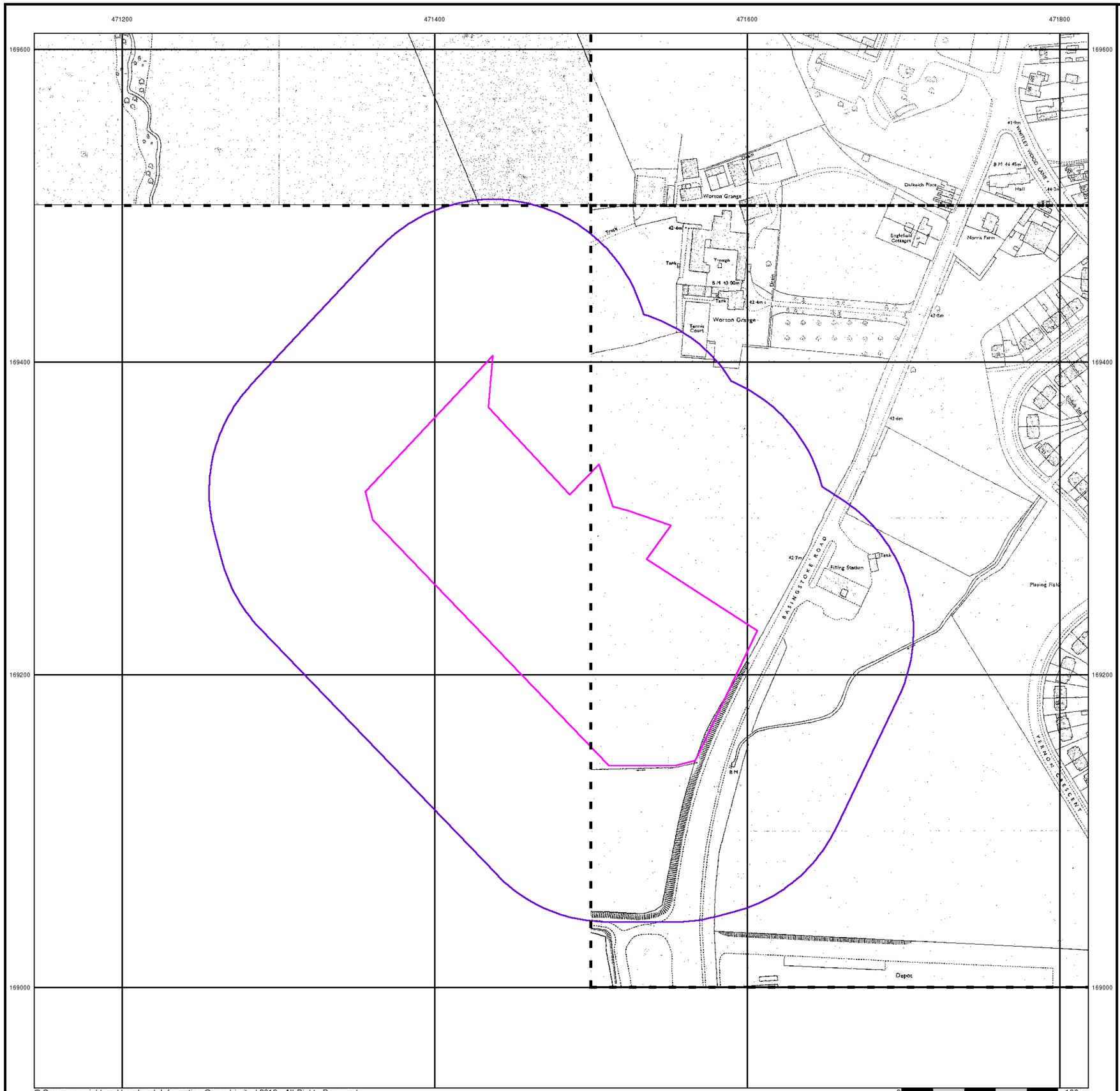
Order Details

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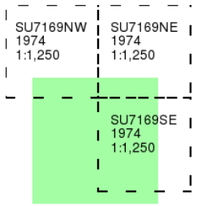
Supply of Unpublished Survey Information

Published 1974

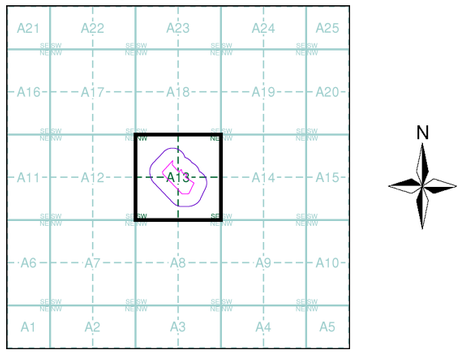
Source map scale - 1:1,250

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Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	57690165_1_1
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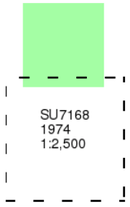
Supply of Unpublished Survey Information

Published 1974

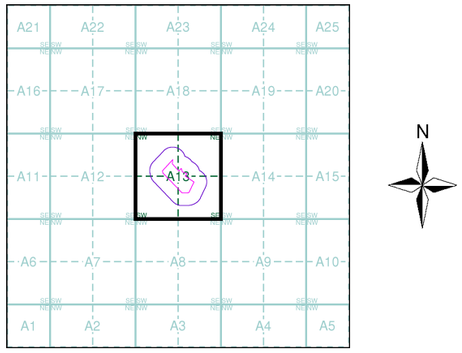
Source map scale - 1:2,500

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Map Name(s) and Date(s)



Historical Map - Segment A13



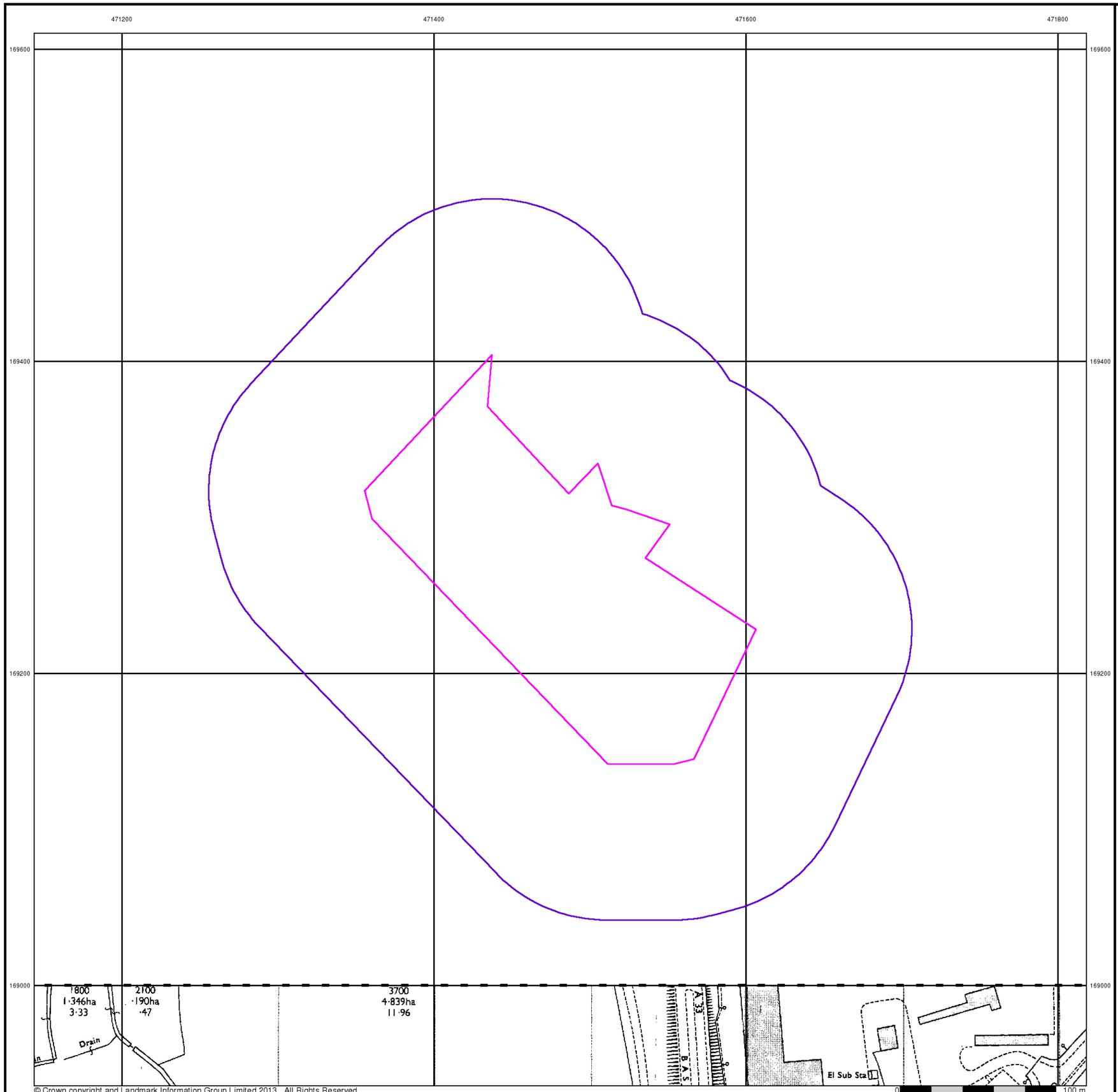
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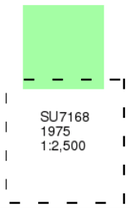
Ordnance Survey Plan

Published 1975

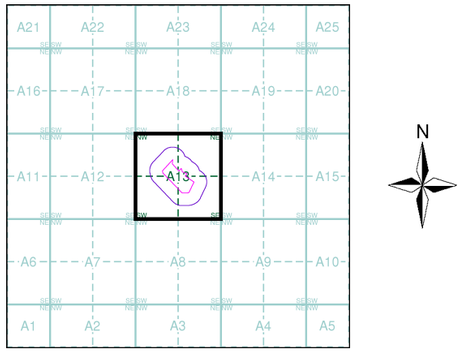
Source map scale - 1:2,500

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Map Name(s) and Date(s)



Historical Map - Segment A13



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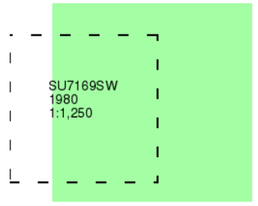
Additional SIMs

Published 1980

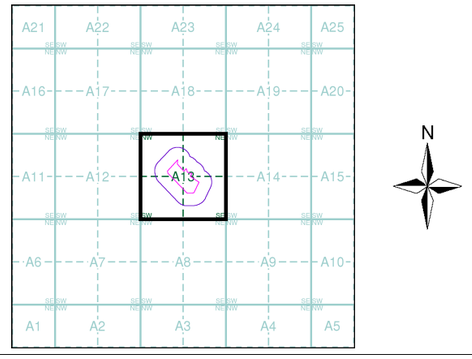
Source map scale - 1:1,250

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Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

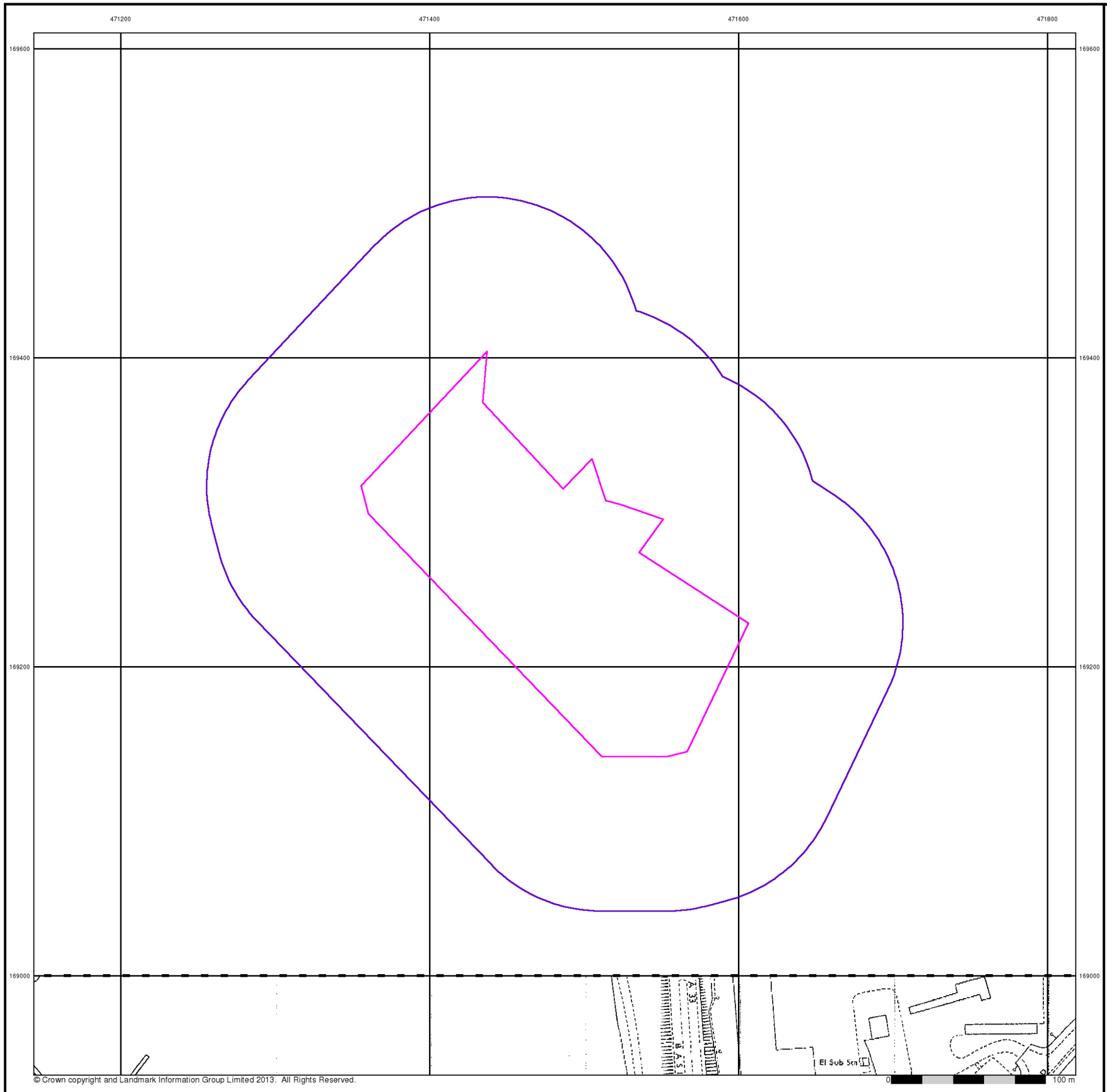
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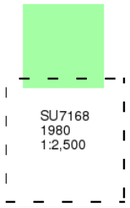
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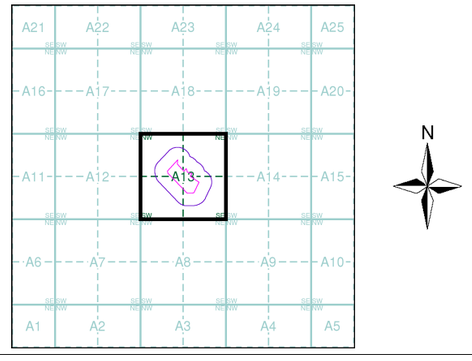
Source map scale - 1:2,500

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Map Name(s) and Date(s)



Historical Map - Segment A13



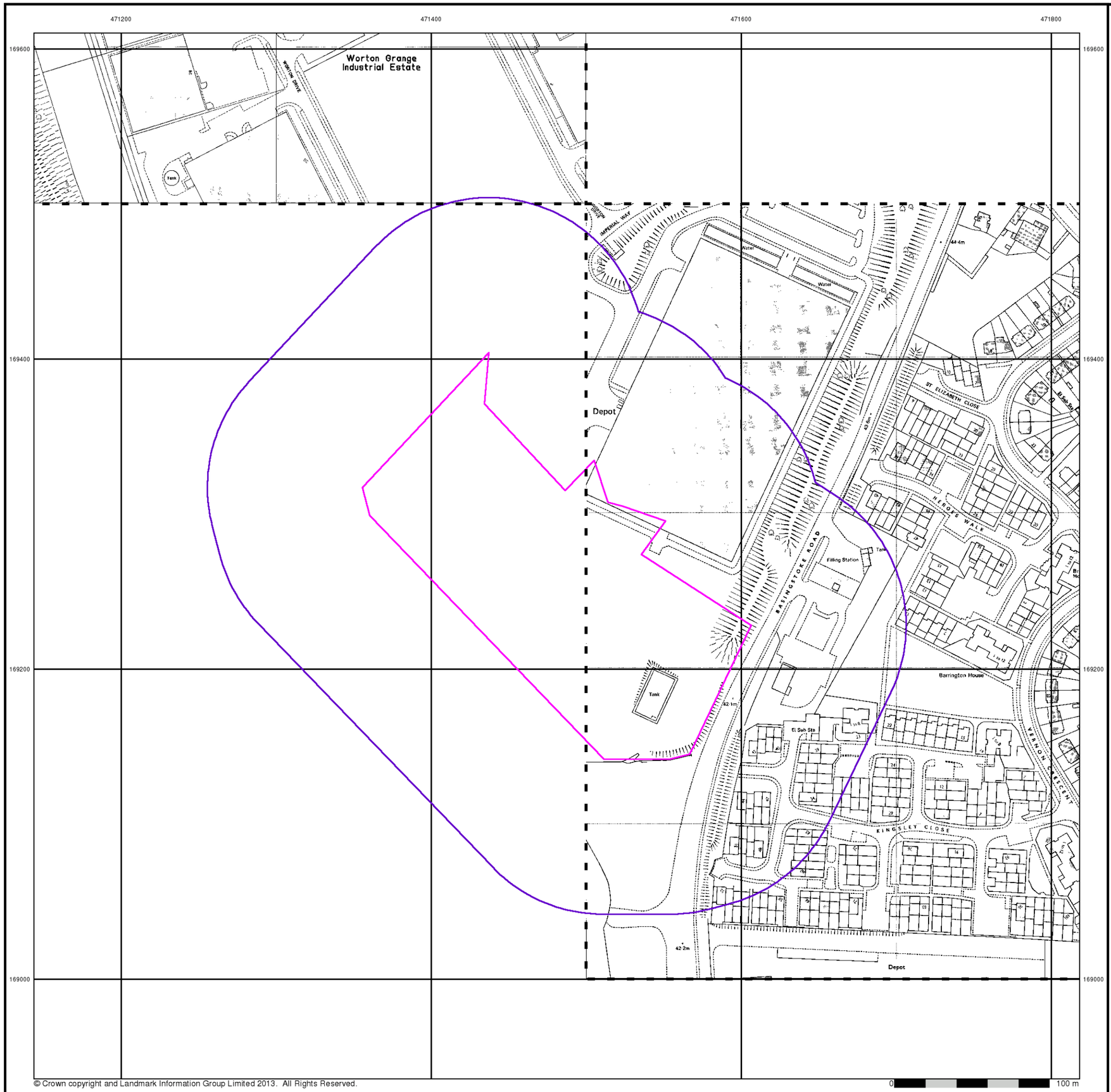
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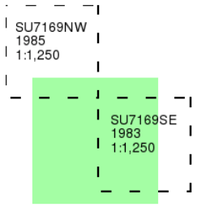
Ordnance Survey Plan

Published 1983 - 1985

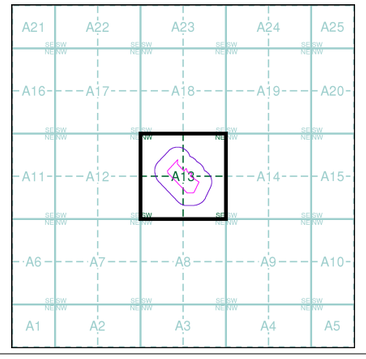
Source map scale - 1:1,250

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Map Name(s) and Date(s)



Historical Map - Segment A13



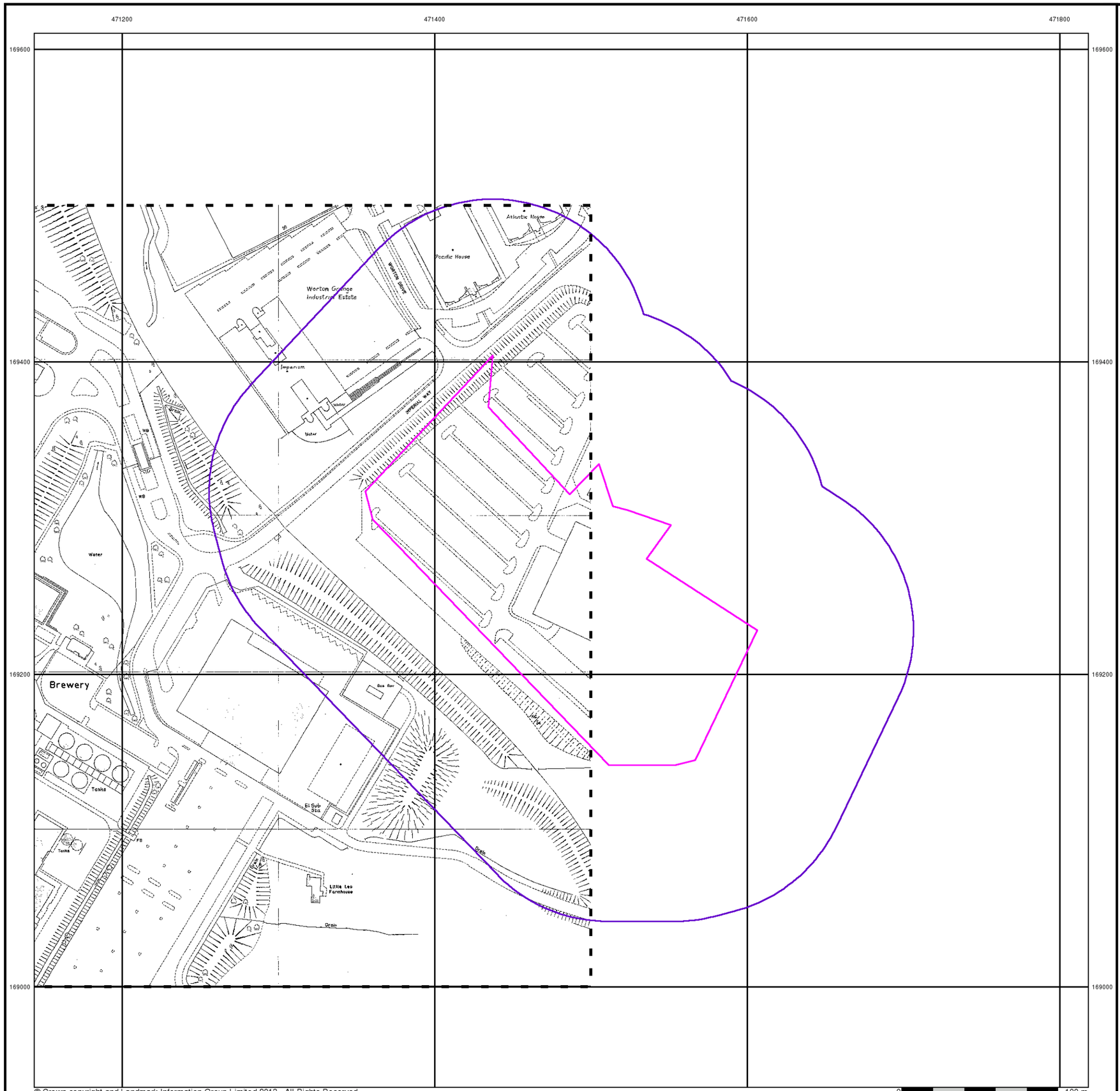
Order Details

Order Number:	57690165_1_1
Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
Search Buffer (m):	100

Site Details

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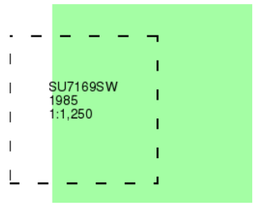
Additional SIMs

Published 1985

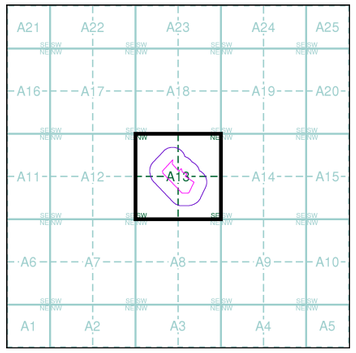
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

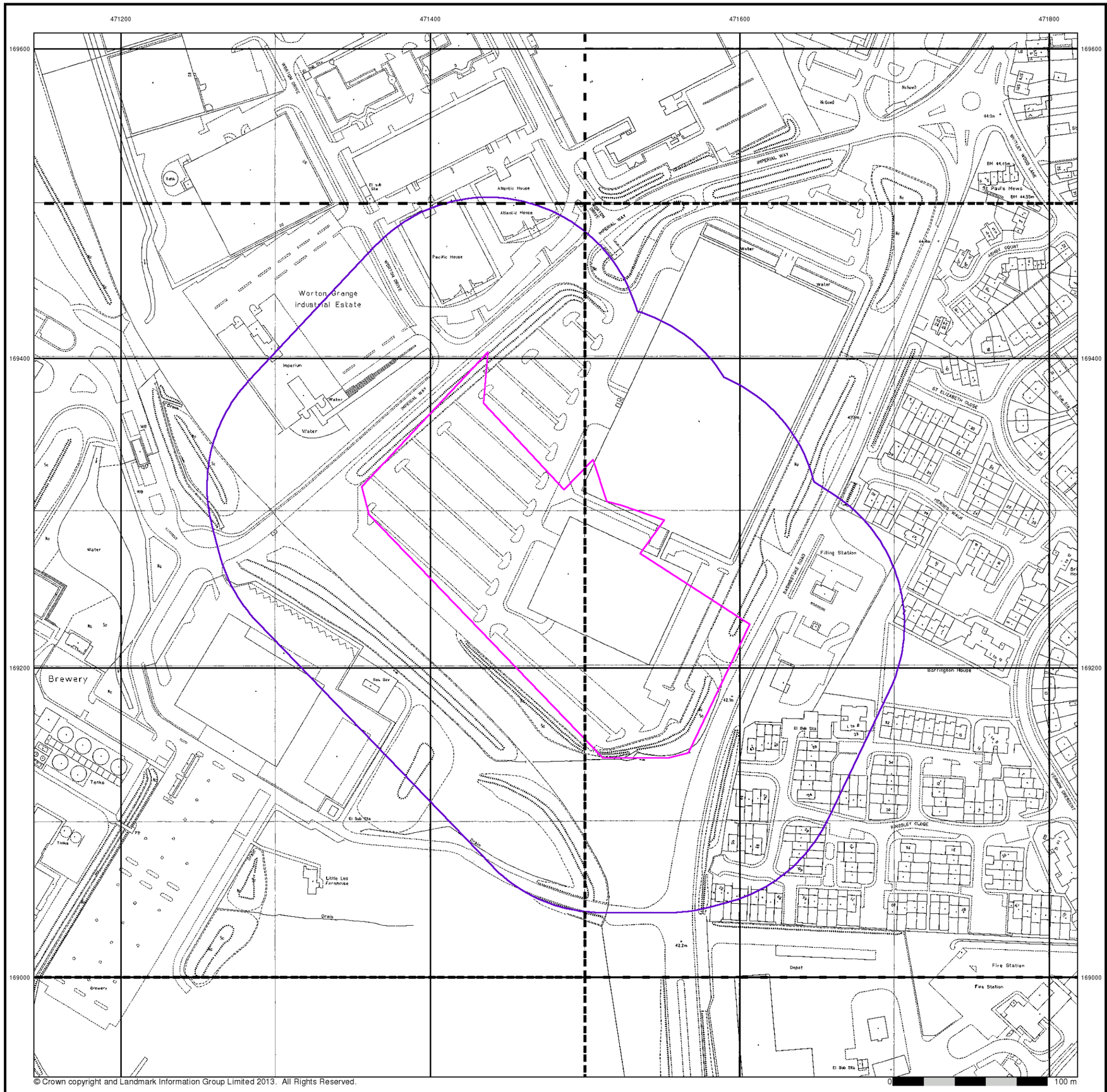
Order Number:	57690165_1_1
Customer Ref:	EED14723-100
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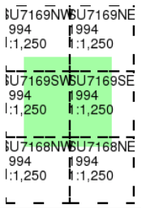
Large-Scale National Grid Data

Published 1994

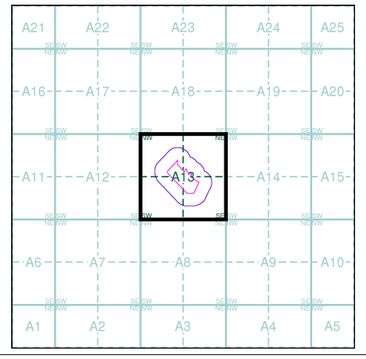
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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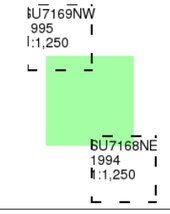
Large-Scale National Grid Data

Published 1994 - 1995

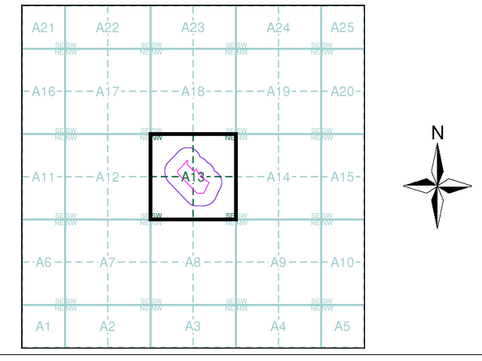
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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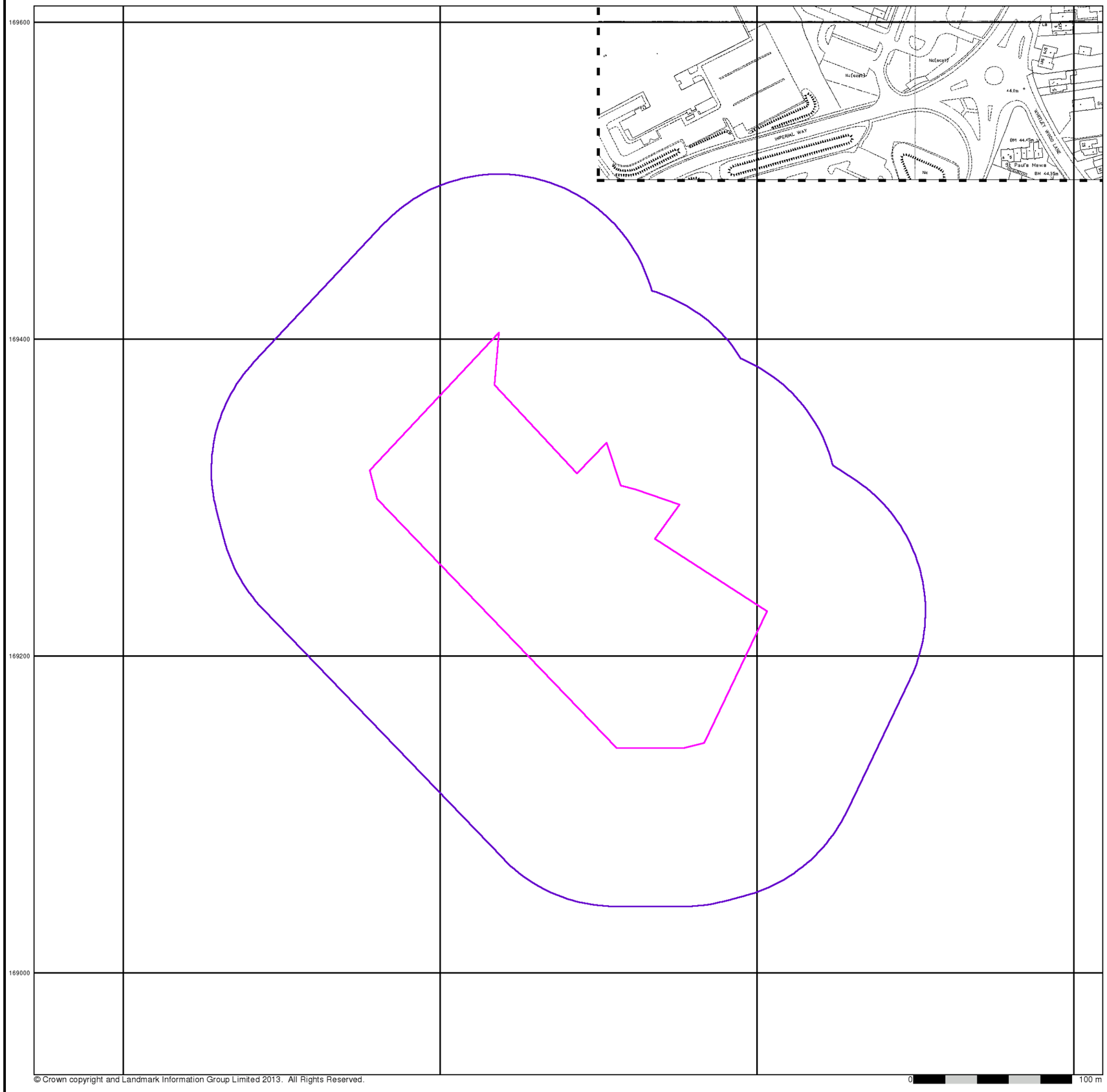
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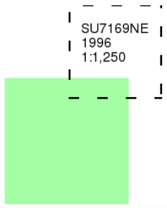
Large-Scale National Grid Data

Published 1996

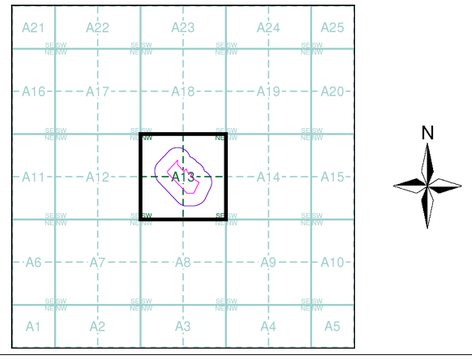
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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Historical Mapping Legends

Ordnance Survey County Series 1:10,560

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

Ordnance Survey Plan 1:10,000

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

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

1:10,000 Raster Mapping

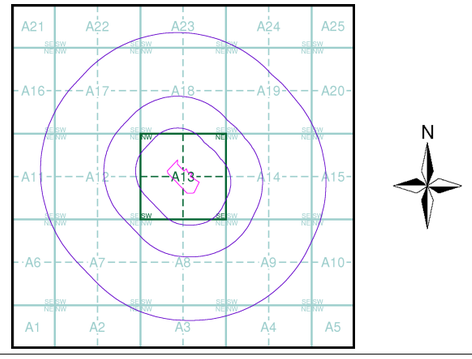
Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Mud
Sand
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or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

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Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Berkshire	1:10,560	1883	3
Berkshire	1:10,560	1900	4
Berkshire	1:10,560	1901	5
Berkshire	1:10,560	1913	6
Berkshire	1:10,560	1938	7
Historical Aerial Photography	1:10,560	1948	8
Ordnance Survey Plan	1:10,000	1961 - 1962	9
Ordnance Survey Plan	1:10,000	1961	10
Ordnance Survey Plan	1:10,000	1971 - 1973	11
Ordnance Survey Plan	1:10,000	1976 - 1979	12
Ordnance Survey Plan	1:10,000	1984	13
Ordnance Survey Plan	1:10,000	1990	14
Reading	1:10,000	1990	15
Ordnance Survey Plan	1:10,000	1995	16
10K Raster Mapping	1:10,000	2006	17
VectorMap Local	1:10,000	2014	18

Historical Map - Slice A



Order Details

Order Number: 57690165_1_1
Customer Ref: EED14723-100
National Grid Reference: 471480, 169270
Slice: A
Site Area (Ha): 2.97
Search Buffer (m): 1000

Site Details

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Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Military and Communication Areas
- Subway Entrance
- Fireproof Building
- Prominent Fireproof Building
- Non-fireproof Building
- Non-fireproof Building (non-dwelling)
- Factory, mill, and flour mill, with chimneys
- Factory, mill, and flour mill, without chimneys
- Power Station, drawn to scale
- Hydroelectric Power Station
- Radio Station, drawn to scale
- Telephone Station, drawn to scale
- Abandoned Open-pit Mine or Quarry
- Open-pit Salt Mine
- Pit
- Oil Deposit or Well
- Oil Seepage
- Tailings Pile
- Fuel Storage Tanks
- Natural Gas Tank
- Bench Mark
- Drill Hole
- Burial Mound
- Triangulation Point on Burial Mound
- Single-track Railroad
- Double-track Railroad and Station Building
- Coniferous Forest
- Deciduous Forest
- Mixed Forest
- Lawns
- Citrus Orchard
- Wet Ground
- Scattered Vegetation

243,8 — Values for prominent elevations

186.0 — Numbers for spot elevations, depth soundings, contour lines, etc.

0,2 — Velocity of the current, width of river bed, depth of river

Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A)	З з (Z)	П п (P)	Ч ч (CH)
Б б (B)	И и (I)	Р р (R)	Ш ш (SH)
В в (V)	Й й (Y)	С с (S)	Щ щ (SHCH)
Г г (G)	К к (K)	Т т (T)	ъ (–)
Д д (D)	Л л (L)	У у (U)	ы (Y)
Е е (E)	М м (M)	Ф ф (F)	ь (')
Ё ё (YO)	Н н (N)	Х х (KH)	Э э (E)
Ж ж (ZH)	О о (O)	Ц ц (TS)	Ю ю (YU or IU)
			Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale

- Government and Administrative Buildings
- Military and Industrial Buildings
- Military and Communication Areas
- Subway Entrance
- Partly Demolished Buildings
- Demolished Buildings
- Built-Up Area with Fireproof Buildings Predominant
- Built-Up Area with Non-Fireproof Buildings Predominant
- Individual Fireproof Building
- Prominent Industrial Building
- Individual Dwelling, Fireproof
- Ruins of an Individual Dwelling
- Factory or Mill Chimney
- Factory or Mill with Chimney
- Factory or Mill without Chimney
- Mine or Open Pit Mine
- Operating Shaft or Mine
- Non-Operating Shaft or Mine
- Salt Mine
- Tailings Pile
- Pit
- Stone Quarry
- Gas Pump or Service Station
- Fuel Storage or Natural Gas Tank
- Oil or Natural Gas Derrick
- Small Hydroelectric Power Station
- Power Station
- Transformer Station
- Cemetery
- Burial Mound (height in metres)
- Triangulation Point on Burial Mound
- Triangulation Point
- Bench Mark
- Bench Mark (monumented)
- Telegraph Office
- Telephone Station
- Radio Station
- Radio Tower
- Airfield or Seaplane Base
- Landing Strip
- Main Highway
- Highway under Construction
- Improved Dirt Road (former truck road)
- Double-track Railroad with First Class Station
- Dismantled Railroad
- Railroad Under Construction
- Shore Embankment
- River or Ditch with Embankment
- Direction and velocity of current
- Well
- Water Reservoir or Rain Water Pit
- Spring
- Isobath with value
- Heavy (Index) Contour Line
- Contour Line and Value
- Half Contour Line
- Spot Elevation Value
- Coniferous
- Deciduous
- Mixed
- Scrub

Key to Numbers on Mapping

SU76NW_Reading

No.	Description
18	Factory (Radio Electronics) And Brewery

SU77SW_Reading

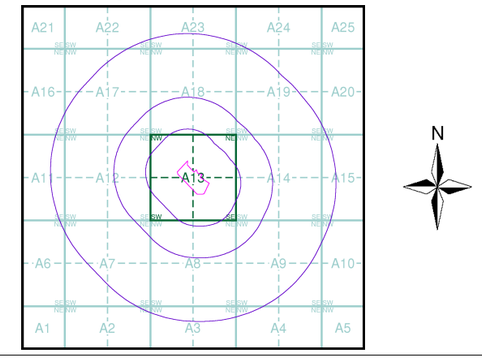
No.	Description
20	Factories (Radio Electronics)

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Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Berkshire	1:10,560	1883	3
Berkshire	1:10,560	1900	4
Berkshire	1:10,560	1901	5
Berkshire	1:10,560	1913	6
Berkshire	1:10,560	1938	7
Historical Aerial Photography	1:10,560	1948	8
Ordnance Survey Plan	1:10,000	1961 - 1962	9
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Ordnance Survey Plan	1:10,000	1971 - 1973	11
Ordnance Survey Plan	1:10,000	1976 - 1979	12
Ordnance Survey Plan	1:10,000	1984	13
Ordnance Survey Plan	1:10,000	1990	14
Reading	1:10,000	1990	15
Ordnance Survey Plan	1:10,000	1995	16
10K Raster Mapping	1:10,000	2006	17
VectorMap Local	1:10,000	2014	18

Russian Map - Slice A



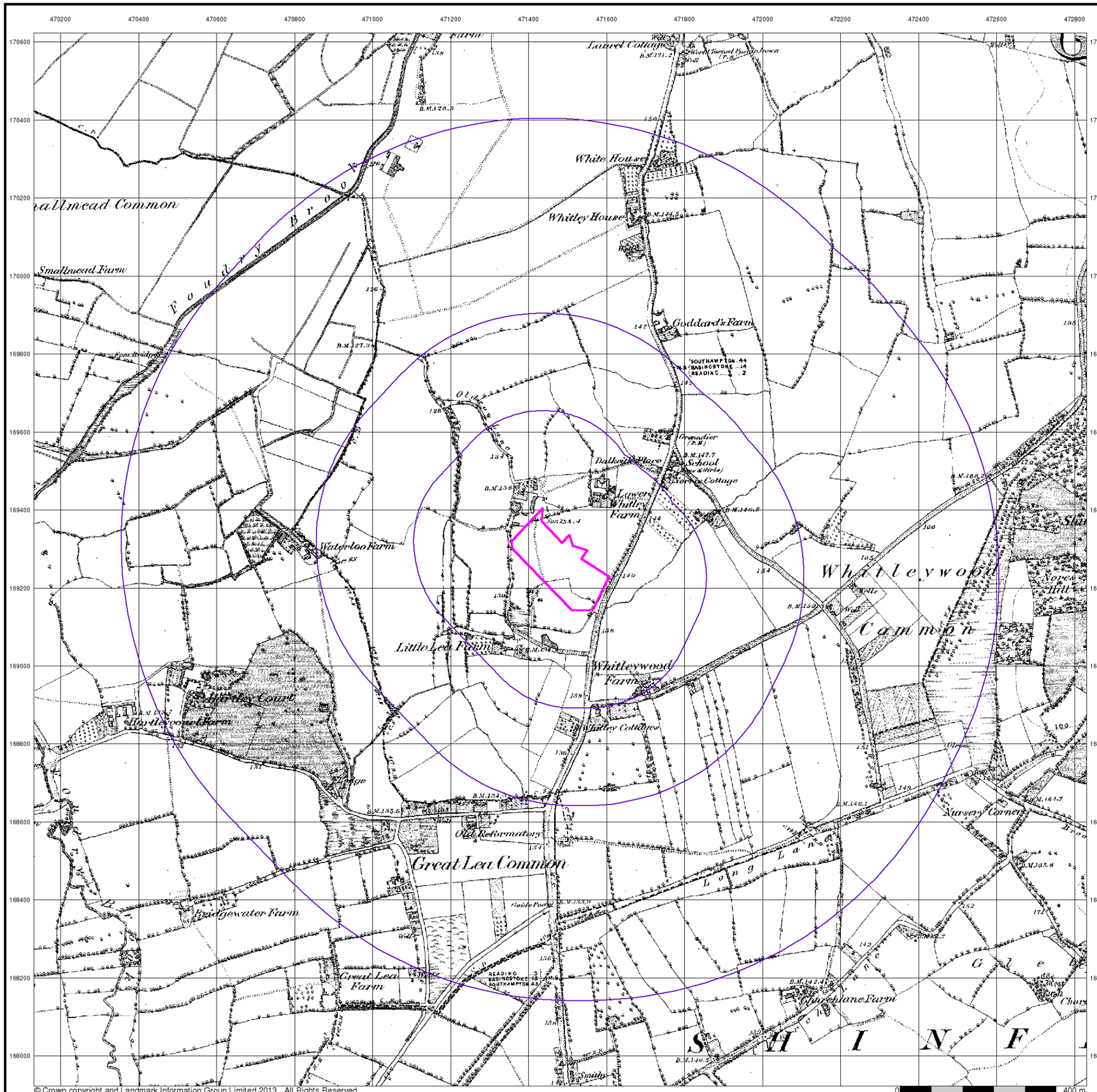
Order Details

Order Number: 57690165_1_1
Customer Ref: EED14723-100
National Grid Reference: 471480, 169270
Slice: A
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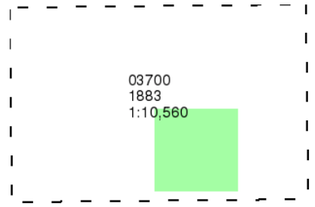
Berkshire

Published 1883

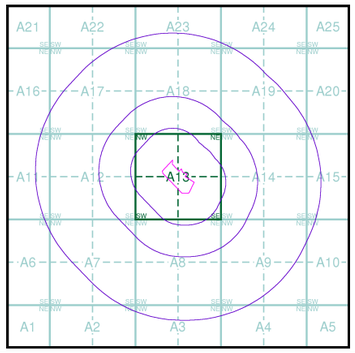
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A



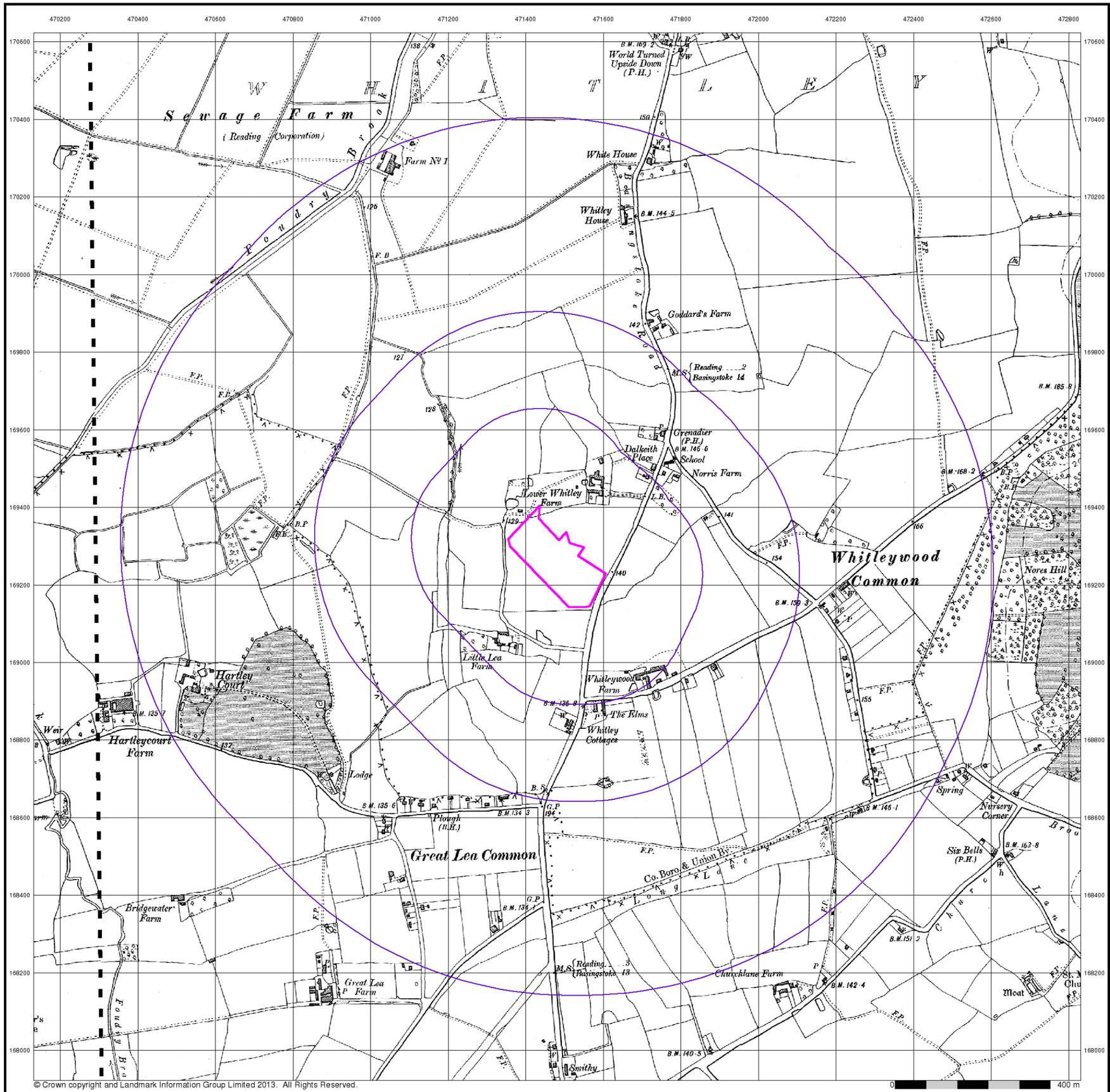
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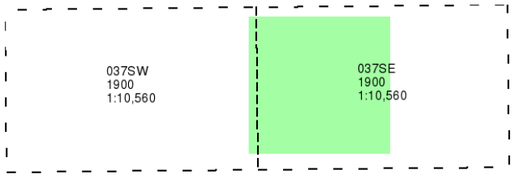
Berkshire

Published 1900

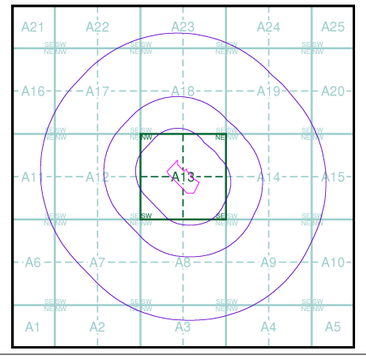
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A



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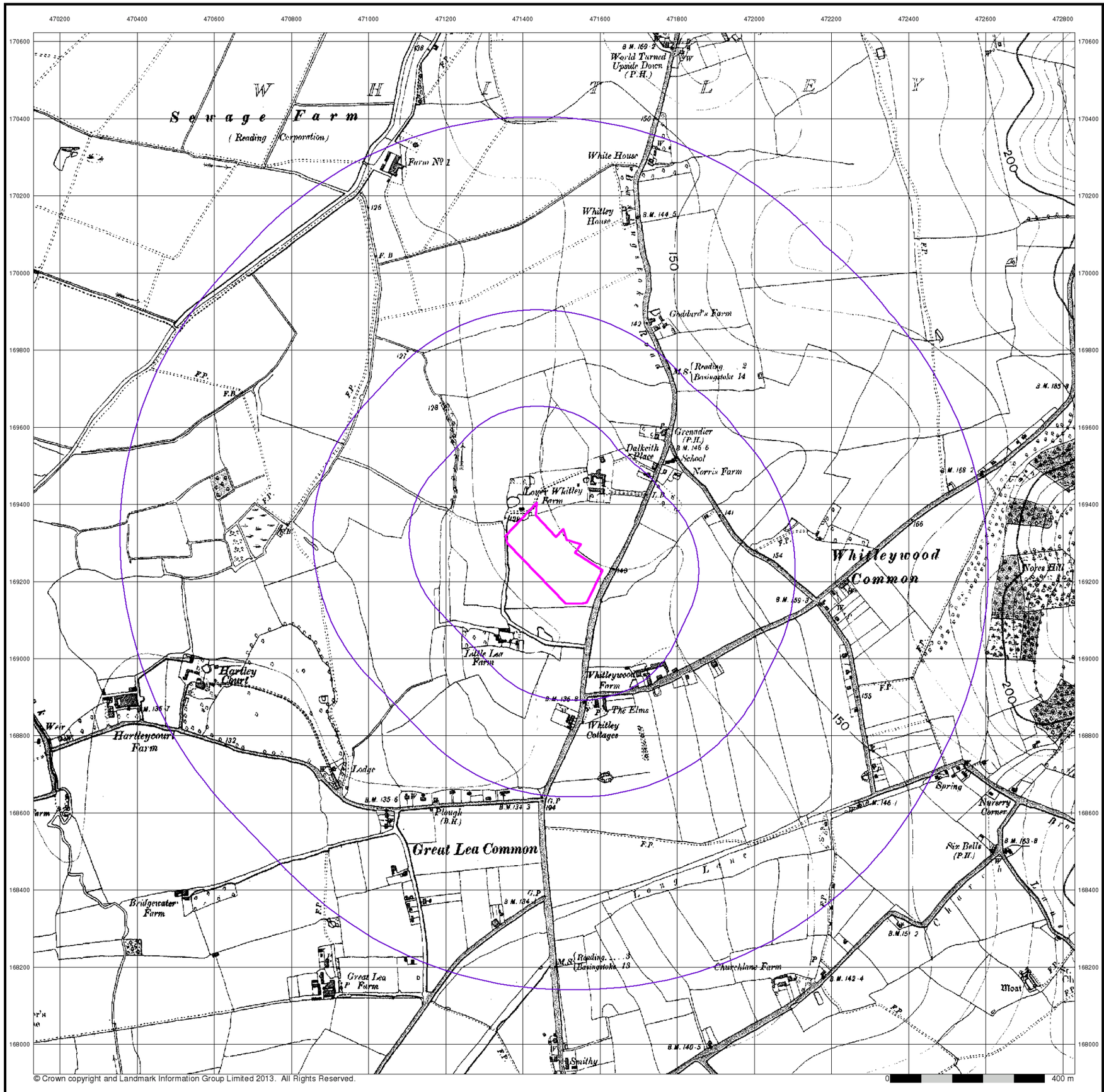
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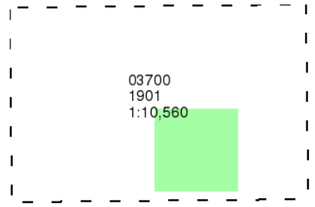
Berkshire

Published 1901

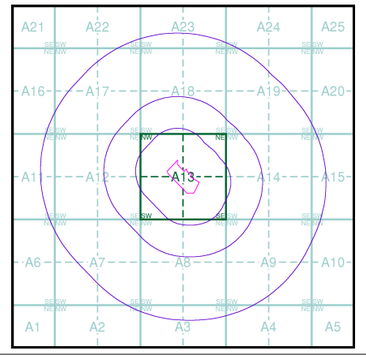
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A



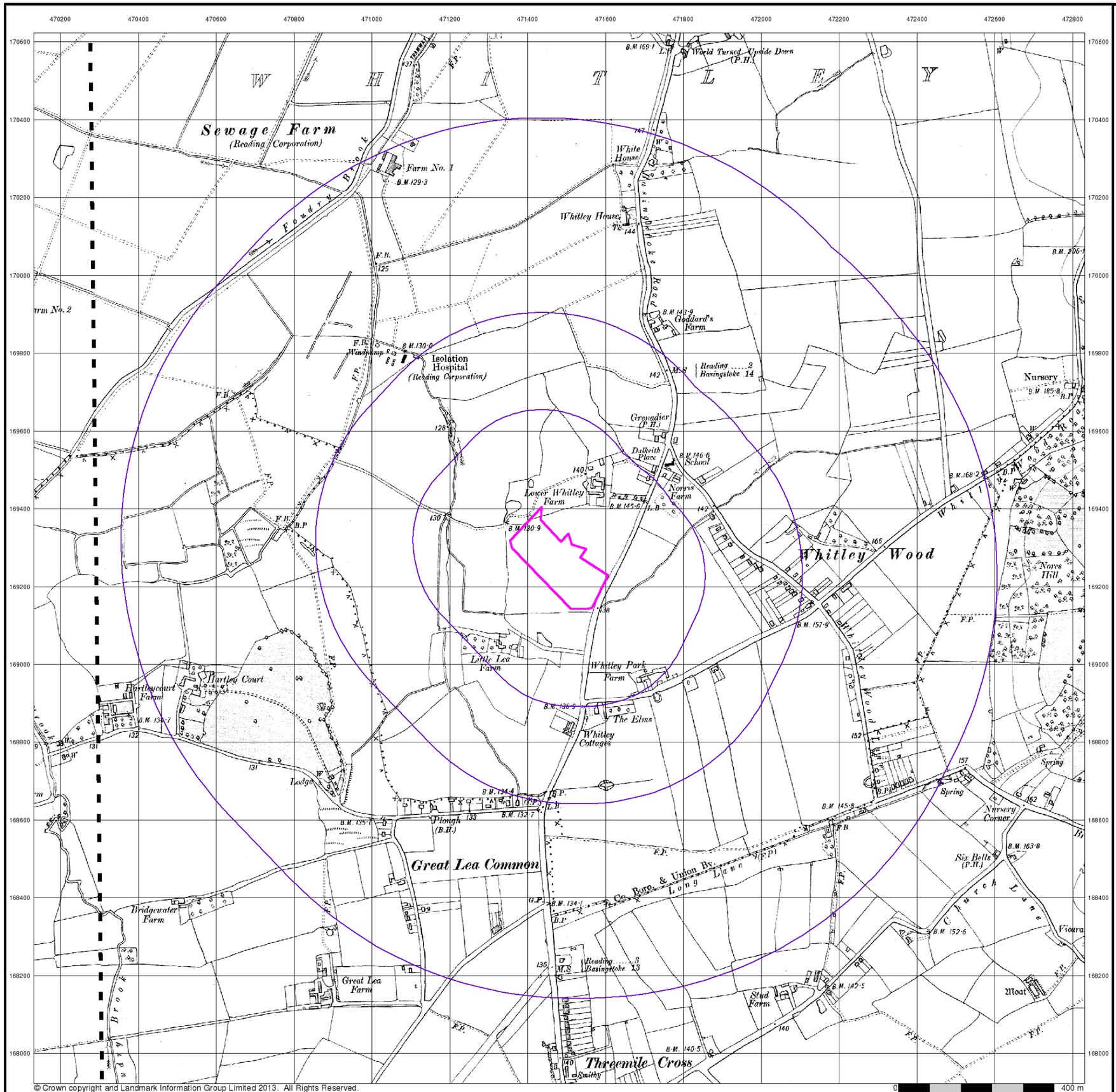
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Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
Search Buffer (m):	1000

Site Details

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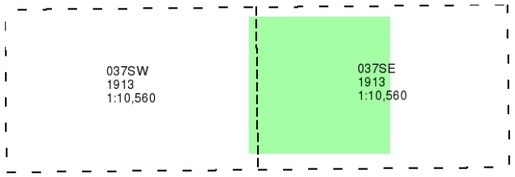
Berkshire

Published 1913

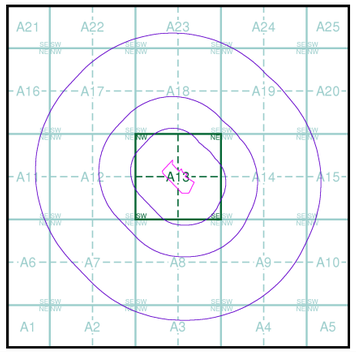
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A



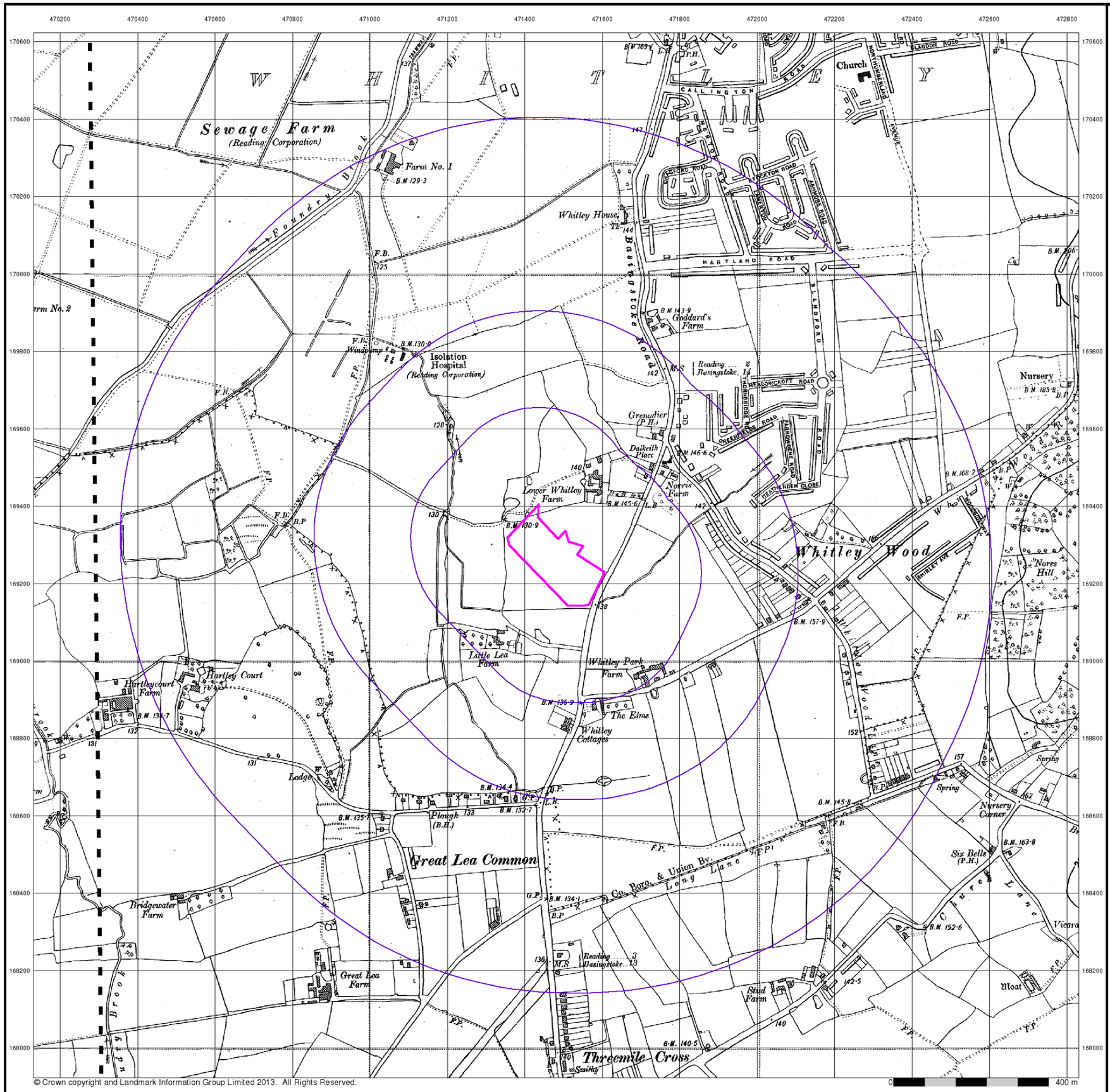
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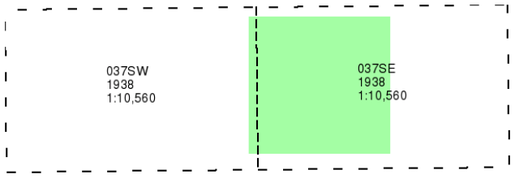
Berkshire

Published 1938

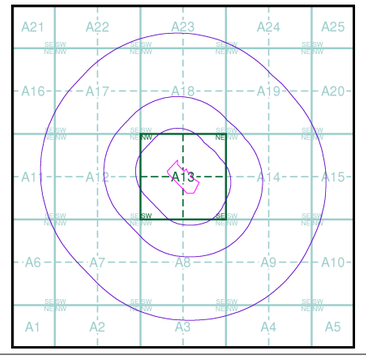
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A



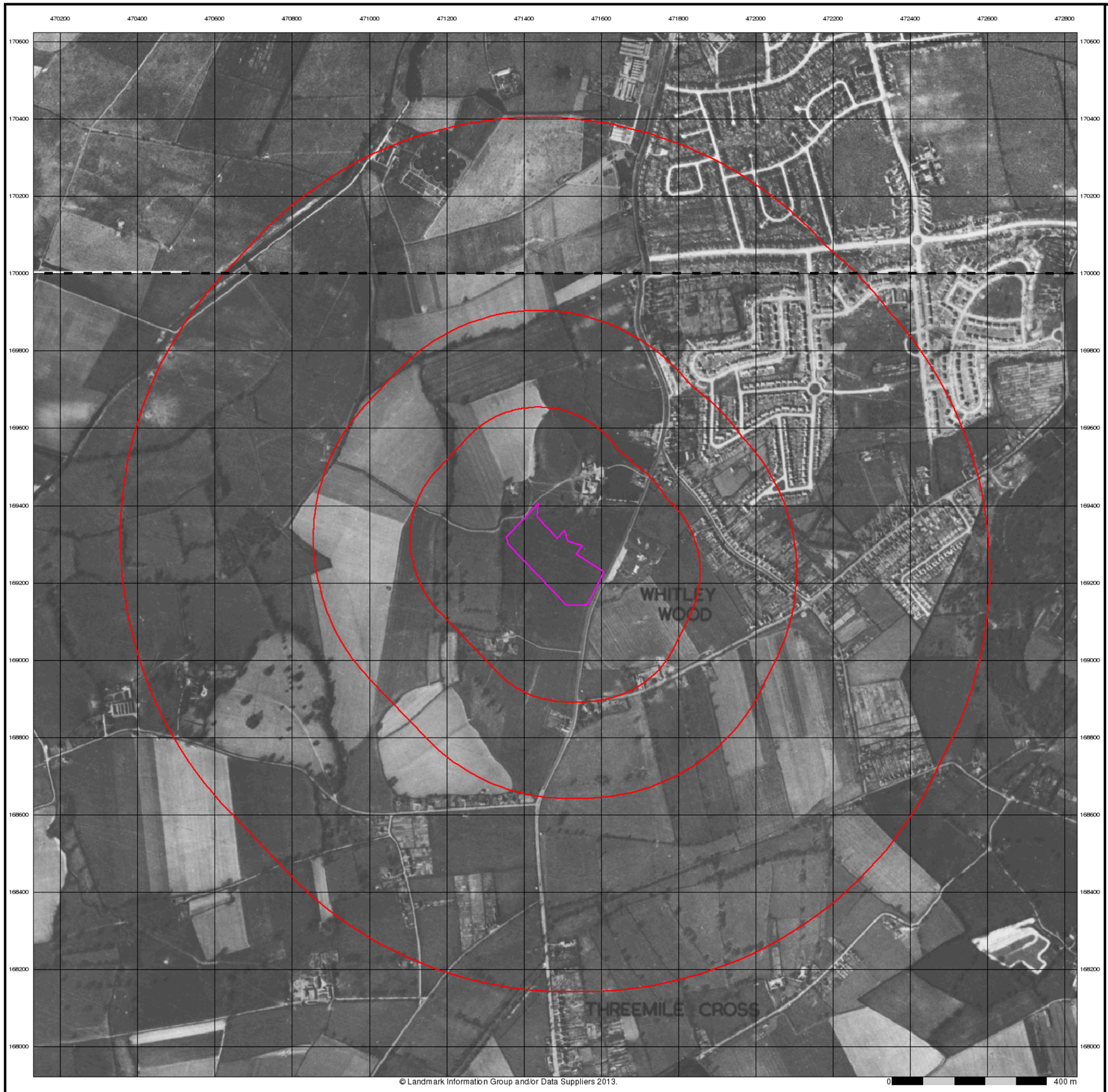
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Site Area (Ha):	2.97
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Historical Aerial Photography

Published 1948

Source map scale - 1:10,560

The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

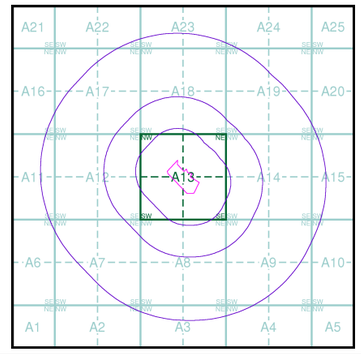
© Landmark Information Group and/or Data Suppliers 2010.

Map Name(s) and Date(s)

SU77SW
1948
1:10,560

SU76NW
1948
1:10,560

Historical Aerial Photography - Slice A



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Order Details

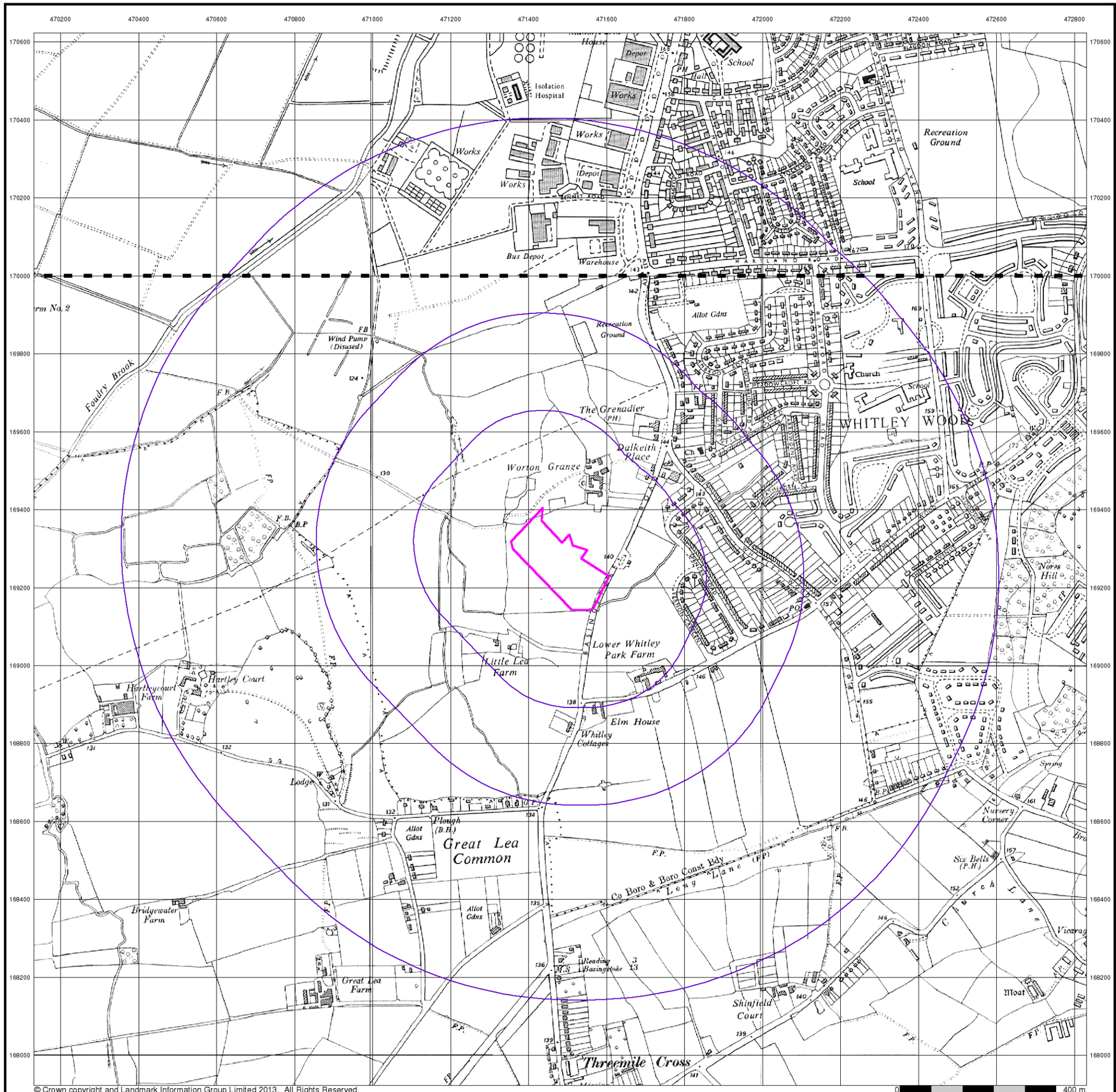
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Ordnance Survey Plan

Published 1961 - 1962

Source map scale - 1:10,000

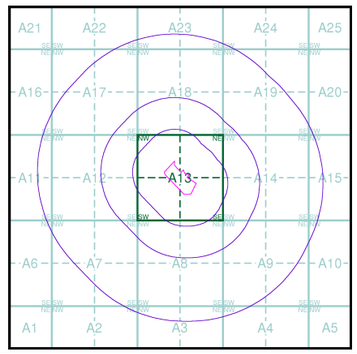
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some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

Map Name(s) and Date(s)

SU77SW
1962
1:10,560

SU76NW
1961
1:10,560

Historical Map - Slice A



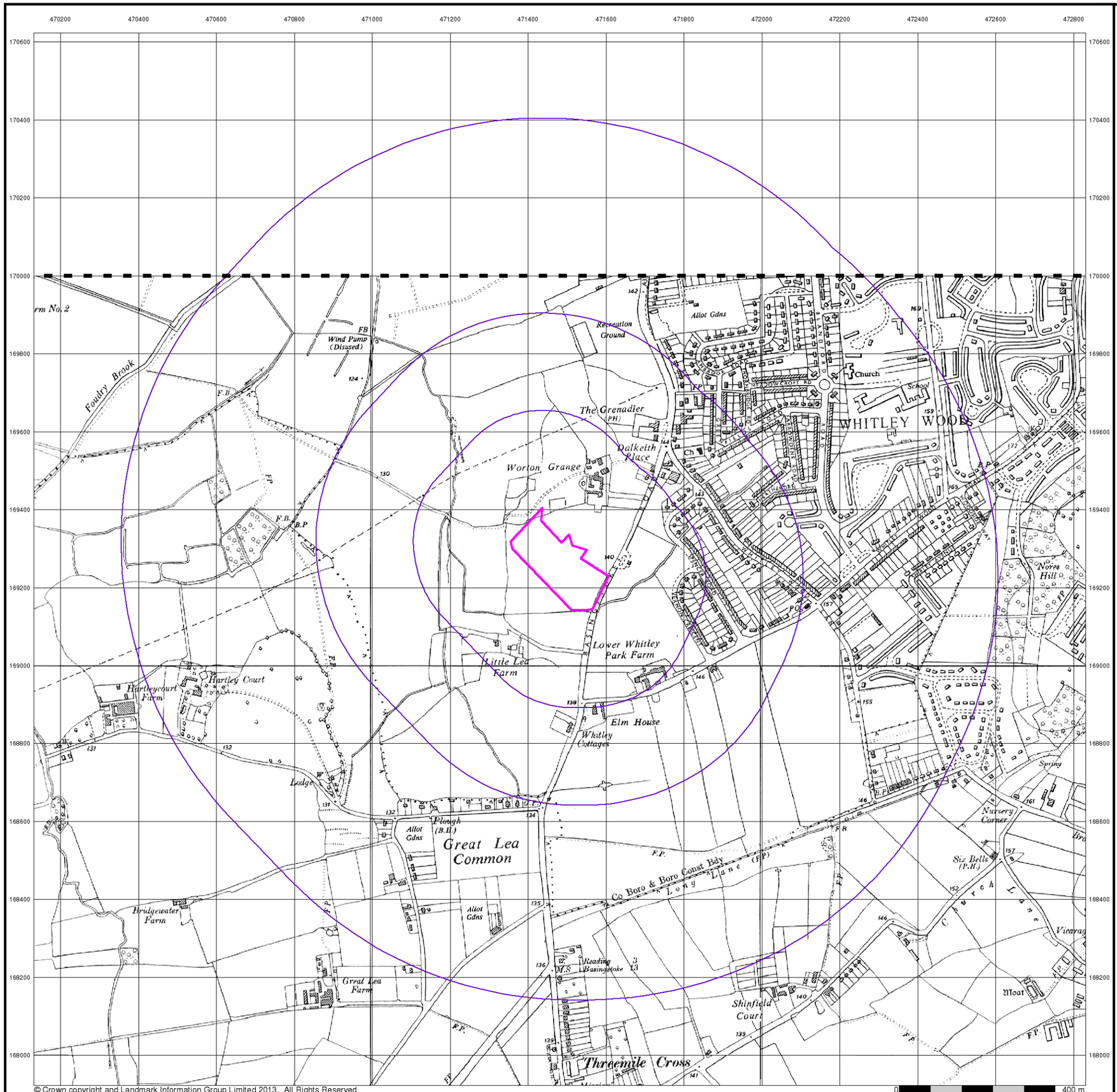
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Site Area (Ha):	2.97
Search Buffer (m):	1000

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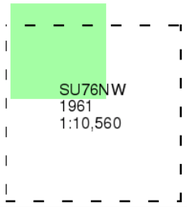
Ordnance Survey Plan

Published 1961

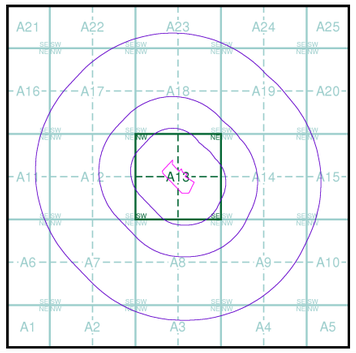
Source map scale - 1:10,000

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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

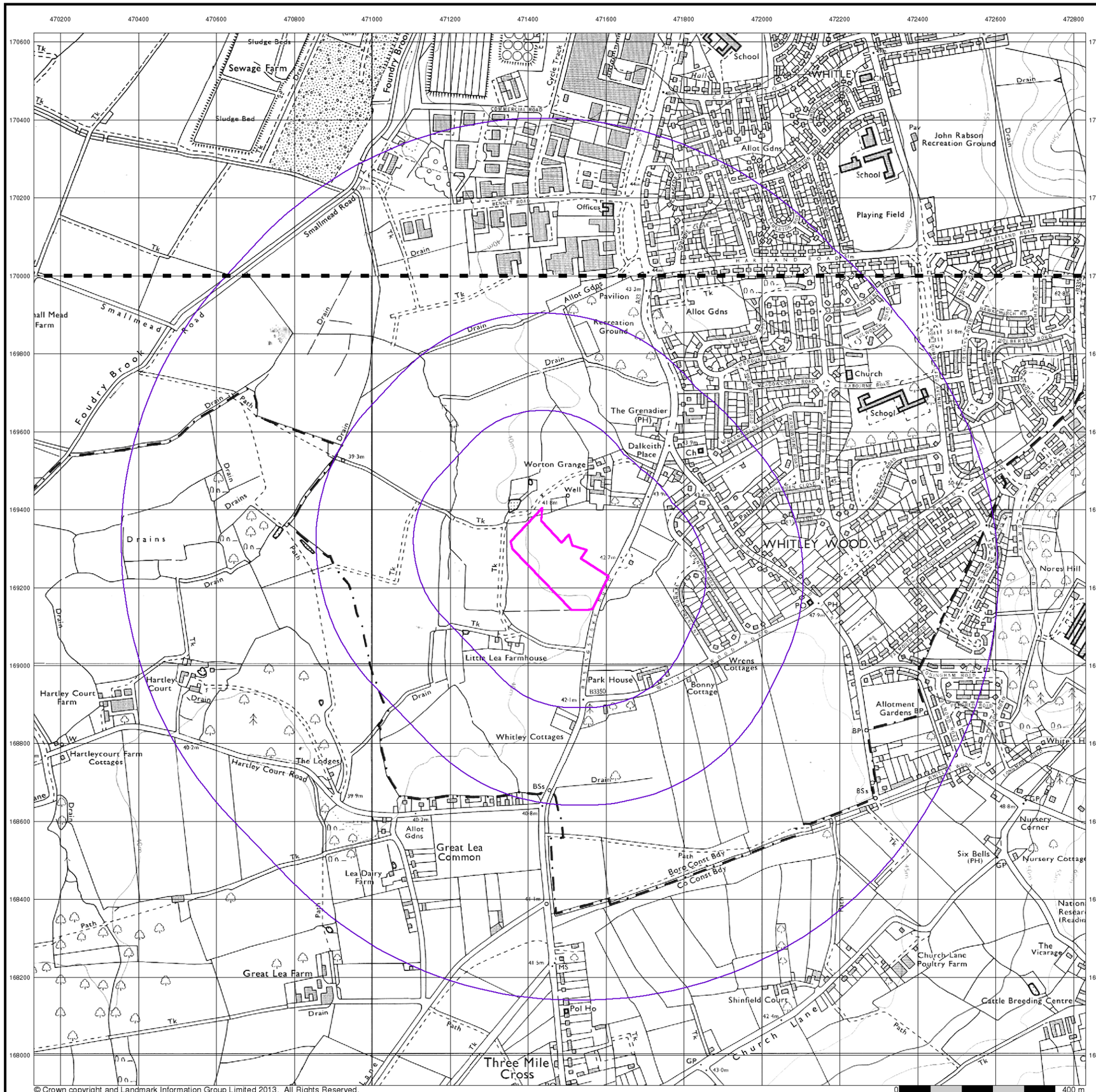
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Ordnance Survey Plan

Published 1971 - 1973

Source map scale - 1:10,000

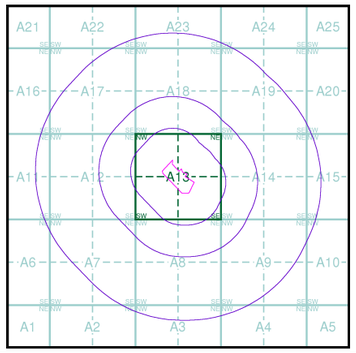
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Map Name(s) and Date(s)

SU77SW
1973
1:10,000

SU76NW
1971
1:10,000

Historical Map - Slice A



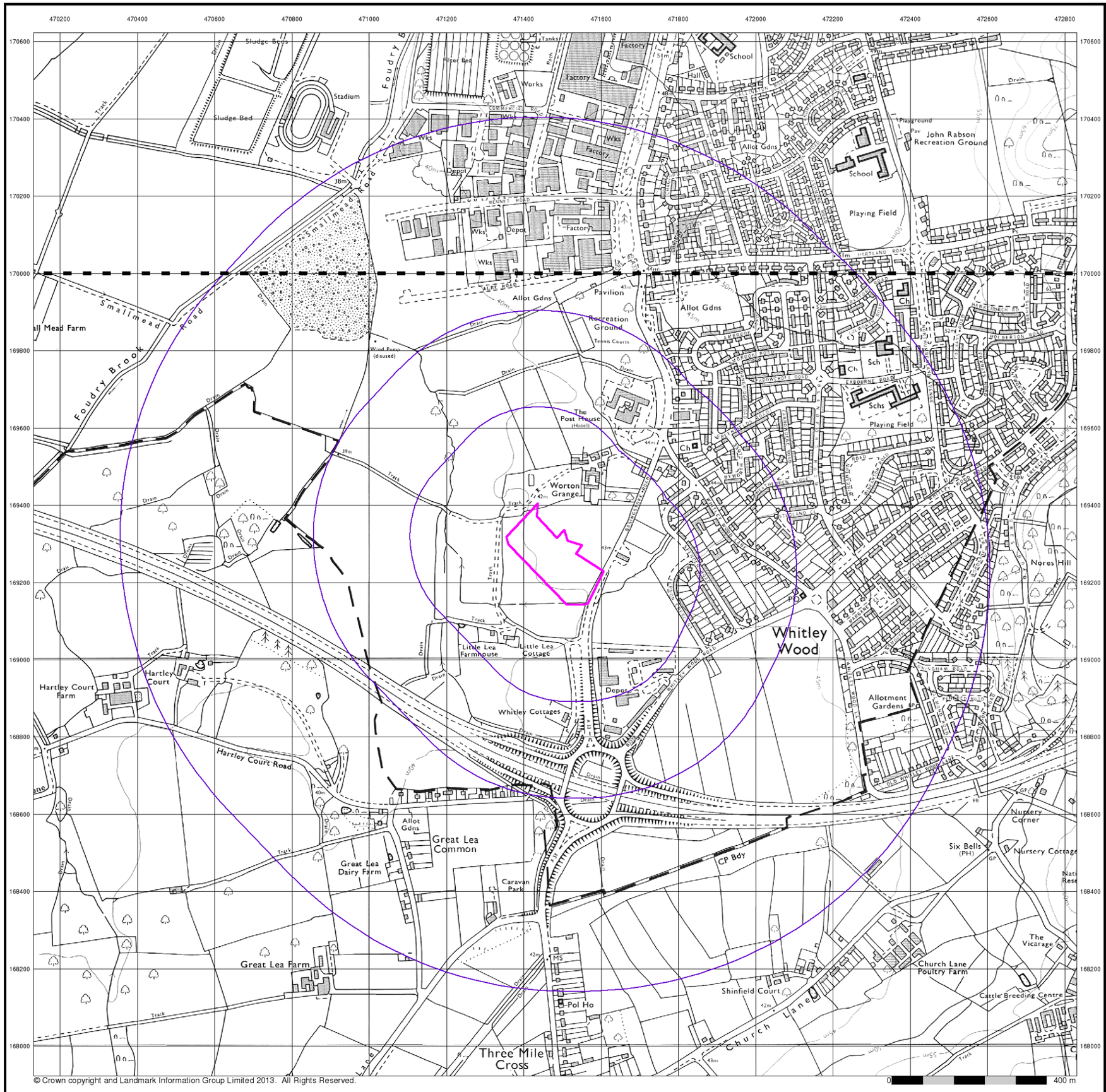
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National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
Search Buffer (m):	1000

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Ordnance Survey Plan

Published 1976 - 1979

Source map scale - 1:10,000

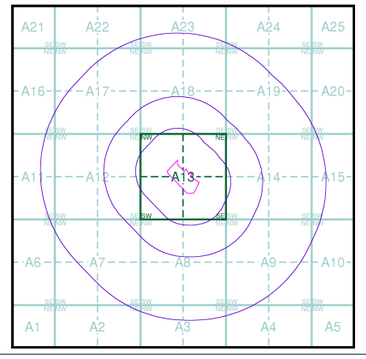
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some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

Map Name(s) and Date(s)

SU77SW
1979
1:10,000

SU76NW
1976
1:10,000

Historical Map - Slice A



Order Details

Order Number:	57690165_1_1
Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
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Site Area (Ha):	2.97
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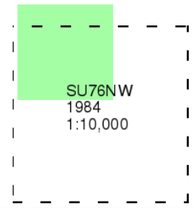
Ordnance Survey Plan

Published 1984

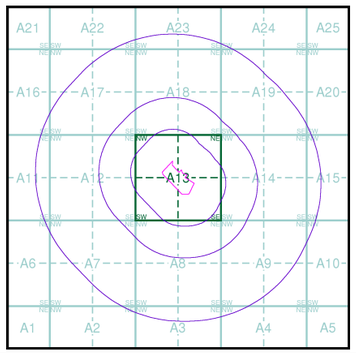
Source map scale - 1:10,000

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Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

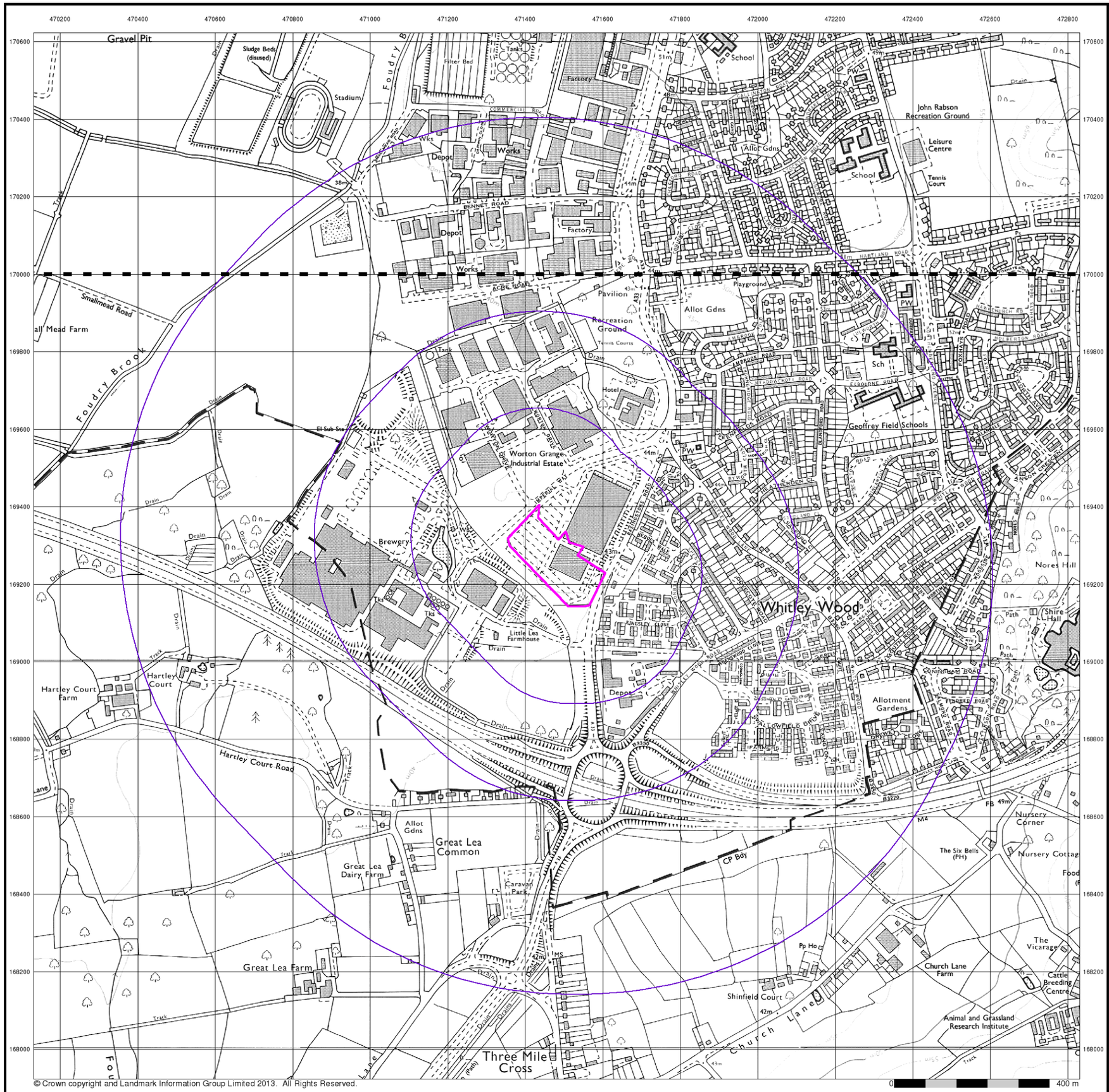
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Ordnance Survey Plan

Published 1990

Source map scale - 1:10,000

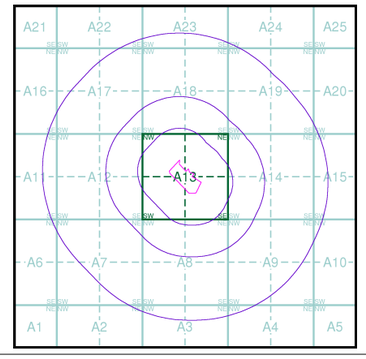
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Map Name(s) and Date(s)

SU77SW
1990
1:10,000

SU76NW
1990
1:10,000

Historical Map - Slice A



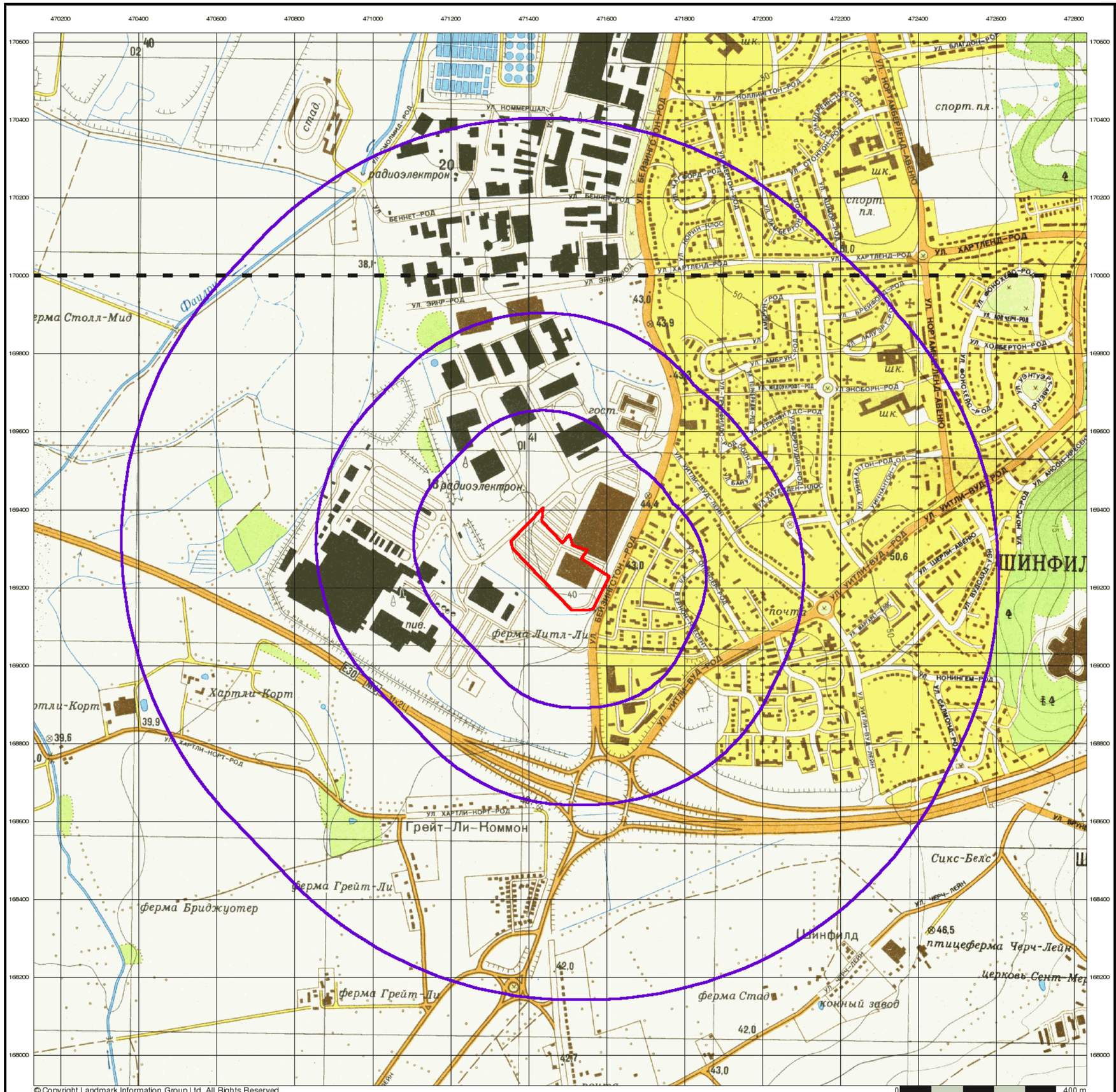
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Reading

Published 1990

Source map scale - 1:10,000

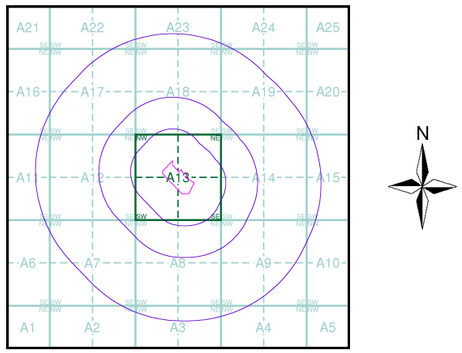
These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use.
They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

Map Name(s) and Date(s)

SU77SW
1990
1:10,000

SU76NW
1990
1:10,000

Russian Map - Slice A

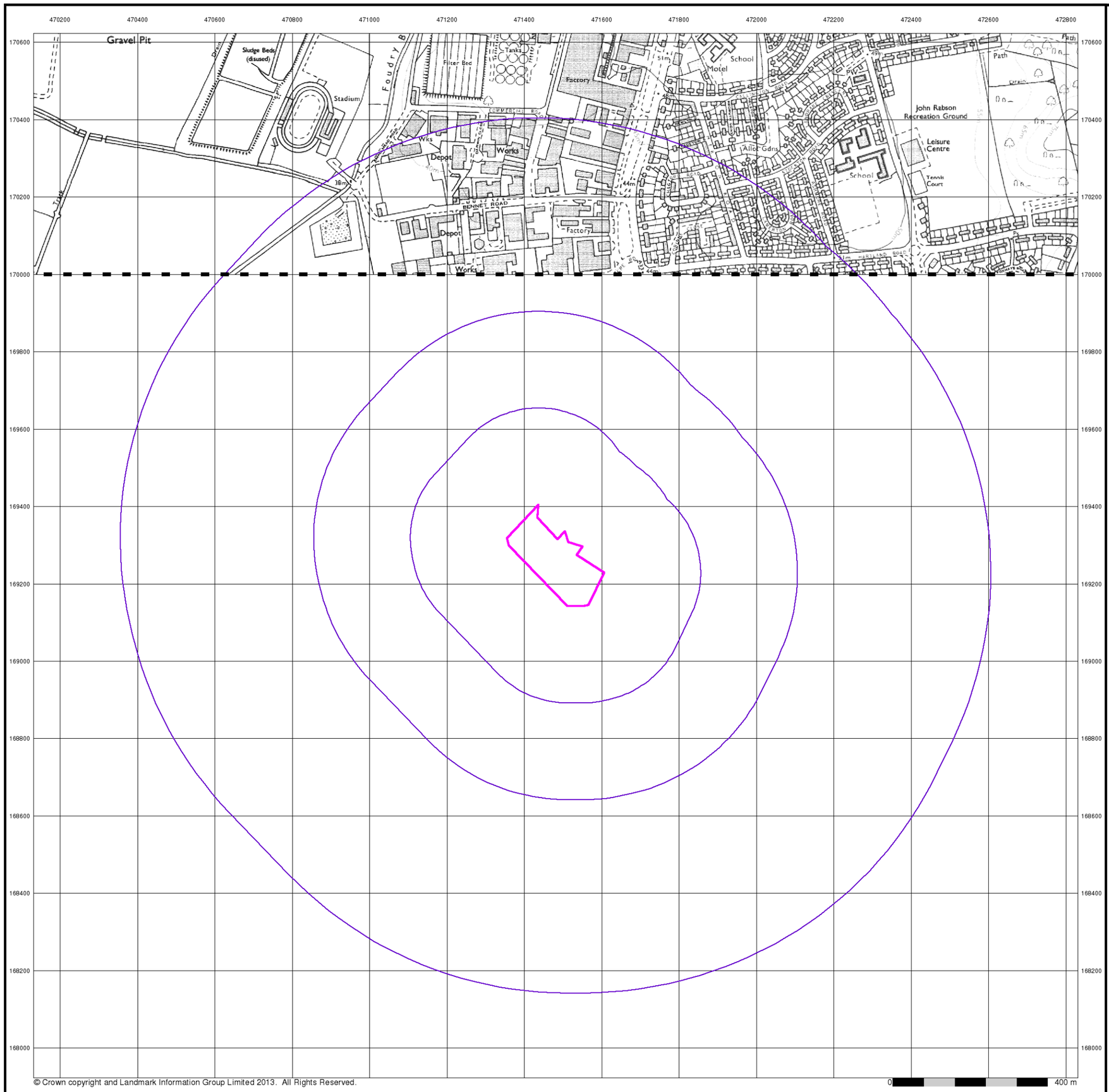


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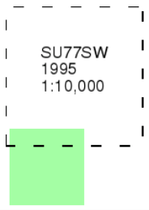
Ordnance Survey Plan

Published 1995

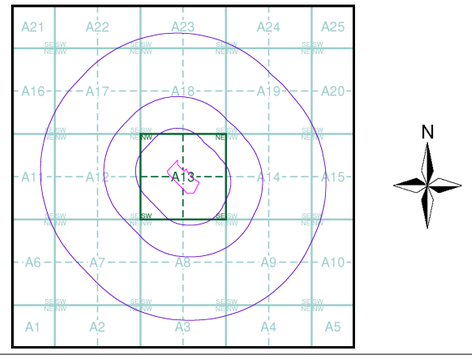
Source map scale - 1:10,000

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

Map Name(s) and Date(s)



Historical Map - Slice A



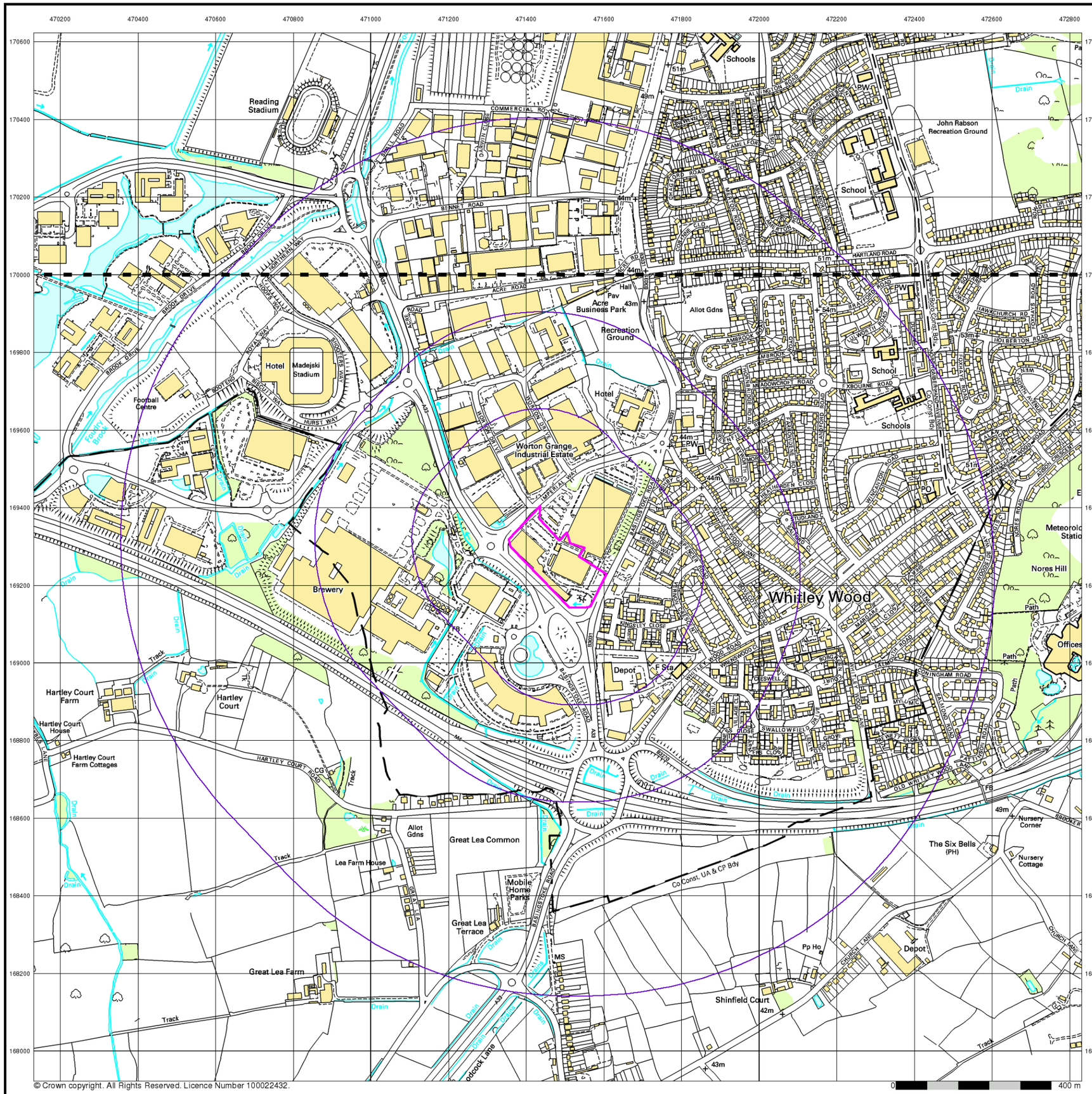
Order Details

Order Number:	57690165_1_1
Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
Search Buffer (m):	1000

Site Details

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Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
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Waterman

10k Raster Mapping

Published 2006

Source map scale - 1:10,000

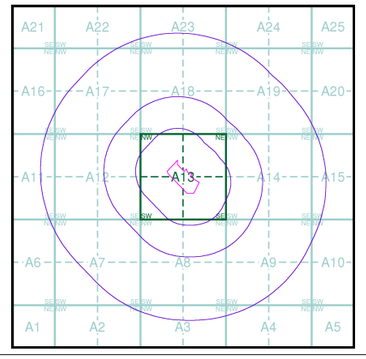
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SU77SW 2006 1:10,000

SU76NW 2006 1:10,000

Historical Map - Slice A



Order Details

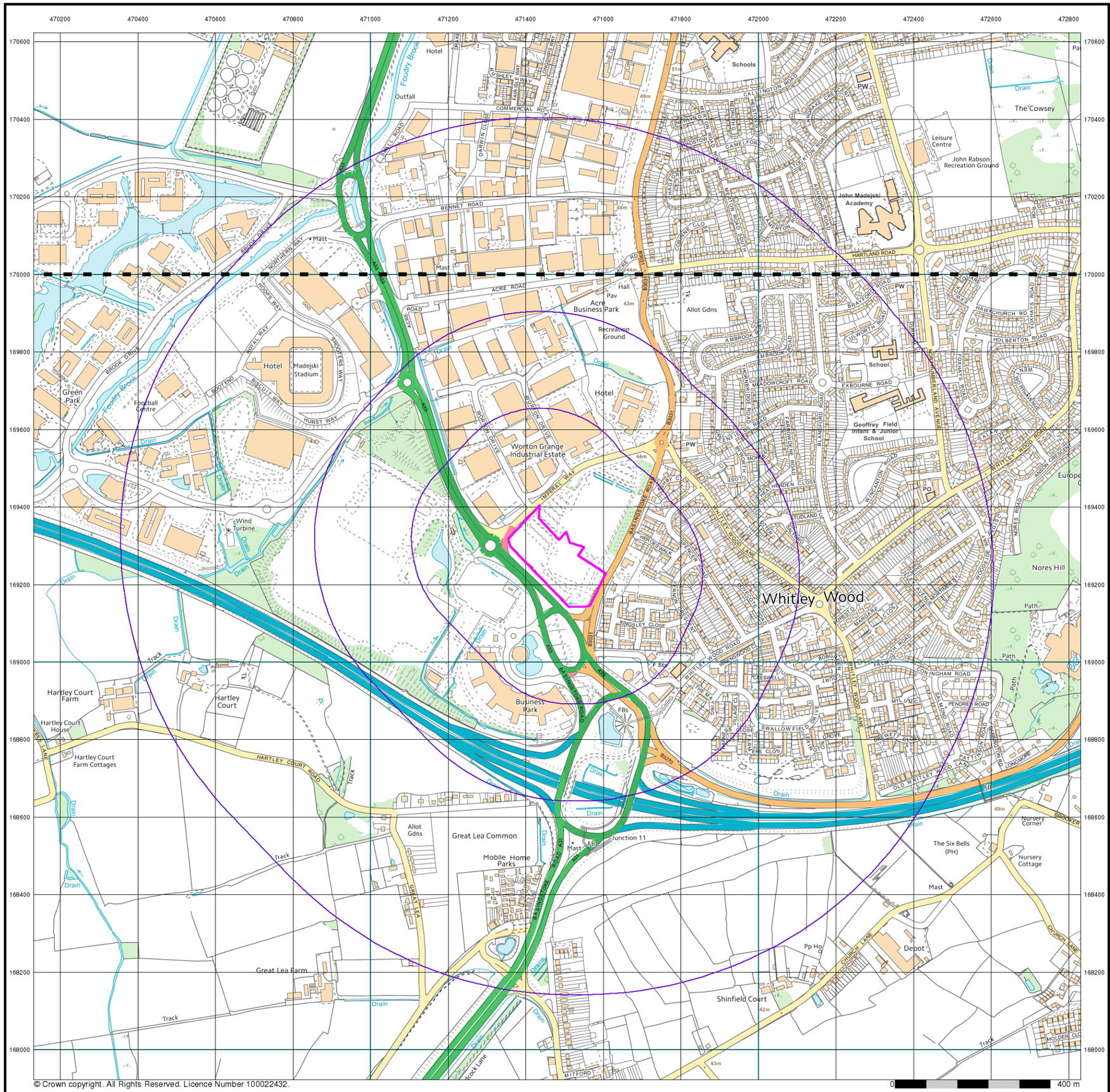
Order Number:	57690165_1_1
Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
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VectorMap Local

Published 2014

Source map scale - 1:10,000

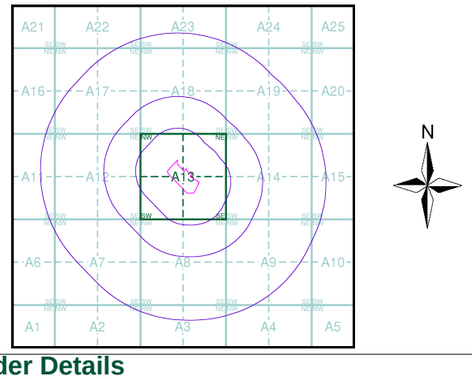
VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

SU77SW
2014
Variable

SU76NW
2014
Variable

Historical Map - Slice A



Order Details

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Geology 1:10,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	MGR	Made Ground (Undivided)	Artificial Deposit	Holocene - Holocene
	LSGR	Landscaped Ground (Undivided)	Unknown/Unclassified Entry	Holocene - Holocene
	WMGR	Infilled Ground	Artificial Deposit	Holocene - Holocene
	WGR	Worked Ground (Undivided)	Void	Holocene - Holocene

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Silt	Flandrian - Pleistocene
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Flandrian - Pleistocene
	BGGR	Beenham Grange Gravel Member	Sand and Gravel	Devensian - Ipswichian
	RTD2	River Terrace Deposits, 2	Sand and Gravel	Quaternary - Ryazanian
	RTD1	River Terrace Deposits, 1	Sand and Gravel	Quaternary - Ryazanian
	RTD6	River Terrace Deposits, 6	Sand and Gravel	Quaternary - Ryazanian
	RTD4	River Terrace Deposits, 4	Sand and Gravel	Quaternary - Ryazanian

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	LC	London Clay Formation	Clay, Silt and Sand	Eocene - Eocene
	LMBE	Lambeth Group	Clay, Silt and Sand	Paleocene - Paleocene

Waterman

Geology 1:10,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:10,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around a site. This mapping may be more up to date than previously published paper maps.

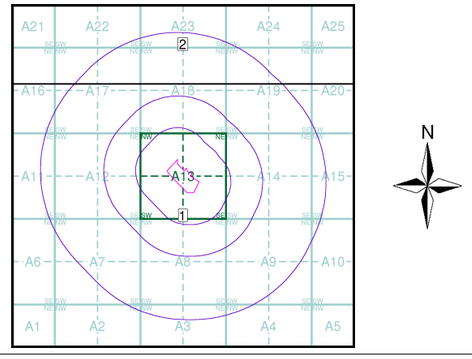
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page.

Please Note: Not all of the layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:10,000 Maps Coverage

Map ID:	2	**Map ID:**	1
Map Name:	SU77SW	**Map Name:**	SU76NW
Map Date:	2011	**Map Date:**	2011
Bedrock Geology:	Available	**Bedrock Geology:**	Available
Superficial Geology:	Available	**Superficial Geology:**	Available
Artificial Geology:	Available	**Artificial Geology:**	Available
Faults:	Not Supplied	**Faults:**	Not Supplied
Landslip:	Not Available	**Landslip:**	Not Available
Rock Segments:	Not Supplied	**Rock Segments:**	Not Supplied

Geology 1:10,000 Maps - Slice A



Order Details

Order Number:	57690165_1_1
Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
Search Buffer (m):	1000

Site Details

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Artificial Ground and Landslip

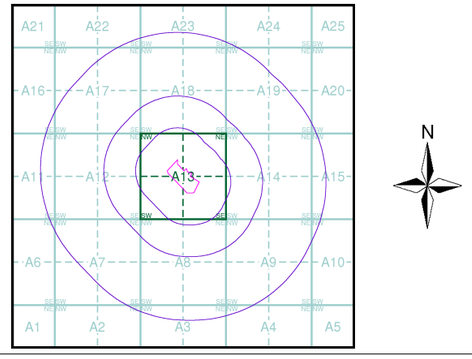
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



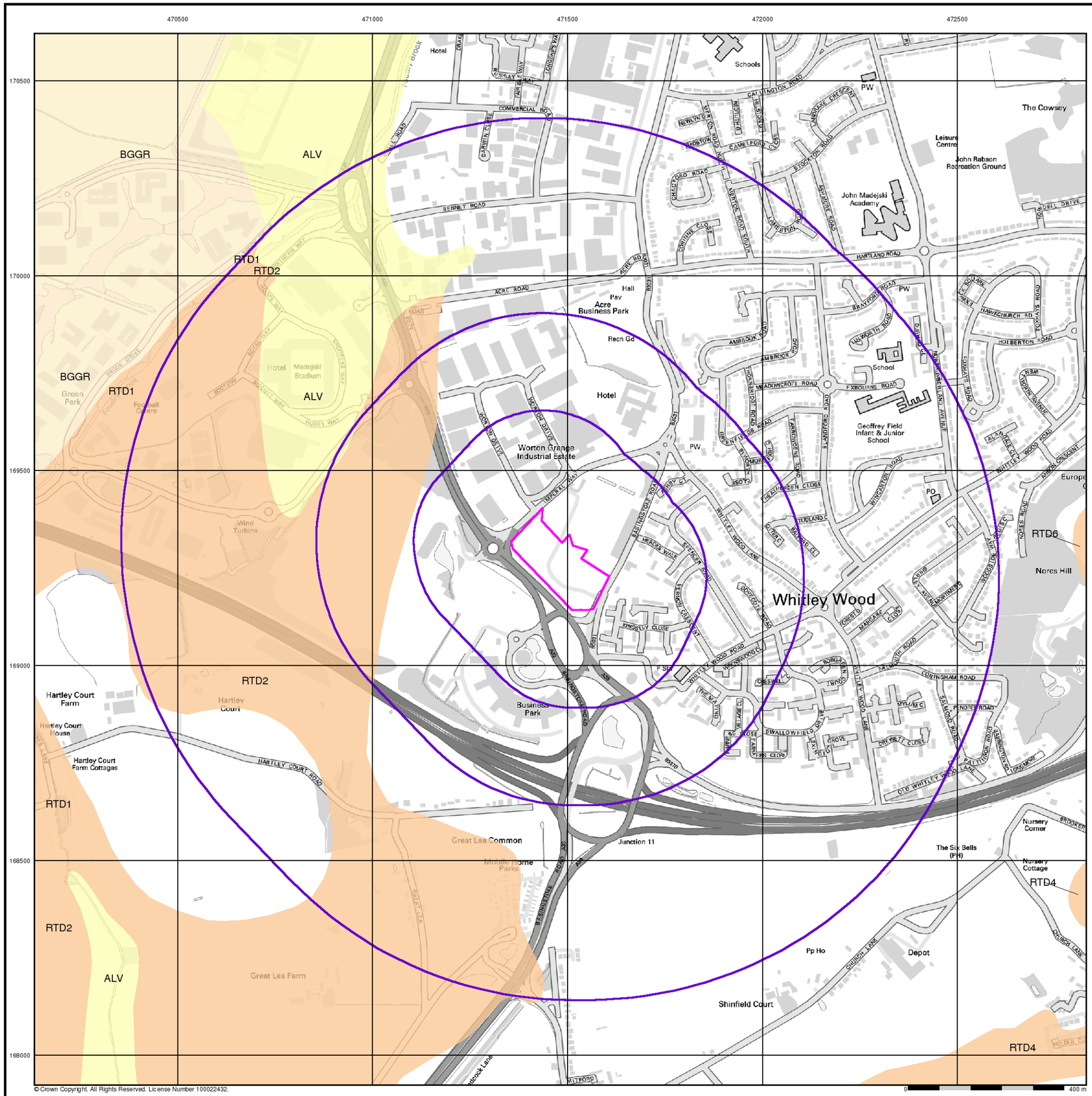
Order Details

Order Number:	57690165_1_1
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National Grid Reference:	471480, 169270
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Site Area (Ha):	2.97
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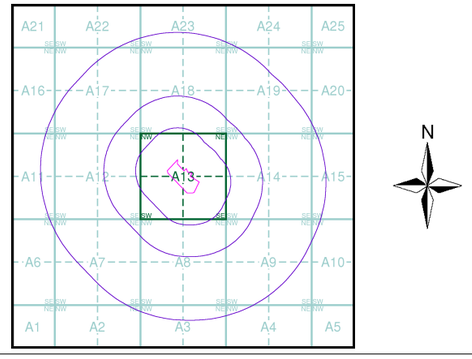
Superficial Geology

BGS 1:10,000 Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



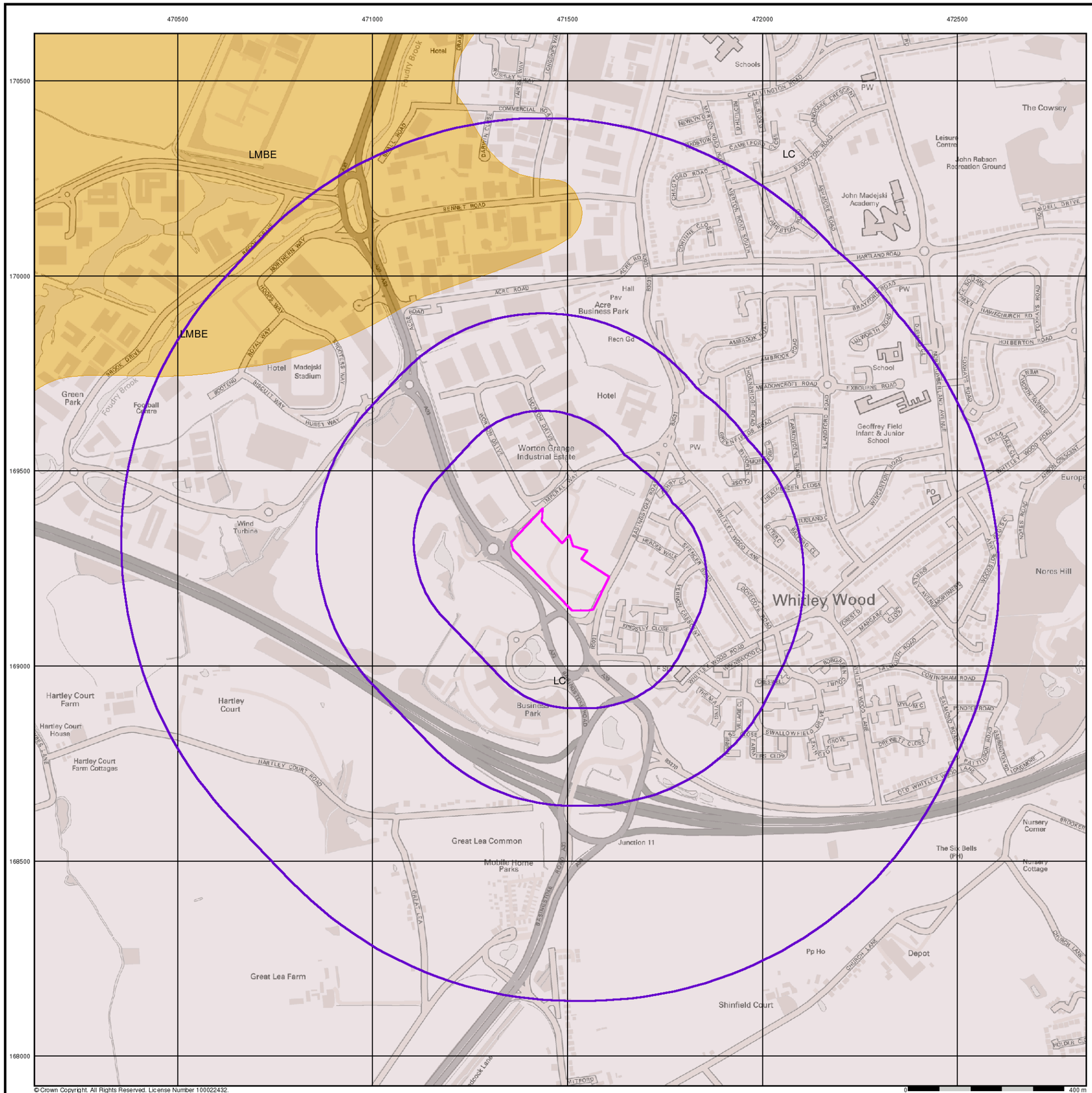
Order Details

Order Number:	57690165_1_1
Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
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Bedrock and Faults

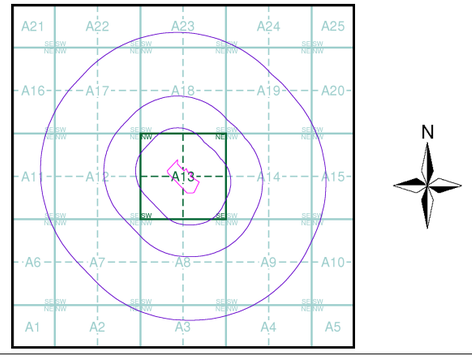
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults and thin beds mapped as lines such as coal seams and mineral veins. These are not restricted by age and could relate to features of any of the 1:10,000 geology datasets.

Bedrock and Faults Map - Slice A

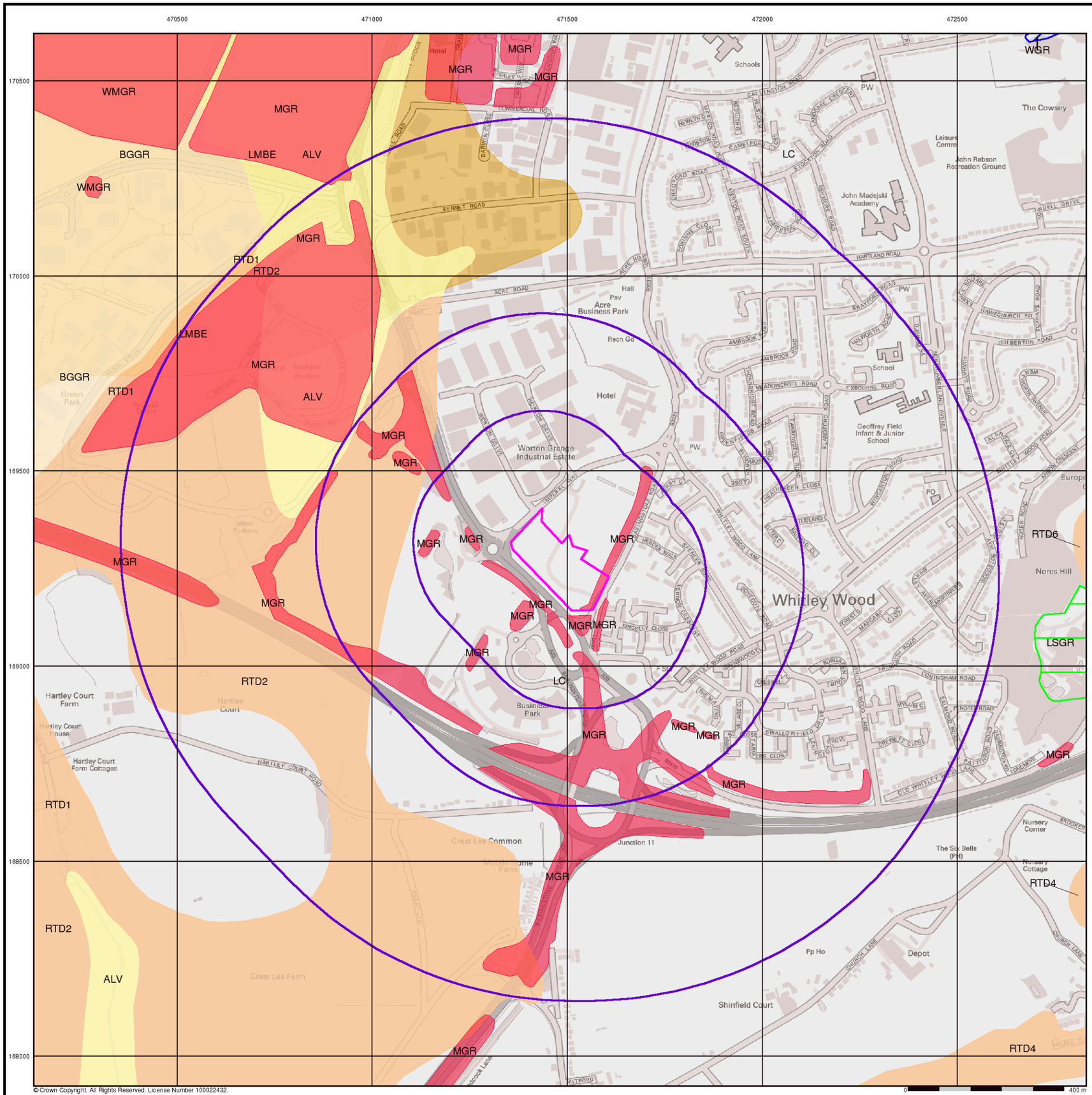


Order Details

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Slice:	A
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Site Details

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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

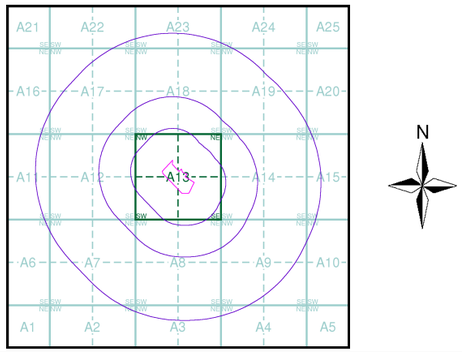
Additional Information

More information on 1:10,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details

Order Number:	57690165_1_1
Customer Ref:	EED14723-100
National Grid Reference:	471480, 169270
Slice:	A
Site Area (Ha):	2.97
Search Buffer (m):	1000

Site Details

11 Ashby Court, READING, RG2 8PG

Alison Bell
Director of Environment and Neighbourhood Services
Civic Offices, Reading, RG1 7AE
☎ 0118 937 3737
Fax: 0118 937 2557
SMS TEXT: 81722

Mr George Hockridge
Merchants House
Wapping Road
Bristol
BS1 4RW

Our Ref:497626

Direct: ☎ 0118 9372314
e_mail: ross.jarvis@reading.gov.uk

11 July 2014

Your contact is: Ross Jarvis – Environmental Protection

Dear Mr Hockridge

ENVIRONMENTAL INFORMATION REGULATIONS 2004
RE: Environmental Information Request: Worton Grange, Reading.

I write with reference to your recent request for environmental information in relation to the above site. A search of records held at Reading Borough Council has found the following:

1. The site has been identified by Reading Borough Council as being potentially contaminated due to its former use as a works.

2. The site has been identified for future investigation under the Council's Part IIA inspection strategy. In its current commercial use the site has been classified as a low risk. There is currently no schedule set for the investigation of the site.

3. The Council has the following records/no records of site investigations or remediation work at the site or surrounding area.

4. There are no records of any landfill sites within 250m of the site.

5. The Council holds the following records of historic pollution incidents within 250m of the site.

Premises	Cause	Premises_type	Premises_des	Reported	Estimated	X	Y
Drinks Manufacture		Manufacturing	Beer manufacturer	29/06/2002	Category 3 (Minor)	471453	169497
Drinks Manufacture	pipe joint failure on acid line	Manufacturing	brewery	22/01/2003	Category 1 (Major)	471453	169497
Electricity Supply and Distribution	Oil filled cable leak	Power Generation and Supply	Oil filled cable	23/06/2003	Category 3 (Minor)	471690	169480

Should you require information on recent pollution incidents please direct your enquiries to the Environment Agency at:

Environment Agency
Isis House,
Wallingford,
Oxfordshire,
OX10 8BD
Tel: 01491 832801

6. The following Environmental Permits are within 250m of the site.

Permit_Holder	Address	Process_Permitted	Part_A2_B	Permit_Ref	X	Y
Shell UK Limited, Shell Centre, York Road, London, SE1 7NA	Shell Fairfield, 585 Basingstoke Road, Reading, Berkshire, RG2 0TA	PG1/14 (06) Unloading of Petrol into Storage at Petrol Stations (PVRI&II)	B	EPA/PAR.B/37/98/P2	471656	169246

The Environment Agency hold records of part A installations that may be in the vicinity. The Environment Agency can be contacted using the above details.

7. The Council do not hold any records of complaints about nuisance originating from the site.

The information in this letter is given on the understanding that the Council accepts no liability for the use to which it is put and gives no guarantee as to the state of the land in question.

The information given represents the position within the Environmental Health database at the date of this letter and the Council can give no guarantee as to the impact of any future events in relation to the site in question.

If you would like to discuss the contents of this letter further, I can be contacted on 0118 9372314.

Yours sincerely,

Ross Jarvis
Senior Technical Officer
Environmental Protection

Appendix C. Exploratory Hole Records

BSL Factual Report (70 pages)

BROWNFIELD SOLUTIONS LTD

WATERMAN EED

Imperial Way, Reading

Factual Geo-Environmental Report

September 2014

Brownfield Solutions Limited
First Floor
19 Hereward Rise
Halesowen
West Midlands
B62 8AN
Tel: 0121 572 9014

www.brownfield-solutions.com

PD/C2611/1038

PROJECT QUALITY CONTROL DATA SHEET

Site Name:	Imperial Way, Reading
Report Title:	Factual Geo-Environmental Report
Report Number:	PD/C2611/1038

Client: Waterman EED	
Merchants House Wapping Road Bristol BS1 4RW	
Contact: Mr Mark Amos	

Revision	Date	Status
-	15 August 2014	Interim Draft
-	01 September 2014	Final

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1.0 INTRODUCTION 1

2.0 THE SITE 2

2.1 LOCATION & ACCESS 2
2.2 SITE DESCRIPTION 2

3.0 METHOD OF INVESTIGATION 3

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3.2 SITE WORKS 3
3.3 SAMPLING 4
3.4 IN-SITU STRENGTH/DENSITY TESTING 4
3.5 FALLING HEAD PERMEABILITY TESTS 4
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3.7 PHOTO-IONISATION DETECTION (PID) MONITORING 5
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4.2 NATURAL STRATA 6
4.3 BEDROCK 6
4.4 GROUNDWATER 7
4.5 OBSERVATIONS 7

DRAWINGS		
Drawing Number	Rev	Title
C2611/01	-	Site Location Plan
C2611/02	-	Exploratory Hole Location Plan

APPENDICES	
APPENDIX A	**Exploratory Hole Logs**
APPENDIX B	**Falling Head Permeability Test Results**
APPENDIX C	**CBR Test Results**
APPENDIX D	**Geotechnical Laboratory Test Results**
APPENDIX E	**Limitations**

FACTUAL GEO-ENVIRONMENTAL REPORT
at
IMPERIAL WAY, READING

1.0 INTRODUCTION

1.1 This report describes a Geo-environmental investigation carried out for Waterman EED on a site at Imperial Way, Reading.

1.2 The objectives of the investigation were to:

- Determine the near surface ground conditions through trial pitting, window sampling and cable percussive boreholes.
- Obtain samples for chemical and geotechnical analysis.
- Install standpipes to allow future monitoring and groundwater sampling and analysis.
- Determine the permeability of the soils underlying the site through in-situ falling head permeability tests.
- Determine the California Bearing Ratio (CBR) value of the shallow soils underlying the site through in-situ Plate Bearing Tests.

2.0 THE SITE

2.1 Location & Access

2.1.1 The site covers an area of approximately 8 hectares and is situated approximately 3.5 km south of Reading Town Centre.

2.1.2 The site is approximately centred on National Grid Reference 471514, 169361 and the Site Location Plan Drawing No. C2611/01 is presented in the rear of this report.

2.2 Site Description

2.2.1 The site is roughly triangular in shape and is bounded by the A33 to the south, Imperial Way to the west and Basingstoke Road (B3031) to the east. The topography is relatively flat, with soil bunds present around the internal perimeter of the site to the northwest, north and east of the site.

2.2.2 Previous commercial structures have been demolished to floor level, a large area of the site is covered by concrete floor slabs which are at a higher elevation than the land to the west. Outside of the areas covered by remaining concrete floor slabs, the site is predominantly covered with tarmac hardstanding, and localised areas of grass, vegetation and trees predominantly around the perimeter of the site.

2.2.3 The site boundary is formed predominantly of chain link fencing, with two accesses present, one off Imperial Way to the west and one off Basingstoke Road to the east. The metal gates are padlocked and concrete barriers are placed infront of the gates, restricting access to the site.

2.2.4 A number of stockpiles of crushed concrete are present on the site associated with the demolition of the former stuctures.

2.2.5 A tank is indicated to be present buried within an embankment in the north of the site.

3.0 METHOD OF INVESTIGATION

3.1 Objectives

3.1.1 The aim of the fieldwork was to:

- Investigate ground conditions on the site.
- Obtain soil and groundwater samples for contamination screening and geotechnical testing.
- Obtain geotechnical information to aid with foundation design.
- Install standpipes to allow future monitoring.
- Undertake falling head permeability tests.
- Undertake CBR tests on the shallow soils underlying the site.

3.2 Site Works

3.2.1 Twelve machine excavated trial pits were excavated to depths of between 3.0m bgl and 4.0m bgl on the 15th, 16th, 17th and 22nd July 2014 using a wheel mounted excavator.

3.2.2 Six window sample boreholes were drilled to depths of between 0.40m and 5.0m bgl using a tracked window sampling rig and liners (windowless) on 23rd July 2014.

3.2.3 Six cable percussive boreholes were drilled to depths of between 10.0m and 15.0m bgl using a Dando 2000 drilling rig between the 14th and 18th July 2014.

3.2.4 Five additional trial pits were excavated to depths of between 0.45m and 0.6m bgl on 22nd July 2014 using a wheel mounted excavator. Plate Load Tests (PBTs) were undertaken in the base of these excavations to determine the California Bearing Ratio (CBR) of the soils.

3.2.5 The approximate locations of the exploratory holes are indicated on the Exploratory Hole Location Plan, Drawing No. C2611/02. The exploratory hole logs are presented in Appendix A.

3.2.6 The exploratory holes were positioned by Waterman EED to establish ground conditions across the site.

3.2.7 Four of the proposed exploratory holes were cancelled at the request of Waterman EED. These included four window sample boreholes (WS3, WS6, WS7, WS8) and one cable percussive borehole (BH7). Furthermore, one trial pit (TP13) was cancelled as a precaution due to uncertainty regarding the presence of underground services.

3.2.8 The boreholes and trial pits were logged by an experienced geo-environmental engineer in general accordance with BS 5930 'Code of Practice for Site Investigations' 1999, BS EN 14688-1:2002 'Geotechnical Investigation and Testing – Identification and classification of soil' and BS EN ISO

14689:2002 'Geotechnical investigation and testing – Identification and classification of rock'.

3.3 Sampling

3.3.1 During the drilling of the exploratory holes, representative samples were taken at regular intervals in accordance with the Waterman EED schedule to allow subsequent laboratory testing.

3.3.2 Sixty-six environmental soil samples and seventy-one disturbed samples were selected and taken during the site works, the type of sample taken being dependent upon the stratum and the purpose of analysis.

3.3.3 Disturbed samples of soil for chemical testing were placed in vessels as outlined by Environmental Scientifics Group (ESG).

3.3.4 Twenty-six bulk samples were taken from the trial pits and cable percussive boreholes.

3.3.5 Twenty-two undisturbed U100 samples were taken from the cable percussive boreholes.

3.3.6 The distribution of samples taken across the site is recorded on the exploratory logs.

3.4 In-Situ Strength/Density Testing

3.4.1 Twenty Standard Penetration Tests (SPTs) were undertaken in the window sample boreholes and twenty-six SPTs were undertaken in the cable percussive boreholes. The distribution and results of the SPT tests are recorded on the exploratory hole logs.

3.4.2 Fifteen hand shear vane tests were carried out on suitable cohesive soils recovered from the trial pits and window sample boreholes. The distribution and results of the hand shear strength tests are recorded on the exploratory hole logs.

3.5 Falling Head Permeability Tests

3.5.1 Two falling head permeability tests were undertaken within BH03 at 3.5m bgl and BH04 at 5.0m bgl. The ground conditions at the test depth in BH03 comprised sand and gravel, encountered between 2.0m and 3.7m bgl. The ground conditions at the test depth in BH04 comprised firm to stiff clay, encountered from 1.5m bgl.

3.5.2 The results of the falling head permeability tests are presented in Appendix B.

3.6 CBR Testing

3.6.1 Five plate load tests were undertaken in the base of five trial pits (CBR1 to CBR5) to determine the California Bearing Ratio (CBR) of the shallow soils. The results of the CBR testing are presented in Appendix C.

3.7 Photo-Ionisation Detection (PID) Monitoring

3.7.1 Photo-Ionisation Detection (PID) monitoring was undertaken on 65No. samples of soils obtained from the exploratory holes across the site using a calibrated Ion Science PhoCheck Tiger device. The distribution and results of the PID monitoring are recorded on the exploratory hole logs.

3.8 Laboratory Testing

3.8.1 Testing for chemical contamination was organised and scheduled directly by the Client, Waterman EED.

3.8.2 Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' 1990. The following tests were scheduled:

BS Test Number	Description	No of Samples
Part 2:	Moisture Content Analysis	4
Part 2:	Plasticity Index Analysis	4
Part 2:	PSD Wet Sieve including sedimentation by pipette	2
Part 4:	Dry density/moisture content relationship 2.5kg rammer	2
Part 7:	Oedometer Consolidation Test at 5 cell pressures	5
Part 7:	Quick Undrained Triaxial	10

3.8.3 Nine soil samples were selected and analysed for concrete aggressivity in accordance with the BRE Special Digest 1 methodology.

3.8.4 Geotechnical and BRE SD1 test results are presented in Appendix D.

4.0 GROUND CONDITIONS

4.1 Made Ground

4.1.1 Made ground was encountered in all 29 exploratory hole locations and was between 0.2m and 2.8m thick, where proven. The thickest made ground was encountered in BH5 in the south-east of the site (2.8m). Thick deposits of made ground were also encountered in BH2 (1.2m), BH3 (2.0m), TP4 (1.5m) and TP11 (1.5m). Elsewhere the made ground was less than 1.0m thick.

4.1.2 Made ground generally comprised surfacing of concrete or tarmac overlying gravel or sand and gravel subbase of mixed lithologies. Locally this was underlain by soft to firm slightly gravelly to very gravelly clay, with gravel of mixed lithologies including rare concrete (BH3, CBR2), brick (CBR5, TP4), pipe (TP4) and pockets of organic clay and timber (CBR2). Cobbles were noted in CBR2, CBR3 and TP4.

4.1.3 In BH5 topsoil surfacing was present to 0.3m bgl underlain by brown gravelly clay, with gravel of brick and concrete, to 2.8m bgl.

4.1.4 In WS10 concrete surfacing was present to 0.4m bgl, underlain by a second layer of concrete which could not be penetrated. The borehole was terminated at 0.4m bgl.

4.1.5 In TP1 gravel subbase underlying tarmac surfacing between 0.05m and 0.15m bgl was described as ashy.

4.2 Natural Strata

4.2.1 There are no superficial deposits recorded underlying the site.

4.3 Bedrock

4.3.1 The shallow natural ground underlying the site is indicated to comprise an upper weathered layer of London Clay. The London Clay comprised firm to stiff brown mottled grey and orange slightly gravelly to gravelly, slightly sandy to sandy clay. Gravel was fine to coarse angular to rounded of mixed lithologies. Locally pockets/lenses of silt and sand were noted in the clay. The brown mottled clay was encountered in 24 of the 29 exploratory hole locations and was between 1.0m and 5.0m thick where the weathered base was proven, and was present to a maxium depth of 5.5m bgl in BH1.

4.3.2 In BH4, a shallow layer of yellow brown very sandy clay was encountered beneath the made ground between 0.3m and 1.5m bgl, underlain by firm to stiff mottled grey clay to 3.7m bgl.

4.3.3 In BH6 a shallow layer of firm brown very gravelly clay was encountered beneath the made ground between 0.6m and 1.5m bgl, underlain by stiff grey brown mottled orange slightly sandy clay to 3.5m bgl.

4.3.4 Locally, a thin layer of dark grey/ green grey (organic) silty clay was encountered underlying the made ground (WS9, CBR3, TP1, TP8, TP11). The organic clay was between 0.1m and 0.45m thick where encountered and was present to a maximum depth of 1.7m bgl in TP11.

4.3.5 Granular deposits were recorded in 2 of the 29 exploratory hole locations in the south of the site. In BH3 medium dense coarse sand and gravel was encountered underlying the made ground between 2.0m and 3.7m bgl. In TP5 brown slightly clayey fine to coarse sand was encountered underlying the made ground between 0.45m and 1.8m bgl.

4.3.6 In 18 of the 29 exploratory hole locations, The London Clay strata generally became stiff to very stiff, dark grey and grey brown, and slightly silty to silty at depth, and was locally friable. In the cable percussive boreholes, the stiff to very stiff grey clay (London Clay) also contained shell fragments and sand bands.

4.4 Groundwater

4.4.1 Groundwater was encountered in BH03 at 3.0m bgl, rising to 2.5m bgl after 20 minutes.

4.4.2 The strata was described as damp below 14.5m bgl in BH01.

4.4.3 Slight groundwater seepages were observed in WS9 below 1.0m bgl.

4.5 Observations

4.5.1 During the works undertaken by BSL observations for both visual and olfactory evidence of contamination were made.

4.5.2 A slight becoming moderate hydrocarbon odour was noted within the granular made ground in TP11 between depths of 0.7m and 1.5m bgl. A possible heavy end hydrocarbon odour was noted within the organic clay between 1.5m and 1.7m bgl. Corresponding PID results were between 0.0ppm and 3.0ppm.

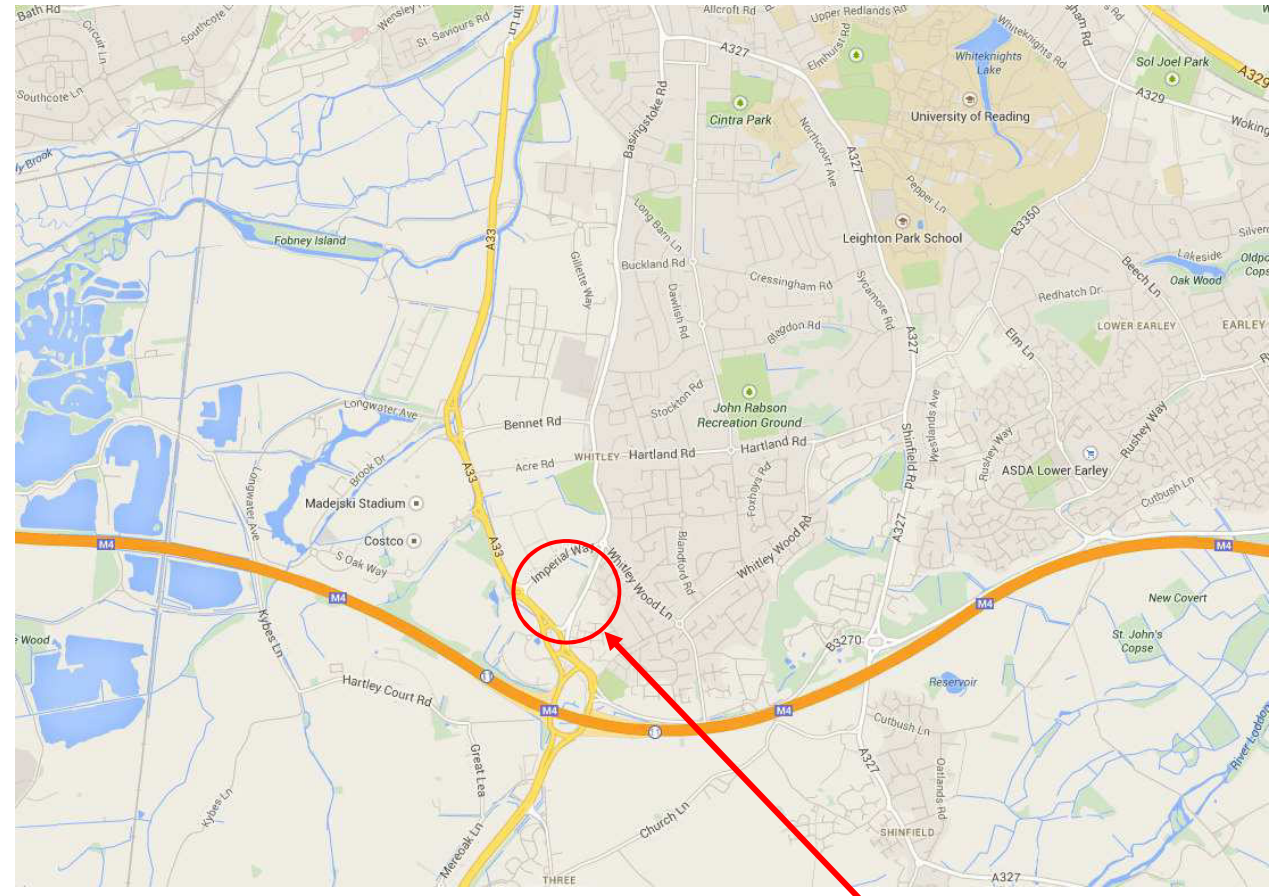
4.5.3 In BH01 a slight hydrocarbon odour was noted in the shallow made ground between 0.2m and 0.5m bgl. Corresponding PID results were 0.0ppm.

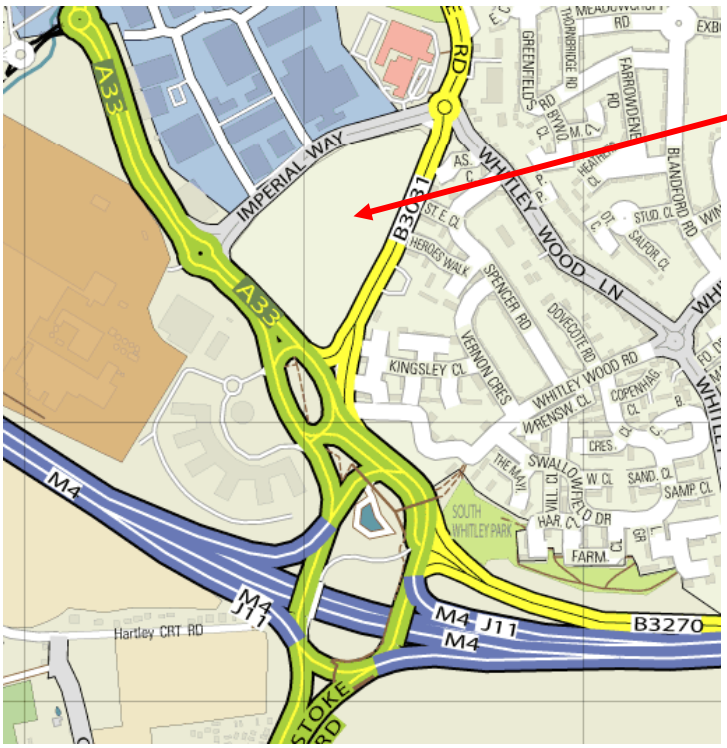
4.5.4 In BH02 a slight hydrocarbon odour was noted within the made ground between 0.1m and 1.2m bgl. Corresponding PID results were 0.0ppm.

Stability of excavations

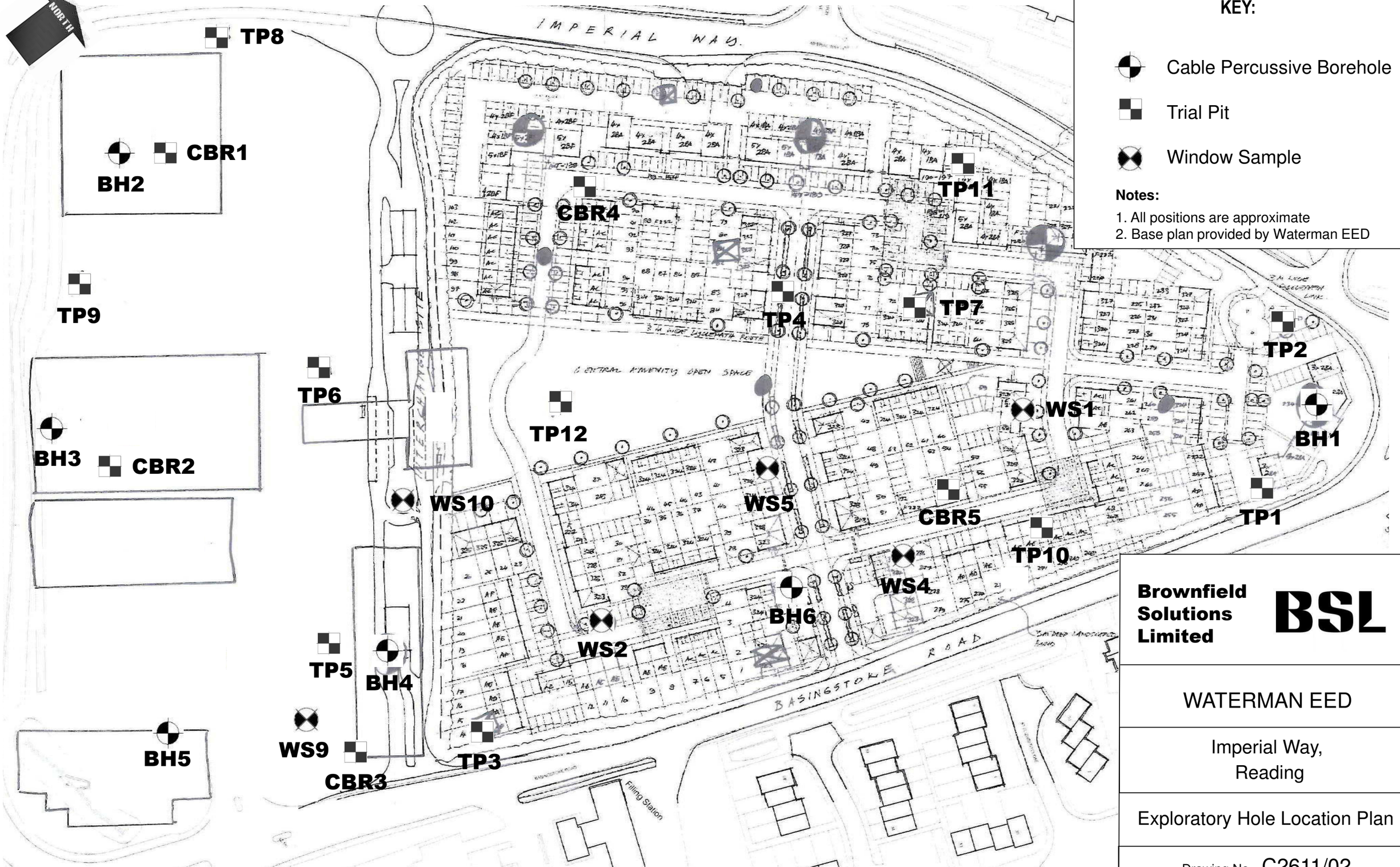
4.5.5 The excavation sides within the natural cohesive soils were stable. Instability of the granular made ground and localised granular soils should be anticipated.

DRAWINGS





Brownfield Solutions Limited BSL	
Waterman EED	
Imperial Way, Reading	
Site Location Plan	
Drawing Number C2611/01	
Scale: NTS	
Drawn By: PD	Checked By: WG



KEY:

- Cable Percussive Borehole
- Trial Pit
- Window Sample

Notes:

1. All positions are approximate
2. Base plan provided by Waterman EED

Brownfield Solutions Limited BSL

WATERMAN EED

Imperial Way,
Reading

Exploratory Hole Location Plan

Drawing No. C2611/02

Scale: NTS

Drawn By: PD	Checked By: WG

APPENDIX A
Exploratory Hole Logs

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Borehole No BH01
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		Cable
Location: READING		Level: -	Scale 1:75
Client: WATERMAN EED		Dates: 14/07/2014	Checked by WG / Logged By SA

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
		0.20	PID	0.0	0.10			MADE GROUND: Tarmac.
		0.20	ES		0.20			
		0.50	PID	0.0	0.50			MADE GROUND: Yellow brown slightly silty fine to coarse sand and angular to subrounded fine to coarse gravel of sandstone and coal. Slight hydrocarbon odour.
		0.50	ES					
		1.00	PID	0.0				
		1.00	ES					MADE GROUND: Brown mottled pink and grey slightly sandy slightly gravelly clay. Gravel is fine to coarse subangular to subrounded of limestone, flint, mudstone and sandstone.
		1.00-1.50	B					
		1.50-1.95	U	35				Firm to stiff brown mottled orange and grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium angular to subrounded of sandstone, limestone, flint and mudstone.
		1.95-2.00	D					
		2.50	SPT	N=18				
		2.50-2.95	D	(3,3,4,5,4,5)				
		3.50-3.95	U	55				
		3.95-4.00	D					
		4.50	SPT	N=25				
		4.50-4.95	D	(4,5,6,6,6,7)				Below 4.50m clay is stiff.
		5.50-6.00	B		5.50			Stiff to very stiff dark grey silty CLAY with occasional sand bands.
		6.50-6.95	U	55				
		6.95-7.00	D					
		8.50	SPT	N=30				
		8.50-8.95	D	(6,7,7,8,7,8)				
		10.50-10.95	U	75				
		10.95-11.00	D					
		12.50	SPT	N=36				
		12.50-12.95	D	(7,8,8,9,9,10)				
								End of Borehole at 15.00 m

Remarks:
1. Hole damp at 14.50m.
2. Installation to 10.00m, 1.00m plain, 9.00m slotted.
3. Chiselling 14.0m to 14.1m bgl (30 mins).

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Borehole No **BH02**
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		Cable
Location: READING		Level: -	Scale 1:75
Client: WATERMAN EED		Dates: 15/07/2014	Checked by WG / Logged By SA

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
		0.20	PID	0.0	0.10			MADE GROUND: Tarmac.
		0.20	ES					
		0.50	PID	0.0				MADE GROUND: Yellow brown slightly clayey fine to coarse sand and angular to subrounded fine to coarse gravel of sandstone and flint. Slight hydrocarbon odour.
		0.50	ES					
		1.00-1.50	B		1.20			Firm to stiff brown mottled light brown grey slightly silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded of sandstone, mudstone, flint and limestone.
		1.50	SPT	N=14				
		1.50	D	(1,2,3,3,4,4)				
		1.50-1.95	D					
		2.50-2.95	U	35				
		2.95-3.00	D					
		3.50	SPT	N=15				
		3.50-3.95	D	(3,3,4,3,4,4)				
		4.50-4.95	U	50	4.50			Firm to stiff grey silty CLAY.
		4.50-5.00	B					
		4.95	D					
		5.50	SPT	N=28				Becoming stiff from 5.50m
		5.50-5.95	D	(5,6,6,7,8,7)				
		7.50-7.95	U	70				
		7.95-8.00	D					
		9.50	SPT	N=35				
		9.50-9.95	D	(6,8,8,9,9,9)				
		10.00	D		10.00			End of Borehole at 10.00 m

Remarks:
1. No groundwater encountered.
2. Backfilled with arisings.

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Borehole No **BH03**
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		Cable
Location: READING		Level: -	Scale 1:75
Client: WATERMAN EED		Dates: 15/07/2014	Checked by WG / Logged By SA

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
		0.20	PID	0.0	0.10			MADE GROUND: Tarmac.
		0.20	ES		0.40			MADE GROUND: Slightly clayey fine to coarse sand and angular to subrounded fine to coarse gravel.
		0.50	PID	0.0				
		0.50	ES					MADE GROUND: Firm brown very gravelly clay. Gravel fine to coarse angular to rounded of mixed lithology, including rare concrete
		1.00-1.50	B					Becoming stiff
		1.50	SPT	N=26				
		1.50-1.95	D	(2,2,9,9,4,4)				
		2.00	D		2.00			Medium dense coarse SAND AND GRAVEL with occasional bands of CLAY
		2.00	ES					
	▼	2.50	SPT	N=26				
		2.50-2.95	D	(5,5,6,7,7,6)				
	▽	2.50-3.00	B					
		3.50	SPT	N=13				
		3.50-3.95	D	(6,4,4,3,3,3)	3.70			Stiff to very stiff grey silty CLAY with occasional sand and shell bands
		4.00	D					
		4.50-4.95	U	50				
		4.50-5.00	D					
		6.00	D					
		6.50	SPT	N=28				
		6.50-6.95	D	(5,5,6,7,7,8)				
		8.50-8.95	U	60				
		8.95-9.00	D					
		10.50	SPT	N=39				
		10.50-10.95	D	(7,9,9,10,10,10)				
		12.50-12.95	U	80				
		12.95-13.00	D					
		14.50	SPT	50/225mm				Becoming very stiff from 14.50m.
		14.50-14.95	D	225mm (12,13,15,17,18)				
								End of Borehole at 15.00 m

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Remarks:
1. Groundwater at 3.00m, rising to 2.50m after 20 minutes.
2. Installation to 8.00m. 1.00m plain, 7.00m slotted.

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Borehole No **BH04**
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		Cable
Location: READING		Level: -	Scale 1:75
Client: WATERMAN EED		Dates: 16/07/2014-17/07/2014 / Checked by WG	Logged By SA

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
		0.20	PID	0.0	0.20			MADE GROUND: Concrete.
		0.20	ES		0.30			MADE GROUND: Yellow sand and gravel sub base.
		0.50	PID	0.0				Soft yellow brown very sandy CLAY
		0.50	ES					
		1.00-1.50	B					
		1.50	ES		1.50			Firm to stiff brown mottled grey CLAY.
		1.50-1.95	U	35				
		1.95-2.00	D					
		2.00-2.50	B					
		2.50	SPT	N=18				
		2.50-2.95	B	(3,3,4,5,5,4)				
		3.50-3.95	U	45	3.70			Firm to stiff becoming very stiff grey brown CLAY with shells and sand bands.
		3.95-4.00	D					Becoming grey no sand
		4.50	SPT	N=21				
		4.50-4.95	D	(4,4,5,5,6,5)				
		6.50-6.95	U	55				
		7.00	D					
		8.50	SPT	N=34				
		8.50-8.95	D	(6,8,8,8,9,9)				
		10.50-10.95	U	70				
		10.95-11.00	D					
		12.50	SPT	N=44				
		12.50-12.95	D	(9,10,10,10,11,13)				
		14.50-14.95	U	85				Becoming mudstone from 14.50m
		14.95-15.00	D					End of Borehole at 15.00 m

Remarks: 1. No groundwater encountered.
2. Installation to 10.00m, 2.00m plain, 8.00m slotted

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Borehole No
BH05
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		Cable
Location: READING		Level: -	Scale 1:75
Client: WATERMAN EED		Dates: 17/07/2014	Checked by WG / Logged By SA

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
		0.20	ES		0.30			Grass over sandy TOPSOIL.
		0.50	ES					MADE GROUND: Brown gravelly clay. Gravel is of brick and concrete.
		1.00-1.50	B					
		1.50	SPT	N=19				
		1.50-1.95	D	(4,5,5,5,4,5)				
		2.50	SPT	N=17				
		2.50-2.95	D	(4,4,4,5,4,4)	2.80			
		3.00	ES					Stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub rounded to rounded of mixed lithologies
		3.00-3.50	B					
		3.50-3.95	U	45				
		4.00	D					
		4.50	SPT	N=18				
		4.50-4.95	D	(3,4,4,5,4,5)				
		5.50-5.95	U	55	5.50			Stiff to very stiff grey brown slightly sandy CLAY with shells and sand bands.
		6.00	D					
		7.50	SPT	N=30				
		7.50-7.95	D	(6,7,7,7,8,8)				
		9.50-9.95	U	85				
		10.00	D		10.00			End of Borehole at 10.00 m

Remarks: 1. No groundwater encountered.
2. Backfiilled with arisings.

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Borehole No
BH06
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		Cable
Location: READING		Level: -	Scale 1:75
Client: WATERMAN EED		Dates: 18/07/2014	Checked by WG / Logged By SA

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
		0.20	ES		0.30			MADE GROUND: Concrete
		0.50	ES		0.60			MADE GROUND: Compact yellow brown sub base
		1.00	B					Firm brown very gravelly brown CLAY
		1.50	ES		1.50			
		1.50-1.95	U	35				Stiff grey brown orange mottled slightly sandy CLAY
		1.95-2.00	D					
		2.50	SPT	N=16				
		2.50-2.95	SPTLS	(3,3,3,4,4,5)				
					3.50			
		3.50-3.95	U	50				Stiff grey mottled brown CLAY with shell fragments and sand bands
		3.95-4.00	D					
		4.50	SPT	N=23				
		4.50-4.95	SPTLS	(4,4,5,6,6,6)				
		5.50-5.95	U	60				
		6.00	D					
		7.50	SPT	N=34				
		7.50-7.95	SPTLS	(7,7,8,9,8,9)				Very stiff below 7.50m
		9.50-9.95	U	95				
		9.95-10.00	D		10.00			End of Borehole at 10.00 m

Remarks:
1. No groundwater encountered..
2. Instllation to 10.00m, 2.00m plain, 8.00m slotted.

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Borehole No
WS01
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		WLS
Location: READING		Level: -	Scale 1:28
Client: WATERMAN EED		Dates: 23/07/2014	Checked by WG / Logged By JJ

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								CONCRETE
		0.30 0.30-0.40	PID ES	2.0	0.30			MADE GROUND: Grey brown silty sandy gravel. Gravel is fine to coarse sub angular of hardcore
		0.70 0.70-0.80	PID ES	2.0	0.60			Firm to stiff orange brown mottled grey sandy CLAY with occasional gravel
		0.90	IVN	88				
		1.00	SPT	N=10 (1,1,1,2,3,4)				
		2.00	SPT	N=19 (3,3,4,4,5,6)				
		2.90	IVN	120	2.50			Stiff dark grey brown CLAY
		3.00	SPT	N=15 (2,3,3,3,4,5)				
		4.00	SPT	N=13 (2,2,2,3,4,4)				Becoming very stiff below 4.0m
		5.00	SPT	N=13 (1,2,2,3,3,5)	5.00			End of Borehole at 5.00 m

1 2 3 4

Remarks:
1. No groundwater encountered.
2. Installation to 4.00m: 0.40m plain pipe and 3.60m slotted.

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Borehole No
WS02
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		WLS
Location: READING		Level: -	Scale 1:28
Client: WATERMAN EED		Dates: 23/07/2014	Checked by WG / Logged By JJ

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								CONCRETE
					0.30			
		0.40	PID	1.0				MADE GROUND: Grey brown silty sandy gravel. Gravel is fine to coarse subangular. (Hardcore sub base)
		0.40	ES					
		0.70	IVN	63	0.70			
		0.80	PID	1.0				Firm to stiff orange brown mottled grey sandy CLAY with occasional gravel. Occasional pockets of iron stained sandstone gravel up to 0.10m in diameter Plastic geotextile present at 0.70m
		1.00	SPT	N=10 (1,1,2,2,3,3)				1
		1.00	ES					
		2.00	SPT	N=14 (1,2,3,2,5,4)	2.00			Stiff dark grey brown CLAY
		2.15	IVN	105				2
		3.00	SPT	N=14 (2,3,2,3,4,5)				3
		4.00	SPT	N=15 (2,3,3,3,4,5)	4.00			End of Borehole at 4.00 m
								4

Remarks:
1. No groundwater encountered.
2. Installation to 4.00m; 0.40m plain pipe and 3.60m slotted pipe.

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Borehole No
WS04
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		WLS
Location: READING		Level: -	Scale 1:28
Client: WATERMAN EED		Dates: 23/07/2014	Checked by WG / Logged By JJ

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
								CONCRETE
					0.30			
		0.40	PID	1.0				MADE GROUND: Grey brown silty sandy gravel. Gravel is fine to coarse subangular. (Hardcore sub base)
		0.40	ES					
					0.60			Firm orange brown mottled grey sandy CLAY with some fine to coarse angular gravel of mudstone and flint
		0.90	ES					
		1.00	PID	1.0				
		1.00	SPT	N=8 (1,1,1,2,2,3)				
		1.50	IVN	59				
		2.00	SPT	N=18 (3,4,4,4,4,6)				Becoming stiff below 2.00m
		2.20	IVN	120				
					2.80			Very stiff dark grey brown CLAY
		3.00	SPT	N=16 (2,3,3,4,4,5)				
		4.00	SPT	N=17 (1,2,4,5,4,4)				Becoming very stiff below 4.00m
		5.00	SPT	N=13 (2,2,2,2,4,5)	5.00			End of Borehole at 5.00 m

1 2 3 4

Remarks: 1. No groundwater encountered.
2. Backfilled with arisings.

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Borehole No
WS05
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		WLS
Location: READING		Level: -	Scale 1:28
Client: WATERMAN EED		Dates: 23/07/2014	Checked by WG / Logged By JJ

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.30			CONCRETE
		0.40	PID	3.0				MADE GROUND: Grey brown silty sandy gravel. Gravel is fine to coarse subangular. (Hardcore sub base)
		0.40	ES		0.60			Firm orange brown mottled grey sandy CLAY with occasional gravel. Occasional medium and coarse sand pockets up to 75mm in diameter Plastic geotextile present at 0.60m
		1.00	SPT	N=7 (1,1,1,2,2,2)				
		1.15	IVN	65				
		1.30	PID	1.0				
		1.40	ES		1.60			Stiff dark grey brown CLAY
		2.00	SPT	N=9 (2,2,2,2,2,3)				
		2.50	IVN	115				
		3.00	SPT	N=10 (2,2,2,2,3,3)				
		4.00	SPT	N=17 (3,3,3,4,5,5)				
					5.00			End of Borehole at 5.00 m

Remarks:
1. No groundwater encountered.
2. Installation to 4.00m; 0.40m plain pipe and 3.60m slotted pipe.

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Borehole No **WS09**
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		WLS
Location: READING		Level: -	Scale 1:28
Client: WATERMAN EED		Dates: 23/07/2014	Checked by WG / Logged By JJ

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								CONCRETE
		0.35	PID	4.0	0.30			MADE GROUND: Grey brown silty sandy gravel. Gravel is fine to coarse subangular. (Hardcore sub base)
		0.35	ES		0.40			Soft to firm dark grey organic sandy CLAY with occasional gravel
		0.60	PID	1.0				
		0.60	ES					
					0.80			Firm to stiff orange brown mottled grey sandy CLAY with some fine to coarse subangular gravel
		1.00	SPT	N=8 (1,0,2,2,2,2)				1
		1.20	IVN	88				
		1.50	ES					
		1.70	PID	1.0				
		2.00	SPT	N=7 (1,2,1,2,2,2)				2
		2.90	IVN	125				
		3.00	SPT	N=8 (1,1,1,2,2,3)	3.00			Stiff dark grey brown CLAY 3
		4.00	SPT	N=14 (1,2,3,3,4,4)	4.00			4 End of Borehole at 4.00 m

Remarks:
1. Slight seepages below 1.00m bgl.
2. Backfilled with arisings.

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Borehole No
WS10
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
IMPERIAL WAY, READING	C2611		WLS
Location: READING		Level: -	Scale 1:28
Client: WATERMAN EED		Dates: 23/07/2014	Checked by WG / Logged By JJ

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.40			CONCRETE
								End of Borehole at 0.40 m

Remarks:
1. No groundwater encountered.
2. Aborted on a second layer of concrete at 0.40m bgl.

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BSL Brownfield Solutions Limited 19 Hereward Rise Halesowen West Midlands B62 8AN	**Trial Pit Log**		Trialpit No **CBR1** Sheet 1 of 1
Project Name: Imperial Way, Reading	Project No. C2611	Co-ords: - Level:	Date 22/07/2014
Location: Reading		Dimensions (m): Depth 0.50	Scale 1:25
Client: Waterman EED			Logged PD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
			PID=3	0.13			MADE GROUND: Tarmac.
	0.20	ES					MADE GROUND: Dark brown, slightly silty sand and gravel. Gravel is fine to coarse subangular to subrounded and includes limestone.
	0.40	ES	PID=1	0.45 0.50			Firm orange brown slightly gravelly CLAY. Gravel is fine to coarse subangular and includes flint. Occasional sand lenses. End of pit at 0.50 m

Remarks:
1. No groundwater encountered.
2. CBR test undertaken in base of pit.
3. Sides stable.

Stability:

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BSL Brownfield Solutions Limited 19 Hereward Rise Halesowen West Midlands B62 8AN	# Trial Pit Log		Trialpit No **CBR2** Sheet 1 of 1
Project Name: Imperial Way, Reading	Project No. C2611	Co-ords: - Level:	Date 22/07/2014
Location: Reading		Dimensions (m): Depth 0.60	Scale 1:25
Client: Waterman EED			Logged PD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.10			MADE GROUND: Tarmac
	0.20	ES	PID=2				MADE GROUND: Red brown slightly silty sand and gravel. Gravel is fine to coarse angular to subangular and includes limestone. Gravels appear red due to red sand coating.
	0.40	ES	PID=0	0.40			MADE GROUND: Soft to firm orange brown gravelly clay. Gravel is fine to medium subangular of mixed lithologies including flint and brick. Rare concrete cobbles and rare pockets of dark grey organic clay and timber.
			HVR=102	0.60			*Buried footing at 0.40m orientated north-south in east corner of pit.*
							End of pit at 0.60 m

1
2
3
4
5

Remarks:
1. No groundwater encountered.
2. CBR test undertaken in base of pit.
3. Sides stable.

Stability:

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BSL Brownfield Solutions Limited 19 Hereward Rise Halesowen West Midlands B62 8AN	**Trial Pit Log**		Trialpit No **CBR3** Sheet 1 of 1
Project Name: Imperial Way, Reading	Project No. C2611	Co-ords: - Level:	Date 22/07/2014
Location: Reading		Dimensions (m): Depth 0.60	Scale 1:25
Client: Waterman EED			Logged PD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.10			MADE GROUND: Tarmac
			PID=2				MADE GROUND: Red brown slightly silty sand and gravel. Gravel is fine to coarse, angular to subangular of mixed lithologies.
	0.20	ES		0.30			Dark grey organic slightly sandy silty CLAY. Gravel is fine to coarse angular to subangular.
			PID=0				*Concrete boulder present at 0.30m bgl.*
	0.40	ES					
			HVR=120	0.60			End of pit at 0.60 m

Remarks:
1. No groundwater encountered.
2. CBR test undertaken in base of pit.
3. Sides stable.

Stability:

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BSL Brownfield Solutions Limited 19 Hereward Rise Halesowen West Midlands B62 8AN	**Trial Pit Log**		Trialpit No **CBR4** Sheet 1 of 1
Project Name: Imperial Way, Reading	Project No. C2611	Co-ords: - Level:	Date 22/07/2014
Location: Reading		Dimensions (m): Depth 0.60	Scale 1:25
Client: Waterman EED			Logged PD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.10			MADE GROUND: Tarmac
				0.26			MADE GROUND: Concrete
	0.30	ES	PID=0	0.46			MADE GROUND: Red brown sand and gravel. Gravel is fine to coarse angular to subangular of predominantly limestone.
	0.50	ES	PID=1 HVR=120	0.60			Firm to stiff brown grey slightly gravelly sandy silty CLAY. Gravel is fine to coarse angular to subrounded of mixed lithologies. End of pit at 0.60 m

1
2
3
4
5

Remarks:
1. No groundwater encountered.
2. CBR test undertaken in base of pit.
3. Sides stable.

Stability:

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BSL Brownfield Solutions Limited 19 Hereward Rise Halesowen West Midlands B62 8AN	**Trial Pit Log**		Trialpit No **CBR5** Sheet 1 of 1
Project Name: Imperial Way, Reading	Project No. C2611	Co-ords: - Level:	Date 22/07/2014
Location: Reading		Dimensions (m): Depth 0.60	Scale 1:25
Client: Waterman EED			Logged PD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.15			MADE GROUND: Concrete
	0.30	ES	PID=0	0.40			MADE GROUND: Brown slightly silty sand and gravel. Gravel is fine to coarse angular to subangular and includes flint, concrete and limestone. *Plastic membrane present at 0.15m bgl.*
	0.60	ES	PID=1 HVR=59	0.60			MADE GROUND: Soft red brown slightly gravelly sandy silty clay. Gravel is fine to medium angular to subrounded of mixed lithologies including brick. End of pit at 0.60 m

1
2
3
4
5

Remarks:
1. No groundwater encountered.
2. CBR test undertaken in base of pit.
3. Sides stable.

Stability:

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Trialpit No
TP1
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
IMPERIAL WAY, READING	C2611	Level: -	15/07/2014
Location: READING		Dimensions: -	Scale 1:25
Client: WATERMAN EED	Checked By: WG	Depth 4.00m	Logged By SA

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.05			MADE GROUND: Tarmac.
			0.15			MADE GROUND: Dark brown to black ashy gravelly sub base.
0.20	PID	0.3				MADE GROUND: Light brown angular to subrounded fine to coarse gravel of limestone
0.20	ES					
0.25	PID	0.4				
0.25	ES		0.40			
			0.50			Firm to stiff dark grey mottled black slightly sandy slightly gravelly silty CLAY with rare fibrous organic matter.
						Firm to stiff brown mottled grey slightly gravelly, slightly silty slightly sandy CLAY.
			4.00			Trialpit Complete at 4.00 m

Remarks:
1. No groundwater encountered.
2. Sides stable.
3. Backfilled on completion.

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Trialpit No
TP2
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
IMPERIAL WAY, READING	C2611	Level: -	15/07/2014
Location: READING		Dimensions: -	Scale 1:25
Client: WATERMAN EED	Checked By: WG	Depth 4.00m	Logged By SA

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10 0.10	PID ES	1.6	0.13			MADE GROUND: Tarmac.
0.40 0.40	PID ES	1.9				MADE GROUND: Fine to coarse angular to subrounded gravel of sandstone and limestone.
0.80 0.80	PID B	1.0	0.65			Firm brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium angular to subrounded of sandstone, mudstone and flint.
2.00	D					
2.80-3.00	B		2.80			Firm to stiff silty CLAY with roots.
4.00 4.00	PID D	1.2	4.00			Trialpit Complete at 4.00 m

Remarks:
1. No groundwater encountered.
2. Sides stable.
3. Backfilled on completion.

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Trialpit No
TP3
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
IMPERIAL WAY, READING	C2611	Level: -	15/07/2014
Location: READING		Dimensions: -	Scale 1:25
Client: WATERMAN EED	Checked By: WG	Depth 4.00m	Logged By SA

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10 0.10	PID ES	0.5				MADE GROUND: Concrete.
			0.25			
0.40 0.40	PID ES	1.5				MADE GROUND: Slightly clayey fine to coarse sand and gravel.
			0.65			Firm to stiff brown mottled orange and grey slightly sandy slightly gravelly CLAY.
			3.20			Stiff to very stiff dark grey silty friable CLAY.
			4.00			Trialpit Complete at 4.00 m

Remarks:
1. No groundwater encountered.
2. Sides stable.
3. Backfilled on completion.

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Trialpit No
TP4
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
IMPERIAL WAY, READING	C2611	Level: -	16/07/2014
Location: READING		Dimensions: -	Scale 1:25
Client: WATERMAN EED	Checked By: WG	Depth 4.00m	Logged By SA

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	PID	0.7	0.10			MADE GROUND: Tarmac.
0.10	ES					
			0.22			MADE GROUND: Concrete slab.
0.40	PID	1.9				MADE GROUND: Fine to coarse sand and angular to subrounded fine to coarse gravel of sandstone, flint, mudstone, limestone and concrete.
0.40	ES					
0.50	PID	2.5	0.50			
0.50	ES					MADE GROUND: Black to dark grey green slightly sandy gravelly organic clay with cobbles. Gravel is fine to coarse angular to subrounded of sandstone, brick, flint and pipe.
0.85	B					
			1.50			Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY.
2.00-2.20	B					
3.00	PID	3.0				
3.00	D					
			3.60			Very stiff dark grey silty friable CLAY.
4.00	PID	0.0	4.00			
4.00	D					Trialpit Complete at 4.00 m

Remarks:
1. No groundwater encountered.
2. Sides stable.
3. Backfilled on completion.

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Trialpit No
TP5
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
IMPERIAL WAY, READING	C2611	Level: -	16/07/2014
Location: READING		Dimensions: -	Scale 1:25
Client: WATERMAN EED	Checked By: WG	Depth 4.00m	Logged By SA

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	PID	3.7				MADE GROUND: Concrete.
0.10	ES		0.20			
						MADE GROUND: Light grey fine to coarse sand and angular to subrounded fine to coarse gravel of sandstone, flint and granite.
0.50	D		0.45			Brown slightly clayey fine to coarse SAND.
1.00	D					
			1.80			Stiff to very stiff dark grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium angular to subrounded of sandstone and mudstone.
2.00	B					
3.00	D					
			3.80			Stiff to very stiff dark grey silty friable CLAY.
4.00	B		4.00			Trialpit Complete at 4.00 m

Remarks:
1. No groundwater encountered.
2. Sides stable.
3. Backfilled on completion.

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Trialpit No
TP6
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
IMPERIAL WAY, READING	C2611	Level: -	16/07/2014
Location: READING		Dimensions: -	Scale 1:25
		Depth 4.00m	
Client: WATERMAN EED	Checked By: WG		Logged By SA

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	PID	3.0				MADE GROUND: Concrete.
0.10	ES		0.20			
0.40	PID	0.4				MADE GROUND: Slightly clayey fine to coarse sand and angular to subround fine to coarse gravel of concrete, brick and flint.
0.40	ES					
			0.65			
0.65-0.85	B					Firm to stiff brown mottled orange and grey slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded of flint and sandstone.
1.00	D					
2.00	D					
						Becoming less sandy and more friable at 3.00m.
3.00-3.20	B					
			3.20			Stiff to very stiff dark grey silty friable CLAY.
4.00	D		4.00			Trialpit Complete at 4.00 m

Remarks:
1. No groundwater encountered.
2. Sides stable.
3. Backfilled on completion.

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HoleBASE 3.1 (Bld 426.72) Standard Trialpit Log v2 dated 27th Nov 03

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Trialpit No
TP7
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
IMPERIAL WAY, READING	C2611	Level: -	17/07/2014
Location: READING		Dimensions: -	Scale 1:25
Client: WATERMAN EED	Checked By: WG	Depth 4.00m	Logged By SA

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	PID	1.1				MADE GROUND: Concrete.
0.10	ES					
			0.25			
			0.32			MADE GROUND: Fine to coarse sand and angular to rounded fine to coarse gravel of flint, limestone, concrete, granite and sandstone.
0.40	PID	2.6				
0.40	ES		0.50			MADE GROUND: Slightly clayey fine to coarse sand and angular to subrounded fine to coarse gravel of sandstone, flint and granite.
0.50-0.70	B					Firm brown mottled orange and grey slightly sandy slightly silty CLAY. Gravel is fine to coarse angular to subrounded of sandstone, limestone and flint.
2.00	PID	1.2				
2.00	D					
3.00	PID	0.8				
3.00	D					
4.00	PID	1.9	4.00			
4.00	D					Trialpit Complete at 4.00 m

Remarks:
1. No groundwater encountered.
2. Sides stable.
3. Backfilled on completion.

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HoleBASE 3.1 (Bld 426.72) Standard Trialpit Log v2 dated 27th Nov 03

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Trialpit No
TP8
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
IMPERIAL WAY, READING	C2611	Level: -	17/07/2014
Location: READING		Dimensions: -	Scale 1:25
Client: WATERMAN EED	Checked By: WG	Depth 4.00m	Logged By SA

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10	PID	0.8	0.10			MADE GROUND:
0.10	ES					MADE GROUND: Brown fine to coarse sand and angular to subrounded fine to coarse gravel of sandstone and flint.
0.40	PID	0.6				
0.40	ES					
0.75	D		0.75			Firm green grey slightly sandy slightly gravelly silty organic CLAY. Gravel is fine to medium angular to subrounded of sandstone and mudstone (Possibly made ground)
1.20	D		1.20			
1.20-1.40	B					Firm to stiff brown mottled grey and orange slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded of sandstone and mudstone.
3.00	D					
3.20-3.60	B					
			3.80			Stiff dark grey silty CLAY.
4.00	D		4.00			Trialpit Complete at 4.00 m

Remarks:
1. No groundwater encountered.
2. Sides stable.
3. Backfilled on completion.

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HoleBASE 3.1 (Bld 426.72) Standard Trialpit Log v2 dated 27th Nov 03

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Trialpit No
TP9
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
IMPERIAL WAY, READING	C2611	Level: -	17/07/2014
Location: READING		Dimensions: -	Scale 1:25
		Depth 4.00m	
Client: WATERMAN EED	Checked By: WG		Logged By SA

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10 0.10	PID ES	0.0	0.10			MADE GROUND: Tarmac.
						MADE GROUND: Dark brown slightly clayey fine to coarse sand and angular to subrounded fine to coarse gravel of sandstone, mudstone and limestone.
0.40 0.40	PID ES	0.0	0.40			Brown mottled orange grey slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub angular to sub rounded of sandstone, mudstone and limestone.
1.00 1.00	PID ES	0.0				
2.00	D					
			2.50			Very stiff friable grey slightly silty CLAY.
3.00	D					
4.00	D		4.00			Trialpit Complete at 4.00 m

Remarks:
1. No groundwater encountered.
2. Sides stable.
3. Backfilled on completion.

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HoleBASE 3.1 (Bld 426.72) Standard Trialpit Log v2 dated 27th Nov 03

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Trialpit No
TP10
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Date
IMPERIAL WAY, READING	C2611	Level: -	17/07/2014
Location: READING		Dimensions: -	Scale 1:25
Client: WATERMAN EED	Checked By: WG	Depth 3.00m	Logged By SA

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Concrete.
			0.25			
0.40	ES					MADE GROUND: Brown slightlly clayey sandy angular to subrounded fine to coarse gravel of flint, sandstone, limestone.
			0.50			Firm to stiff brown mottled grey and orange slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of sandstone, mudstone and flint.
			3.00			Trialpit Complete at 3.00 m

Remarks:
1. No groundwater encountered.
2. Sides stable.
3. Backfilled on completion.

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HoleBASE 3.1 (Bld 426.72) Standard Trialpit Log v2 dated 27th Nov 03

BSL Brownfield Solutions Limited 19 Hereward Rise Halesowen West Midlands B62 8AN	**Trial Pit Log**		Trialpit No **TP11** Sheet 1 of 1
Project Name: Imperial Way, Reading	Project No. C2611	Co-ords: - Level:	Date 22/07/2014
Location: Reading		Dimensions (m): Depth 3.00	Scale 1:25
Client: Waterman EED			Logged PD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.15			MADE GROUND: Tarmac.
				0.30			MADE GROUND: Concrete
	0.35	ES	PID=3				MADE GROUND: Brown slightly silty sand and gravel. Gravel is fine to coarse and is predominantly limestone with occasional tarmac fragments (fallen in from above).
	0.80	ES	PID=0				*Slight becoming moderate hydrocarbon odour below 0.70m bgl.*
	1.20	B	PID=1				
	1.30	ES					*Geomembrane plastic grid present at 1.30m bgl.*
	1.50	ES	PID=0	1.50			Dark grey black organic slightly sandy slightly gravelly silty organic CLAY with organic odour and occasional organic matter. Possible heavy end hydrocarbon odour. Possibly MADE GROUND.
	1.70	ES	PID=0	1.70			Brown mottled orange/cream brown/grey slightly sandy slightly gravelly CLAY with lenses and pockets of silt and sand. Gravel is fine to coarse angular to rounded of mixed lithologies.
				3.00			End of pit at 3.00 m

1 2 3 4 5

Remarks:
1. No groundwater encountered.
2. CBR test undertaken in base of pit.
3. Sides stable.

Stability:

AGS

BSL Brownfield Solutions Limited 19 Hereward Rise Halesowen West Midlands B62 8AN	**Trial Pit Log**	Trialpit No **TP12** Sheet 1 of 1

Project Name: Imperial Way, Reading	Project No. C2611	Co-ords: - Level:	Date 22/07/2014
Location: Reading		Dimensions (m): Depth 3.00	Scale 1:25
Client: Waterman EED			Logged PD

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30			CONCRETE
	0.40	ES	PID=0				MADE GROUND: Brown slightly silty sand and gravel. Gravel is fine to coarse angular to rounded predominantly of limestone with occasional tarmac (fallen in from above).
	0.60	B					
	0.75	ES	PID=1	0.75			Firm to stiff brown mottled creamy brown orange brown sandy silty CLAY with fine to medium sand lenses and pockets.
	1.10	ES	HVR=99 PID=1				
	1.10	B					
				1.60			Firm to stiff brown mottled grey orange brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse angular to rounded of mixed lithologies including flint. Occasional sandy lenses.
			HVR=120				
				3.00			End of pit at 3.00 m

1
2
3
4
5

Remarks:
1. No groundwater encountered.
2. CBR test undertaken in base of pit.
3. Sides stable.

Stability:

AGS

APPENDIX B
Falling Head Permeability Test Results

Variable head permeability test			Site:	Imperial Way	Location:	Reading
Depth below top of casing/standpipe to:			Job No:	C2611	Borehole No:	BH03
			Date:	16/07/2014	Sheet:	1 of 1
(a) bottom of borehole:	3.5	m	Ground level (m Aod)	N/A	Crew:	RD Drilling
(b) bottom of casing:	3.0	m				
(c) top of filter material:	N/A	m	Weather:		Sunny	
(d) centre of piezometer tip:	N/A	m	Type of Test:		Falling Head	
(e) initial groundwater level:	3.0	m	Diameter of casing/standpipe (mm)			150
Height of casing/standpipe above surface	0.0	m	Length of filter (mm)	N/A	Dia of filter (mm)	N/A
Elevation of casing/standpipe (Aod)	N/A	m				

Test Record:

Time	Time elapsed (min)	Depth to water level (m)	Time	Time elapsed (min)	Depth to water level (m)	Time	Time elapsed (min)	Depth to water level (m)
	0	0.500						
	1	1.470						
	2	2.300						
	3	2.800						
	4	3.000						
	5	3.020						
	10	3.020						
	15	3.020						
	20	3.020						
	25	3.020						
	30	3.020						
	35	3.020						
	40	3.020						
	45	3.020						
	50	3.020						
	55	3.020						
	60	3.020						

Remarks: Falling head permeability test undertaken within cable percussive borehole.
No piezometer or filter material added.
Test undertaken within Sand and Gravel strata.

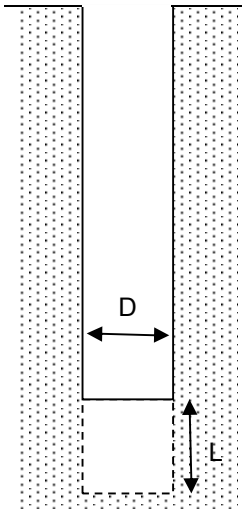
Note: Depth to water level to be measured from top of casing or standpipe

Calculation Sheet	WATERMAN EED	BSL
1 of 2	IMPERIAL WAY, READING	
	C2611	

Date:	By:	Checked:
12/08/2014	PD	WG

Falling Head Permeability in accordance with BS 5930

Calculation of Intake Factor (F) Borehole BH03



Area of base

A = 0.0177 m^2

Diameter

D = 150 mm

0.15 m

Length

L = 500 mm

0.5 m

$$F = \frac{2 \pi L}{\ln [(L/D) + \sqrt{\{1+(L/D)^2\}}]}$$

$$F = \frac{3.142}{1.919}$$

F = 1.637

Calculation Sheet	WATERMAN EED	BSL
2 of 2	IMPERIAL WAY, READING	
	C2611	

Date:	By:	Checked:
12/08/2014	PD	WG

Falling Head Permeability in accordance with BS 5930

Borehole BH03

At time = 1 mins (t_1) Depth to water =	1.47	t_1	60 sec
Depth to base of borehole =	3.5		
Depth of Water (H_1) =	2.03		
At time = 5 mins (t_2) Depth to water =	3.02	t_2	300 sec
Depth to base of borehole =	3.5		
Depth of Water (H_2) =	0.48		

$$k = \frac{A}{F(t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$k = \frac{0.0177}{392.92} \ln \frac{2.03}{0.48}$$

k = 6.49E-05 m/s

Variable head permeability test			Site:	Imperial Way	Location:	Reading
Depth below top of casing/standpipe to:			Job No:	C2611	Borehole No:	BH04
			Date:	17/07/2014	Sheet:	1 of 1
(a) bottom of borehole:	5.0	m	Ground level (m Aod)	N/A	Crew:	RD Drilling
(b) bottom of casing:	1.5	m				
(c) top of filter material:	N/A	m	Weather:		Sunny	
(d) centre of piezometer tip:	N/A	m	Type of Test:		Falling Head	
(e) initial groundwater level:	Dry	m	Diameter of casing/standpipe (mm)			150
Height of casing/standpipe above surface	0.0	m	Length of filter (mm)	N/A	Dia of filter (mm)	N/A
Elevation of casing/standpipe (Aod)	N/A	m				

Test Record:

Time	Time elapsed (min)	Depth to water level (m)	Time	Time elapsed (min)	Depth to water level (m)	Time	Time elapsed (min)	Depth to water level (m)
	0	0.000						
	1	0.000						
	2	0.000						
	3	0.000						
	4	0.000						
	5	0.000						
	10	0.000						
	15	0.000						
	20	0.000						
	25	0.000						
	30	0.000						

Remarks: Falling head permeability test undertaken within cable percussive borehole.
No piezometer or filter material added.
Test undertaken within Clay strata.

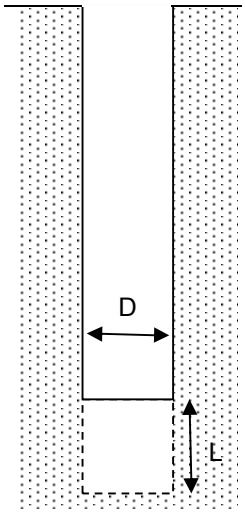
Note: Depth to water level to be measured from top of casing or standpipe

Calculation Sheet	WATERMAN EED	BSL
1 of 2	IMPERIAL WAY, READING	
	C2611	

Date:	By:	Checked:
12/08/2014	PD	WG

Falling Head Permeability in accordance with BS 5930

Calculation of Intake Factor (F) Borehole BH04



Area of base

A = 0.0177 m^2

Diameter

D = 150 mm

0.15 m

Length

L = 3500 mm

3.5 m

$$F = \frac{2 \pi L}{\ln [(L/D) + \sqrt{\{1+(L/D)^2\}}]}$$

$$F = \frac{21.991}{3.843}$$

F = 5.722

Calculation Sheet	WATERMAN EED	BSL
2 of 2	IMPERIAL WAY, READING	
	C2611	

Date:	By:	Checked:
12/08/2014	PD	WG

Falling Head Permeability in accordance with BS 5930

Borehole BH04

At time = 1 mins (t_1) Depth to water =	0	t_1	60 sec
Depth to base of borehole =	5.0		
Depth of Water (H_1) =	5		
At time = 30 mins (t_2) Depth to water =	0	t_2	1800 sec
Depth to base of borehole =	5.0		
Depth of Water (H_2) =	5		

$$k = \frac{A}{F(t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$k = \frac{0.0177}{2848.71} \ln \frac{5}{5}$$

k = 0.00E+00 m/s

APPENDIX C
CBR Test Results

PSL
Professional Soils Laboratory

LABORATORY REPORT

UKAS TESTING
4043

Contract Number: PSL14/3717

Client's Reference: Report Date: 24 July 2014

Client Name: Brownfield Solutions
Wychwood House
1 Queens Street
Northwich
Cheshire
CW9 5JL

For the attention of: James Doyle

Contract Title: Imperial Way, Reading.

Date Received: 23/7/2014
Date Commenced: 23/7/2014
Date Completed: 24/7/2014

Notes: **Opinions and Interpretations are outside the UKAS Accreditation**

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Checked and Approved Signatories:

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A Watkins (Director)
M Beastall (Laboratory Manager)

D Lambe (Senior Technician)
S Royle (Senior Technician)

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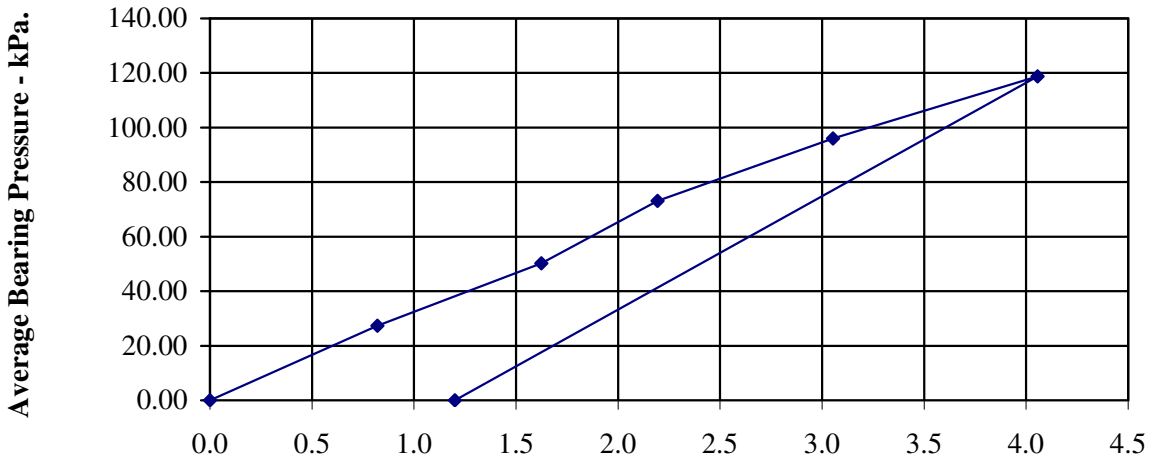
VERTICAL DEFORMATION TESTS.

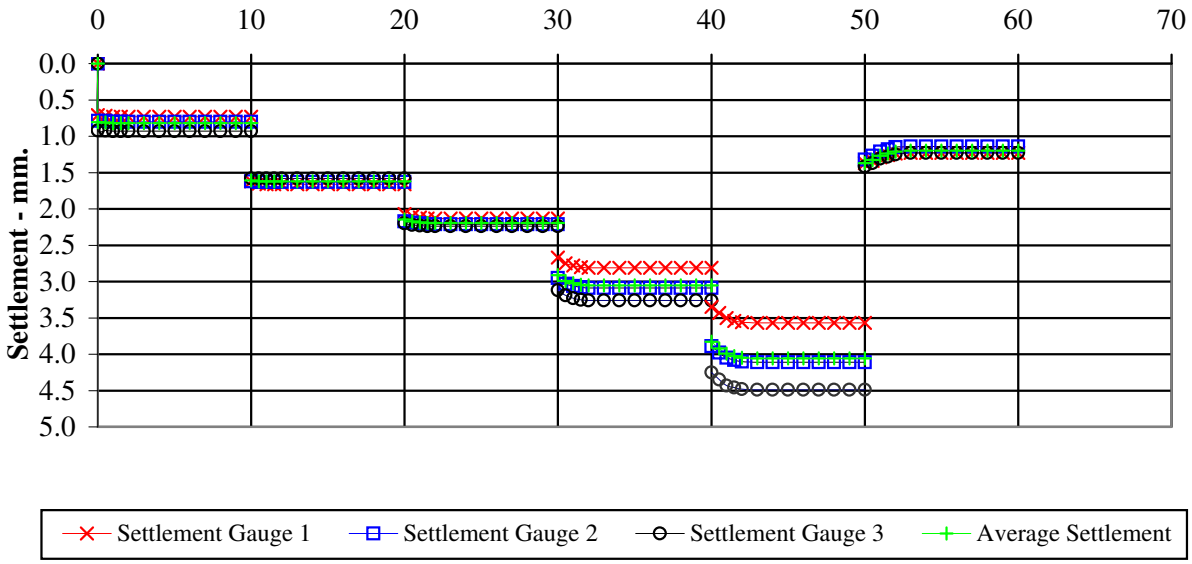
BS 1377 : Part 9 : 1990.

Date of Test: 22/07/14

Test Position: CBR01 **Depth (m):** 0.45

Plate Area (m2): 0.2827433 **Type of Kentledge:** Wheeled
Moisture Content (%) N/A
Maximum Applied Pressure (kPa): 118.82
Maximum Deformation (mm): 4.06
Description: Light brown slightly gravelly slightly sandy CLAY.





Compiled By	Date	Checked By	Date	Approved By	Date	Contract No.
	23/07/14		23/07/14		23/07/14	PSL14/3717

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Professional Soils Laboratory

Professional Soils Laboratory Ltd.
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Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4
Incorporating IAN 73/06

Date of Test	**22/07/14**	
Test Position	**CBR01**	
Depth (m)	**0.45**	
Moisture Content(%)	**N/A**	
Description	**Light brown slightly gravelly slightly sandy CLAY.**	
Maximum Deflection	**4.06**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load(@1.25mm)	**40.0**	**kN/m^2**
Plate diameter	**600**	**mm**
Conversion factor for plate diameter	**0.804**	
K_{762}(modulus of subgrade reaction)	**25.7**	**$kN/m^2/mm$**
CBR Value	**2.7**	**%**

Checked/Approved	Date
M.Burns	23/07/14

IMPERIAL WAY, READING.	**Contract No. PSL14/3717**

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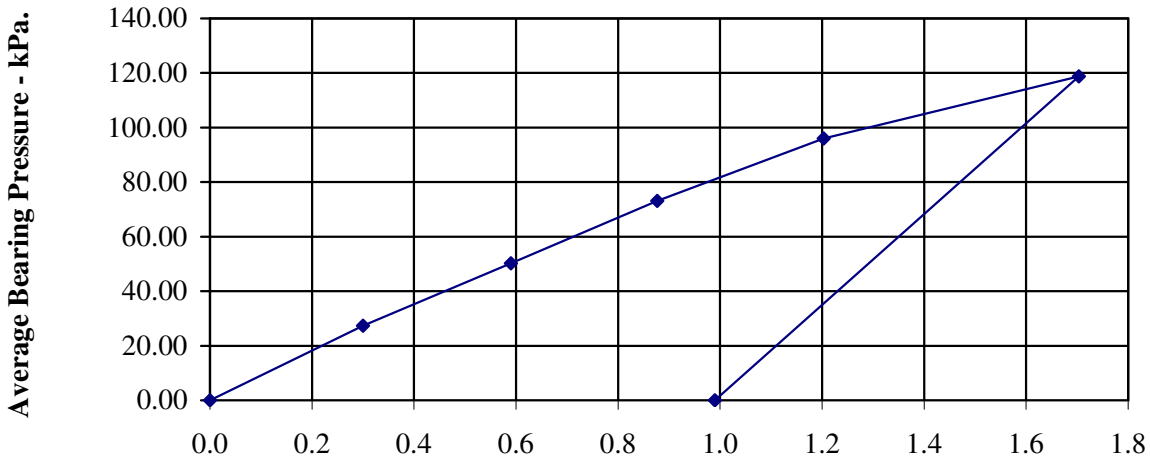
VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

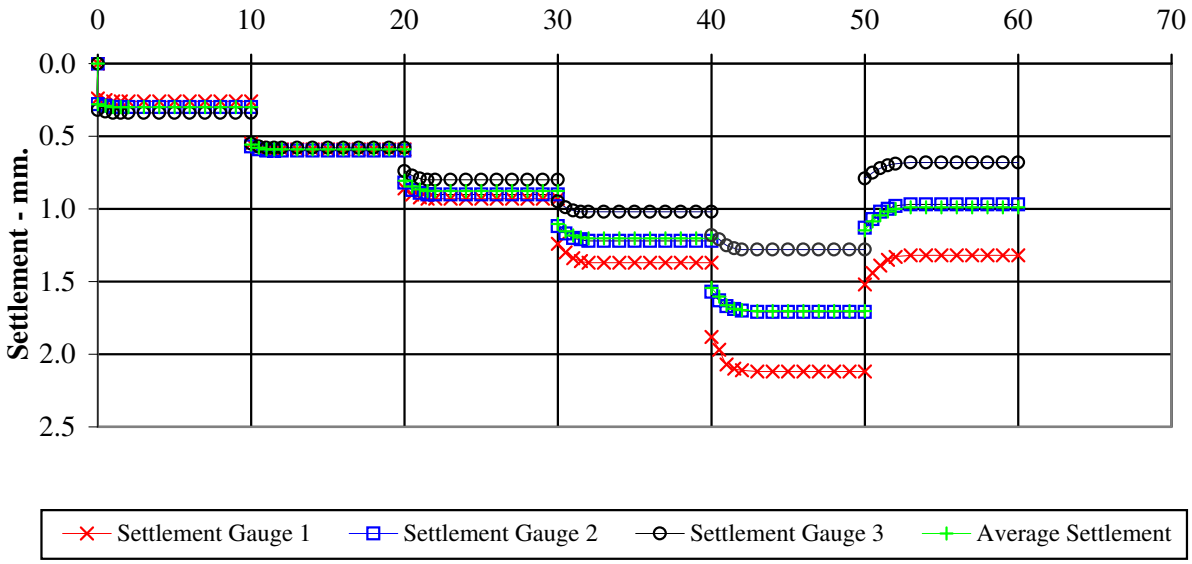
Date of Test: 22/07/14

Test Position: CBR02 **Depth (m):** 0.65

Plate Area (m2): 0.2827433 **Type of Kentledge:** Wheeled
Moisture Content (%) N/A
Maximum Applied Pressure (kPa): 118.82
Maximum Deformation (mm): 1.70
Description: Light brown slightly gravelly slightly sandy CLAY.



Time - minutes.



Compiled By	Date	Checked By	Date	Approved By	Date	Contract No.
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Incorporating IAN 73/06

Date of Test	**22/07/14**	
Test Position	**CBR02**	
Depth (m)	**0.65**	
Moisture Content(%)	**N/A**	
Description	**Light brown slightly gravelly slightly sandy CLAY.**	
Maximum Deflection	**1.70**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load(@1.25mm)	**98.0**	**kN/m^2**
Plate diameter	**600**	**mm**
Conversion factor for plate diameter	**0.804**	
K_{762}(modulus of subgrade reaction)	**63.1**	**$kN/m^2/mm$**
CBR Value	**12.7**	**%**

Checked/Approved	Date
M. Burns	23/07/14

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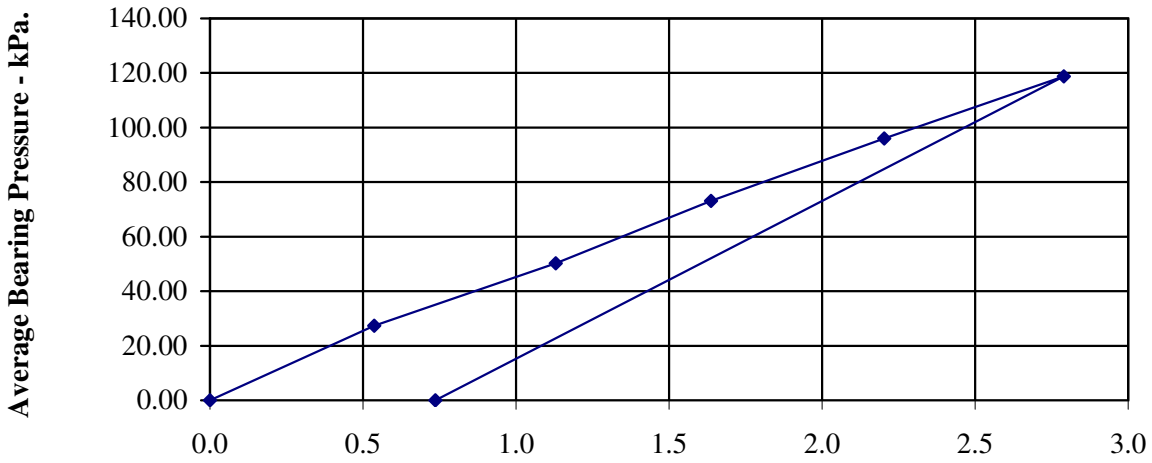
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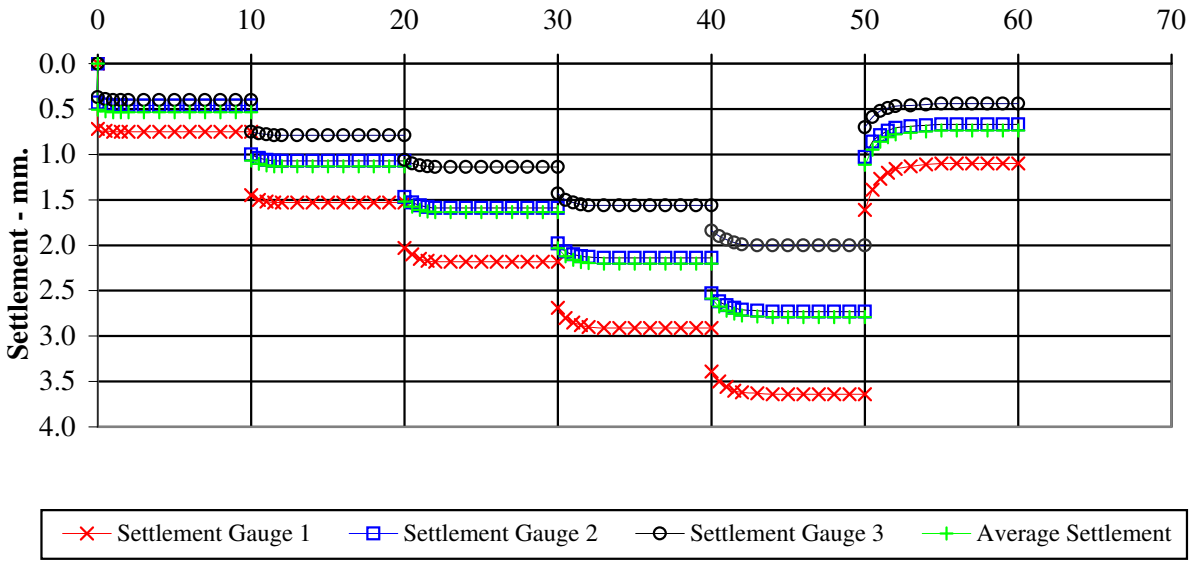
BS 1377 : Part 9 : 1990.

Date of Test: 22/07/14

Test Position: CBR03 **Depth (m):** 0.45

Plate Area (m2): 0.2827433 **Type of Kentledge:** Wheeled
Moisture Content (%) N/A
Maximum Applied Pressure (kPa): 118.82
Maximum Deformation (mm): 2.79
Description: Light brown slightly gravelly slightly sandy CLAY.





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Date of Test	**22/07/14**	
Test Position	**CBR03**	
Depth (m)	**0.45**	
Moisture Content(%)	**N/A**	
Description	**Light brown slightly gravelly slightly sandy CLAY.**	
Maximum Deflection	**2.79**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load(@1.25mm)	**57.0**	**kN/m^2**
Plate diameter	**600**	**mm**
Conversion factor for plate diameter	**0.804**	
K_{762}(modulus of subgrade reaction)	**36.7**	**$kN/m^2/mm$**
CBR Value	**5.0**	**%**

Checked/Approved	Date
M. Burns	23/07/14

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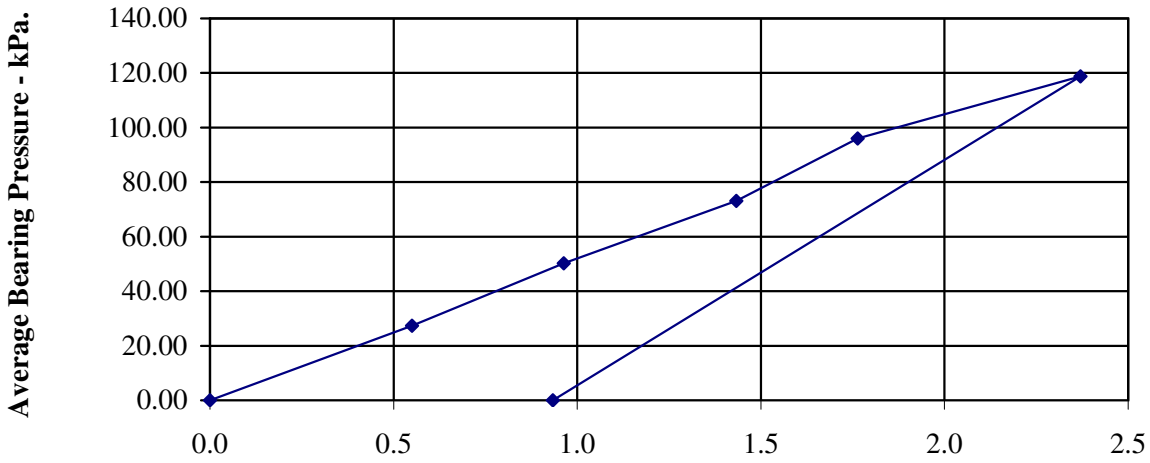
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BS 1377 : Part 9 : 1990.

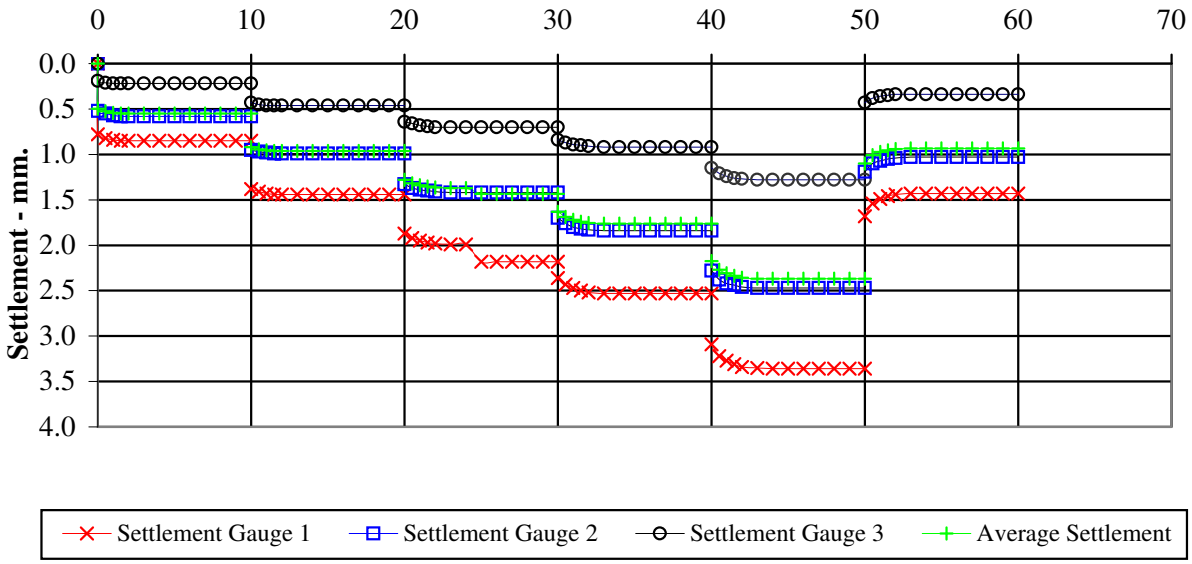
Date of Test: 22/07/14

Test Position: CBR04 **Depth (m):** 0.00

Plate Area (m2): 0.2827433 **Type of Kentledge:** Wheeled
Moisture Content (%) N/A
Maximum Applied Pressure (kPa): 118.82
Maximum Deformation (mm): 2.37
Description: Light brown slightly gravelly slightly sandy CLAY.



Time - minutes.



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Calculation of Equivalent CBR Value from Plate Bearing Test

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Incorporating IAN 73/06

Date of Test	**22/07/14**	
Test Position	**CBR04**	
Depth (m)	**0.00**	
Moisture Content(%)	**N/A**	
Description	**Light brown slightly gravelly slightly sandy CLAY.**	
Maximum Deflection	**2.37**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load(@1.25mm)	**64.0**	**kN/m^2**
Plate diameter	**600**	**mm**
Conversion factor for plate diameter	**0.804**	
K_{762}(modulus of subgrade reaction)	**41.2**	**$kN/m^2/mm$**
CBR Value	**6.1**	**%**

Checked/Approved	Date
M. Burns	23/07/14

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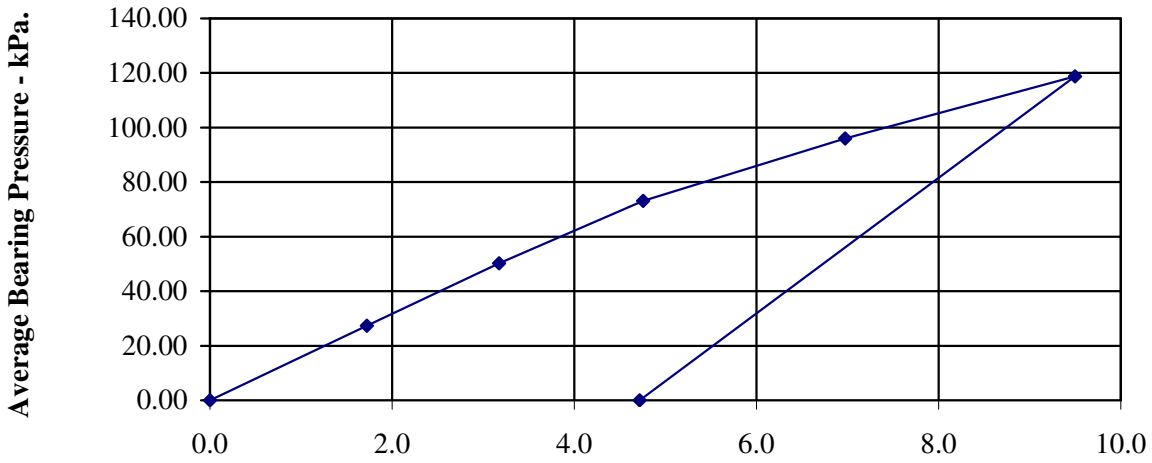
VERTICAL DEFORMATION TESTS.

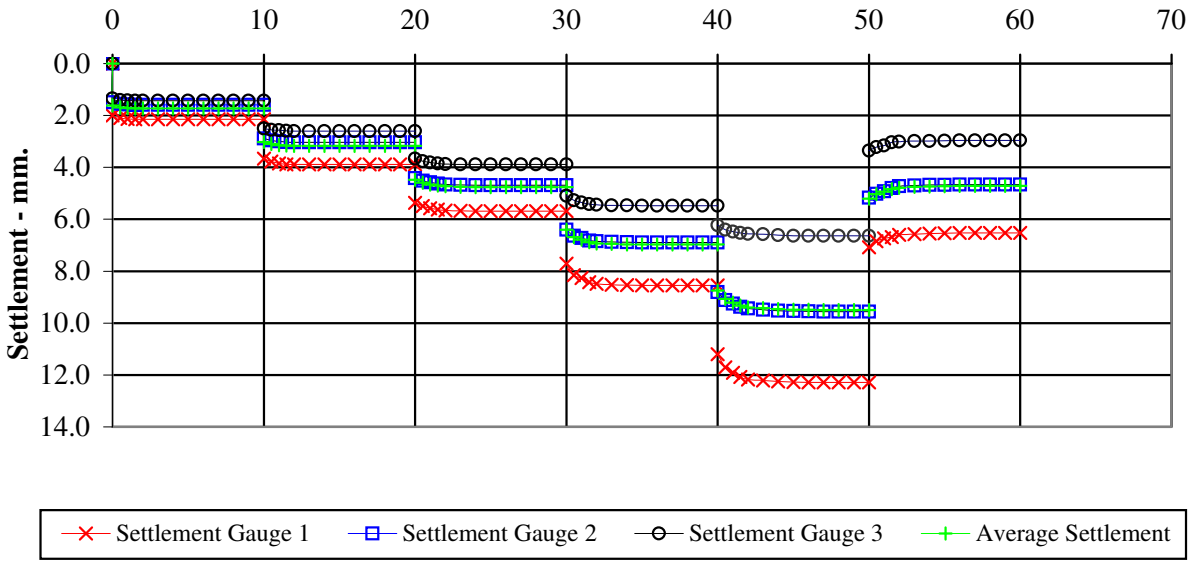
BS 1377 : Part 9 : 1990.

Date of Test: 22/07/14

Test Position: CBR05 **Depth (m):** 0.70

Plate Area (m2): 0.2827433 **Type of Kentledge:** Wheeled
Moisture Content (%) N/A
Maximum Applied Pressure (kPa): 118.82
Maximum Deformation (mm): 9.50
Description: Light brown slightly gravelly slightly sandy CLAY.





Compiled By	Date	Checked By	Date	Approved By	Date	Contract No.
	23/07/14		23/07/14		23/07/14	PSL14/3717

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Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4
Incorporating IAN 73/06

Date of Test	**22/07/14**	
Test Position	**CBR05**	
Depth (m)	**0.70**	
Moisture Content(%)	**N/A**	
Description	**Light brown slightly gravelly slightly sandy CLAY.**	
Maximum Deflection	**9.50**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load(@1.25mm)	**20.0**	**kN/m^2**
Plate diameter	**600**	**mm**
Conversion factor for plate diameter	**0.804**	
K_{762}(modulus of subgrade reaction)	**12.9**	**$kN/m^2/mm$**
CBR Value	**0.8**	**%**

Checked/Approved	Date
M.Burns	23/07/14

IMPERIAL WAY, READING.	**Contract No. PSL14/3717**

APPENDIX D
Geotechnical Laboratory Testing Results

PSL
Professional Soils Laboratory

LABORATORY REPORT

UKAS TESTING
4043

Contract Number: PSL14/3901

Client's Reference: Report Date: 22 August 2014

Client Name: Brownfield Solutions
Wychwood House
1 Queens Street
Northwich
Cheshire
CW9 5JL

For the attention of: Will Griffiths

Contract Title: Imperial Way, Reading.

Date Received: 4/8/2014
Date Commenced: 4/8/2014
Date Completed: 22/8/2014

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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Checked and Approved Signatories:

R Gunson (Director)
A Watkins (Director)
M Beastall (Laboratory Manager)

D Lambe (Senior Technician)
S Royle (Senior Technician)

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awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Depth m	Description of Sample
BH01		U	1.50	Stiff brown mottled grey gravelly slightly sandy CLAY.
BH01		U	3.50	Stiff brown slightly gravelly slightly sandy CLAY.
BH01		U	6.50	Stiff dark brown slightly sandy CLAY.
BH01		U	10.50	Stiff dark brown slightly sandy CLAY.
BH01		B	1.00	Brown slightly gravelly slightly sandy CLAY.
BH02		U	2.50	Firm brown mottled grey slightly sandy CLAY.
BH02		U	7.50	Stiff dark brown slightly sandy CLAY.
BH02		U	4.50	Stiff dark brown slightly sandy CLAY.
BH02		D	1.50	Brown mottled grey slightly sandy CLAY.
BH03		U	8.50	Stiff dark brown slightly sandy CLAY.
BH03		U	12.50	Stiff dark brown slightly sandy CLAY.
BH04		U	3.50	Stiff dark brown mottled grey slightly sandy LAY.
BH04		U	14.50	Very stiff brown mottled grey sandy CLAY.
BH04		U	6.50	Stiff dark brown slightly sandy CLAY.
BH04		U	10.50	Firm dark brown slightly sandy CLAY.
BH05		U	3.50	Stiff brown slightly sandy CLAY.
BH05		U	5.50	Stiff brown slightly sandy CLAY.
BH05		B	1.00	Brown slightly gravelly sandy CLAY.
BH06		U	1.50	Stiff brown mottled grey slighty gravelly slightly sandy CLAY.

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IMPERIAL WAY, READING.

Contract No: PSL14/3901

Client Ref: C2611

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Depth m	Description of Sample
BH06		U	3.50	Stiff dark brown slightly sandy CLAY.
BH06		U	5.50	Stiff dark brown slightly sandy CLAY.
BH06		U	9.50	Stiff dark brown slightly sandy CLAY.
BH06		B	1.00	Brown slightly sandy CLAY.
TP11		B	1.20	MADE GROUND brown sandy silty gravel.
TP12		B	0.60	MADE GROUND brown sandy silty gravel.

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Contract No: PSL14/3901

Client Ref: C2611

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
BH01		B	1.00	16				62	26	36	95	High plasticity CH.
BH02		D	1.50	27				56	25	31	98	High plasticity CH.
BH05		B	1.00	12				51	24	27	95	High plasticity CH.
BH06		B	1.00	26				66	26	40	100	High plasticity CH.

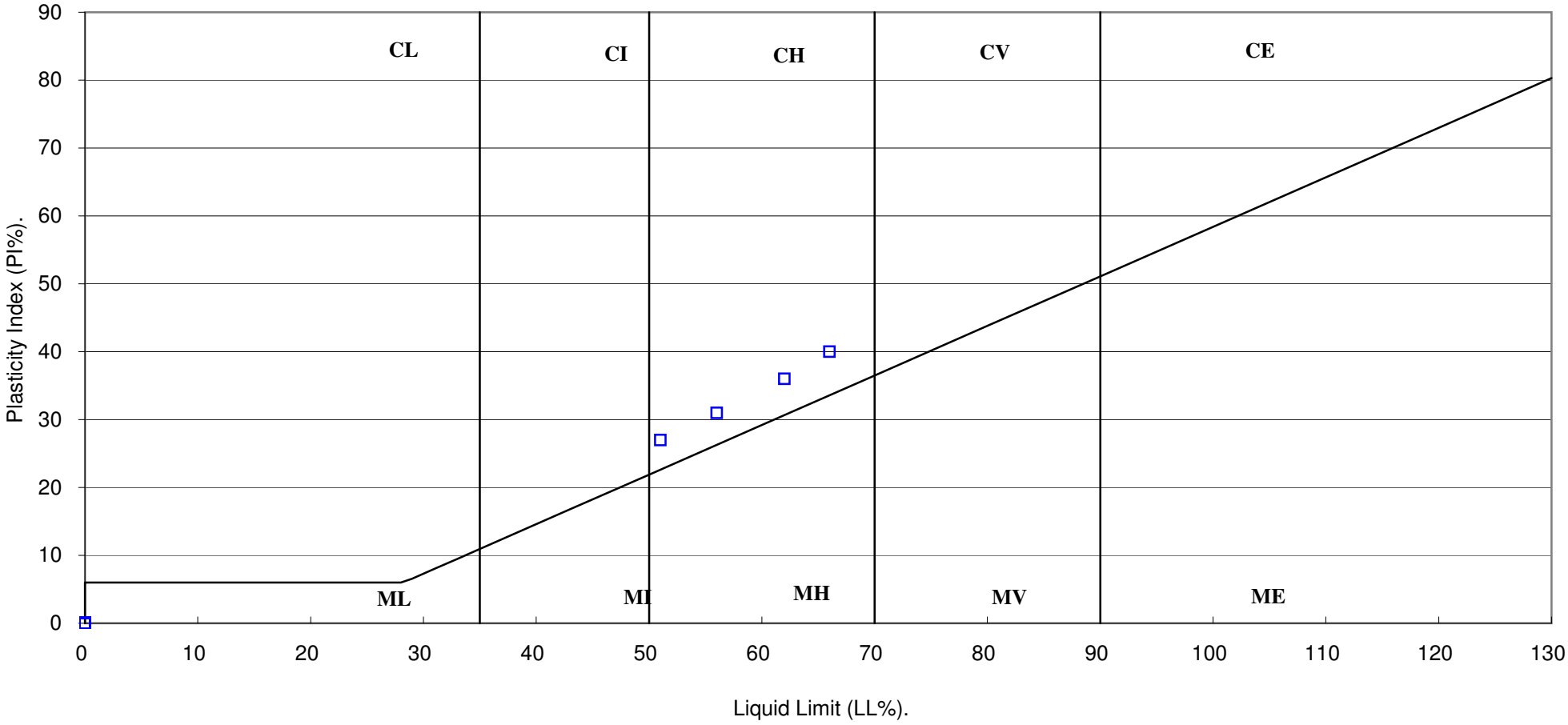
SYMBOLS : NP : Non Plastic *** : Liquid Limit and Plastic Limit Wet Sieved.**

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PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



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	IMPERIAL WAY, READING.				Contract No:	PSL14/3901
					Client Ref:	C2611

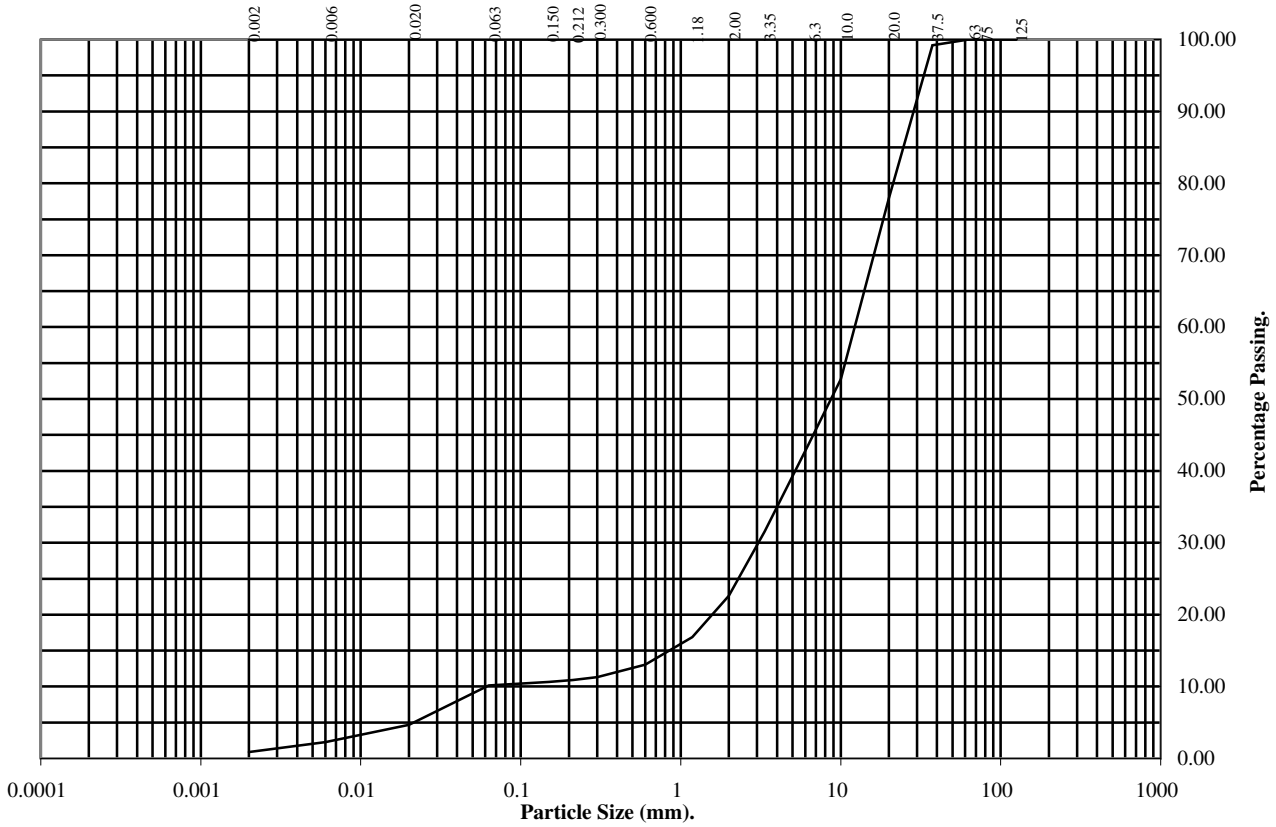
Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP11 **Depth (m):** 1.20

Sample Number: **Sample Type:** B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	99
20	78
10	53
6.3	44
3.35	32
2	23
1.18	17
0.6	13
0.3	11
0.212	11
0.15	11
0.063	10

Particle Diameter	Percentage Passing
0.02	5
0.006	2
0.002	1

Soil Fraction	Total Percentage
Cobbles	0
Gravel	77
Sand	13
Silt	9
Clay	1

Remarks:
See summary of soil descriptions.

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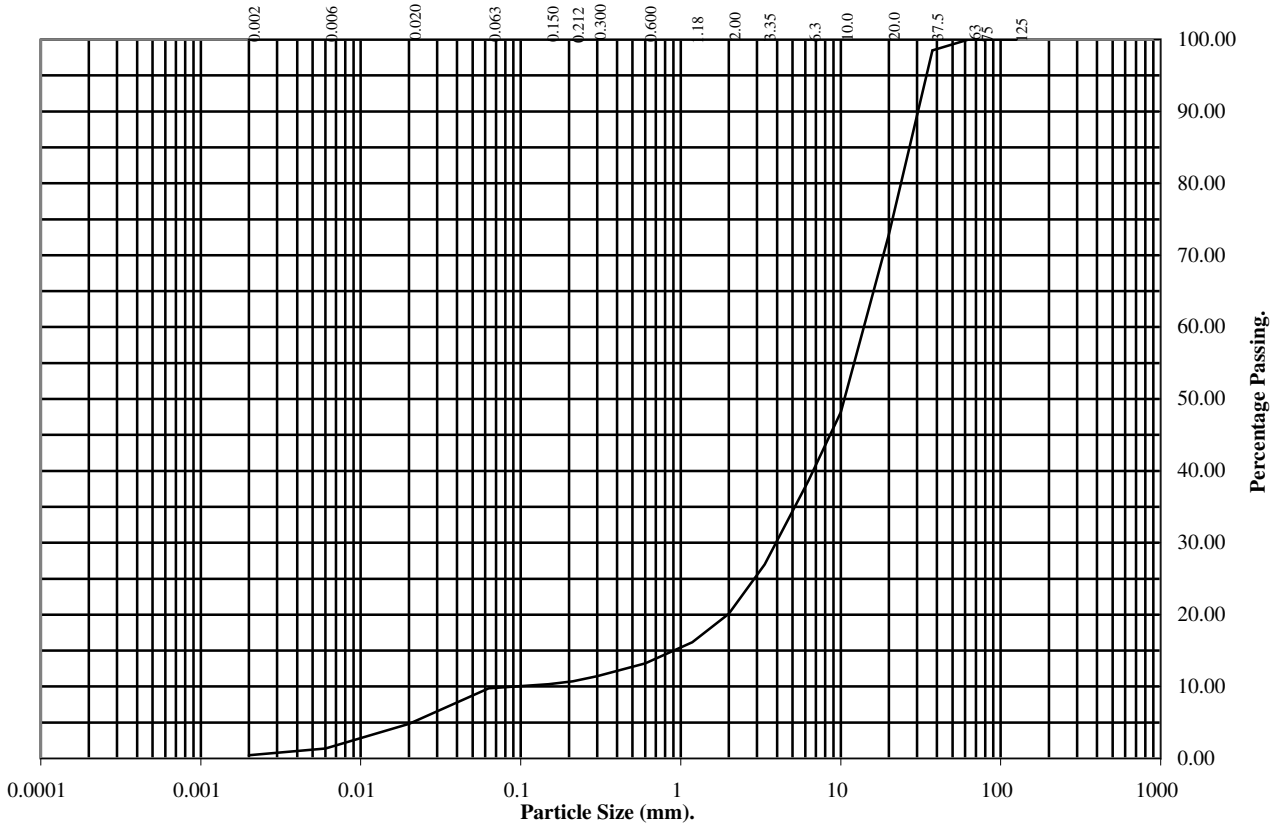
Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: TP12 **Depth (m):** 0.60

Sample Number: **Sample Type:** B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	99
20	73
10	48
6.3	39
3.35	27
2	20
1.18	16
0.6	13
0.3	11
0.212	11
0.15	10
0.063	10

Particle Diameter	Percentage Passing
0.02	5
0.006	1
0.002	0

Soil Fraction	Total Percentage
Cobbles	0
Gravel	80
Sand	10
Silt	10
Clay	0

Remarks:
See summary of soil descriptions.

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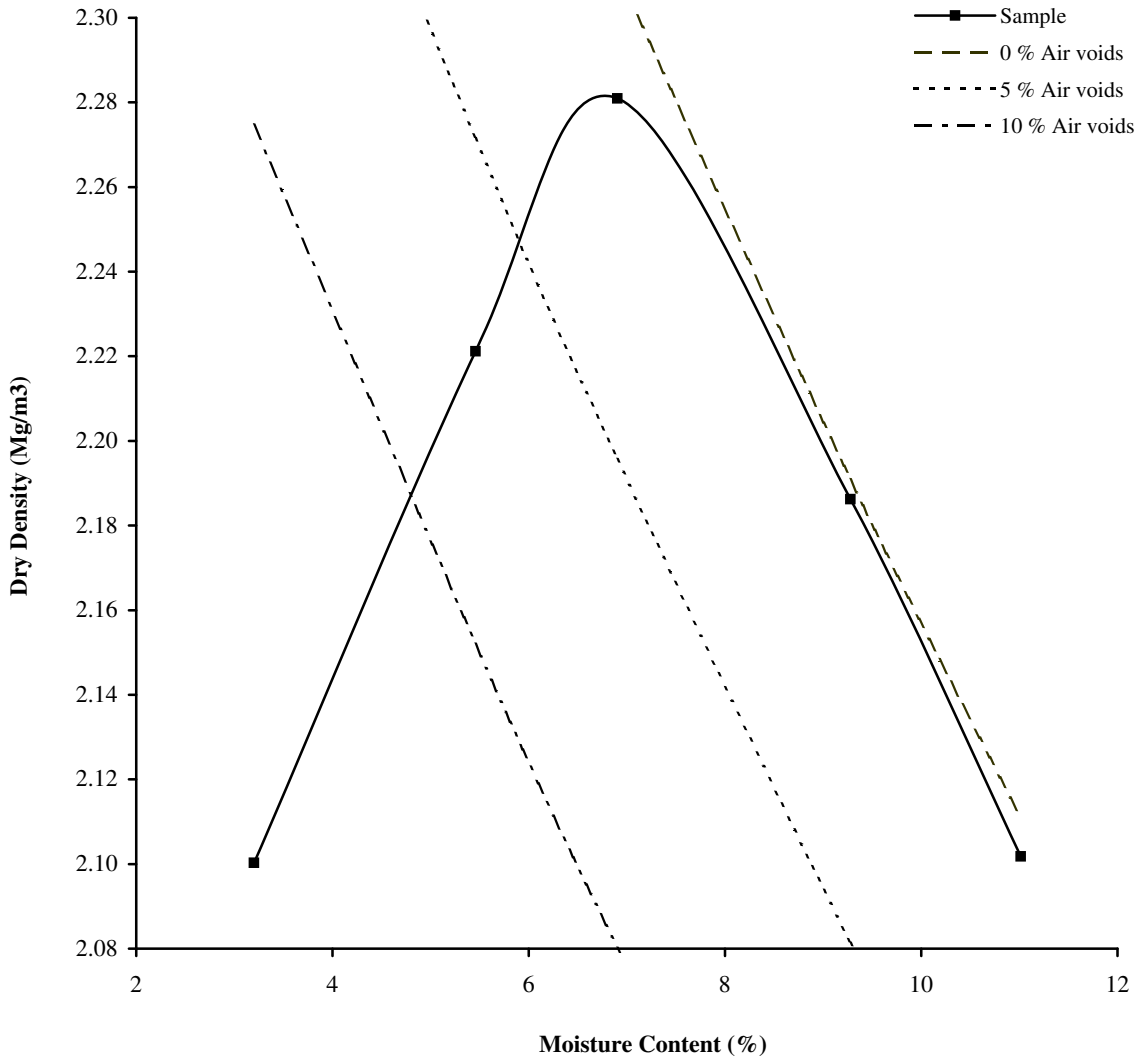
PSL Professional Soils Laboratory	IMPERIAL WAY, READING.	Contract No.: PSL14/3901

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Hole Number: TP11 **Depth (m) :** 1.20

Sample Number: **Sample Type:** B



Initial Moisture Content:	3	Method of Compaction	2.5kg / Separate Sample	
Particle Density (Mg/m3):	2.75	Assumed	Material Retained on 37.5 mm Test Sieve (%):	1
Maximum Dry Density (Mg/m3):		2.28	Material Retained on 20.0 mm Test Sieve (%):	21
Optimum Moisture Content (%):		7		
Remarks	See Summary of Soil Descriptions.			

Checked By	Date	Approved By	Date
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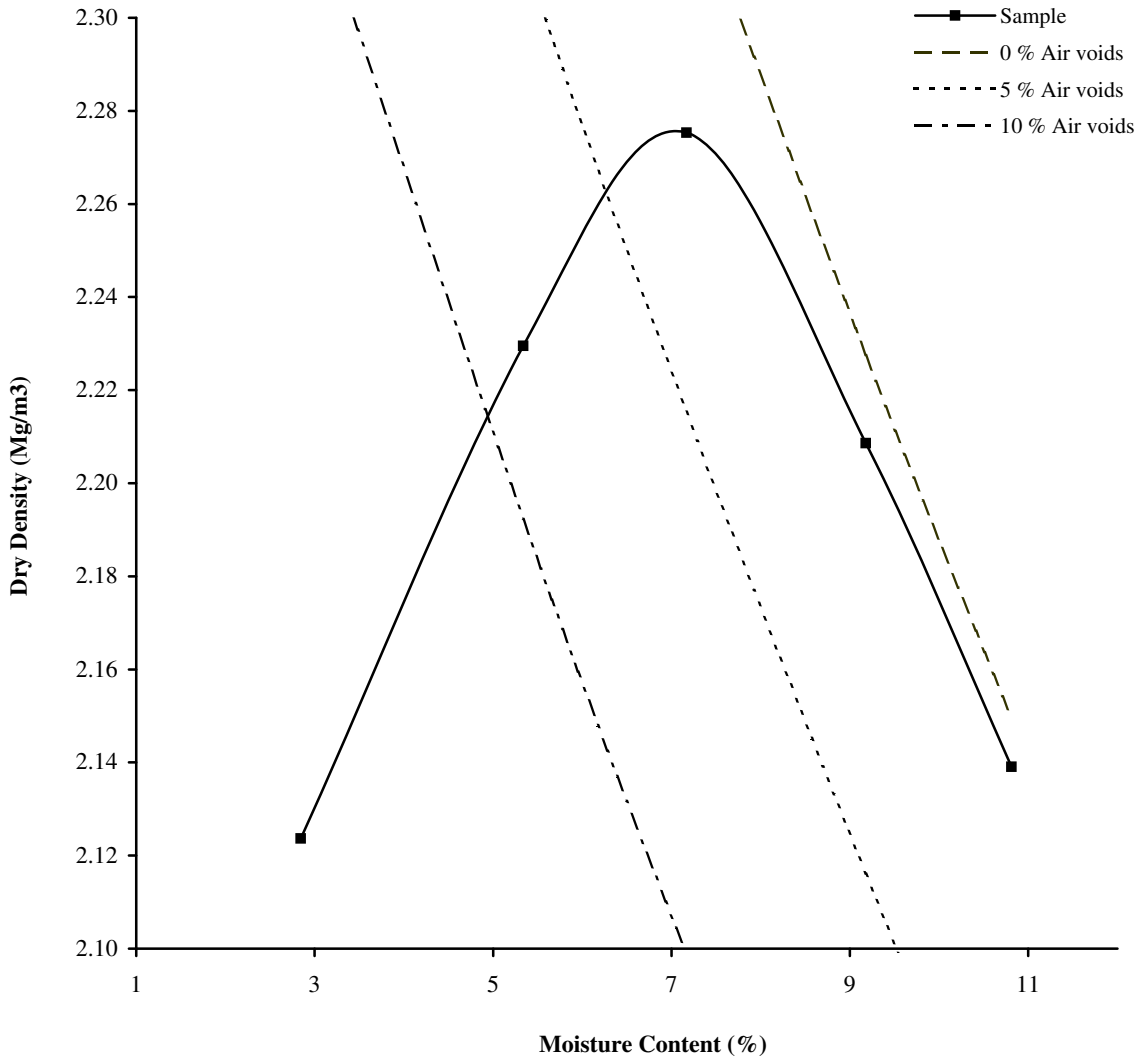
PSL Professional Soils Laboratory	**IMPERIAL WAY, READING.**	**Contract No. PSL14/3901**

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Hole Number: TP12 **Depth (m) :** 0.60

Sample Number: **Sample Type:** B



Initial Moisture Content:	3.0	Method of Compaction	2.5kg / Separate Sample	
Particle Density (Mg/m3):	2.8	Assumed	Material Retained on 37.5 mm Test Sieve (%):	1
Maximum Dry Density (Mg/m3):		2.28	Material Retained on 20.0 mm Test Sieve (%):	26
Optimum Moisture Content (%):		7		
Remarks	See Summary of Soil Descriptions.			

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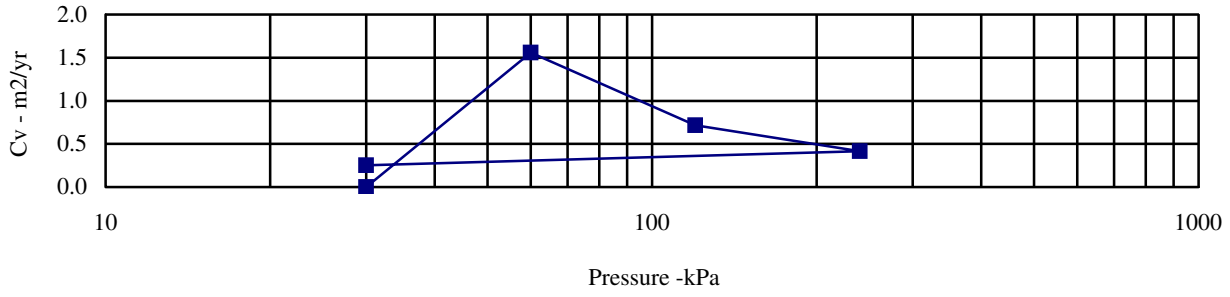
One Dimensional Consolidation Properties

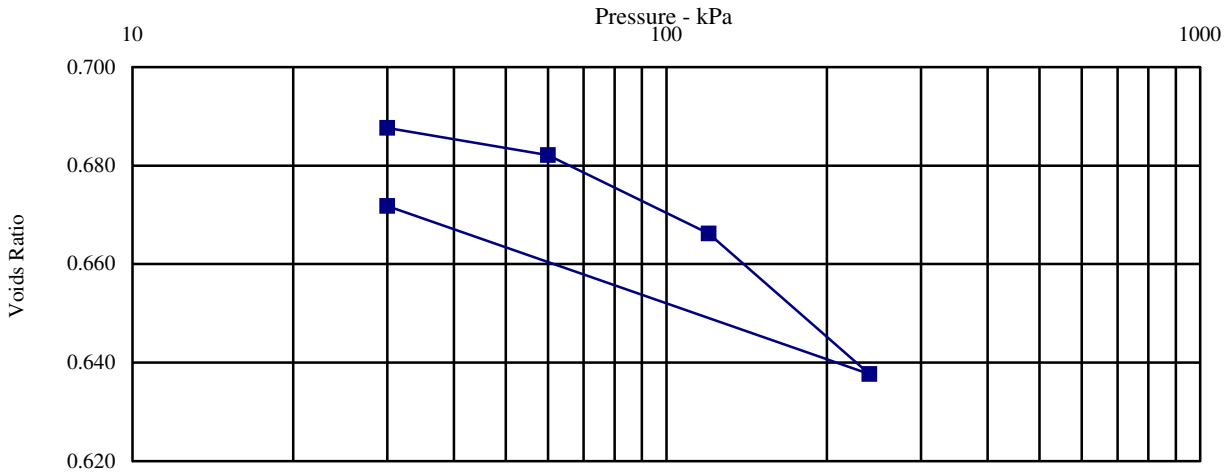
BS 1377: Part 5: 1990

Hole Number: **BH01** **Depth (m):** **1.50**

Sample Number: **Sample Type:** **U**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	25							
Bulk Density (Mg/m3):	1.99	0	-	30	Swelling	Swelling	Method used to	
Dry Density (Mg/m3):	1.59	30	-	60	0.109	1.557	determine CV:	t90
Voids Ratio:	0.670	60	-	120	0.158	0.718	Nominal temperature	
Degree of saturation:	100.1	120	-	240	0.142	0.414	during test ' C:	20
Height (mm):	19.99	240	-	30	0.099	0.251	Remarks:	
Diameter (mm)	75.19						See summary of soils description.	
Particle Density (Mg/m3):	2.65							
Assumed								





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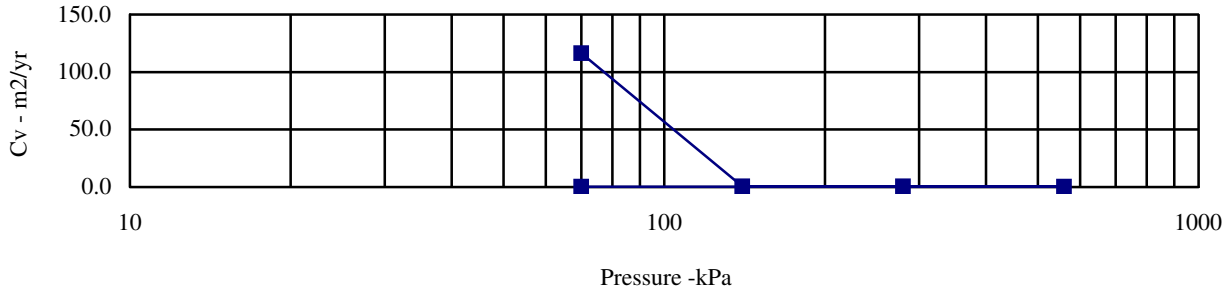
One Dimensional Consolidation Properties

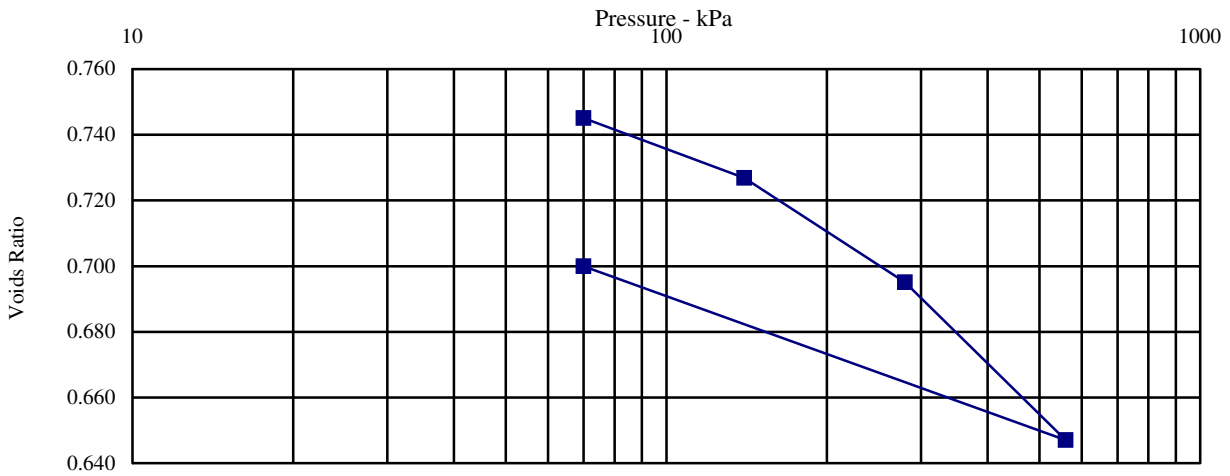
BS 1377: Part 5: 1990

Hole Number: **BH01** **Depth (m):** **3.50**

Sample Number: **Sample Type:** **U**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	27							
Bulk Density (Mg/m3):	1.91	0	-	70	0.148	116.403	Method used to	
Dry Density (Mg/m3):	1.50	70	-	140	0.149	0.692	determine CV:	t90
Voids Ratio:	0.763	140	-	280	0.131	0.495	Nominal temperature	
Degree of saturation:	95.1	280	-	560	0.101	0.395	during test ' C:	20
Height (mm):	20.59	560	-	70	0.066	0.368	Remarks:	
Diameter (mm)	75.21						See summary of soils description.	
Particle Density (Mg/m3):	2.65							
Assumed								





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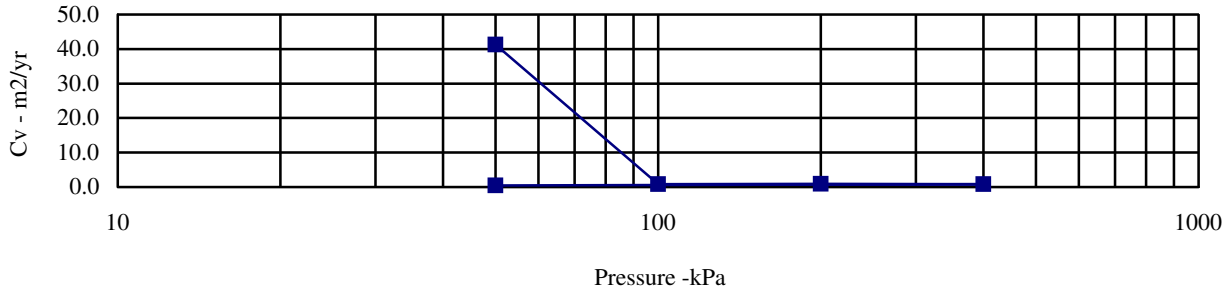
One Dimensional Consolidation Properties

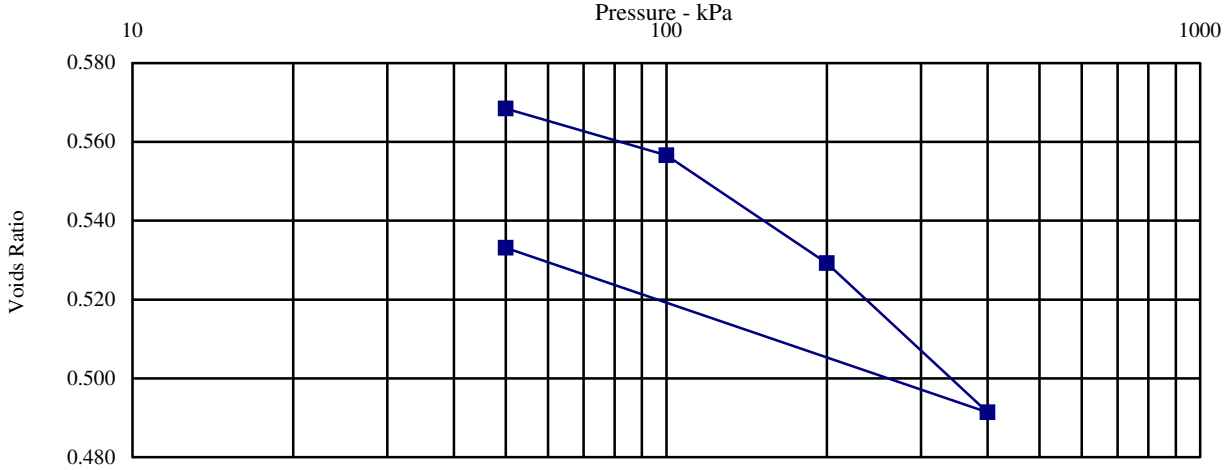
BS 1377: Part 5: 1990

Hole Number: **BH02** **Depth (m):** **2.50**

Sample Number: **Sample Type:** **U**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	22							
Bulk Density (Mg/m3):	2.06	0	-	50	-0.061	41.319	Method used to	
Dry Density (Mg/m3):	1.69	50	-	100	0.151	0.880	determine CV:	t90
Voids Ratio:	0.564	100	-	200	0.176	0.940	Nominal temperature	
Degree of saturation:	101.5	200	-	400	0.124	0.847	during test ' C:	20
Height (mm):	20.02	400	-	50	0.080	0.481	Remarks:	
Diameter (mm)	75.21						See summary of soils description.	
Particle Density (Mg/m3):	2.65							
Assumed								





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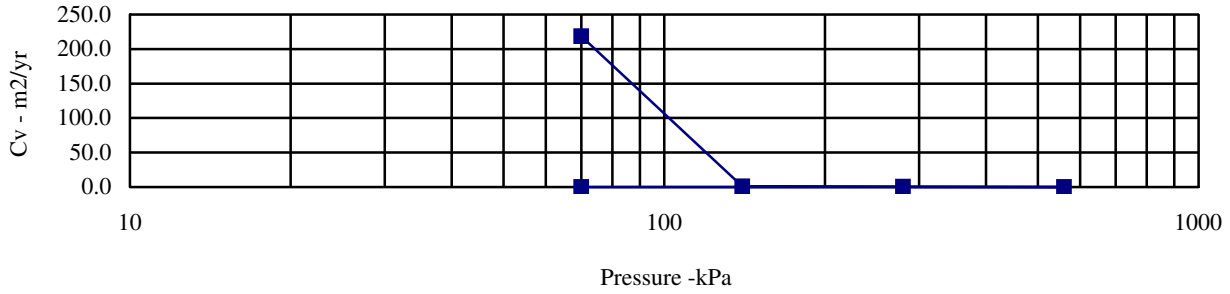
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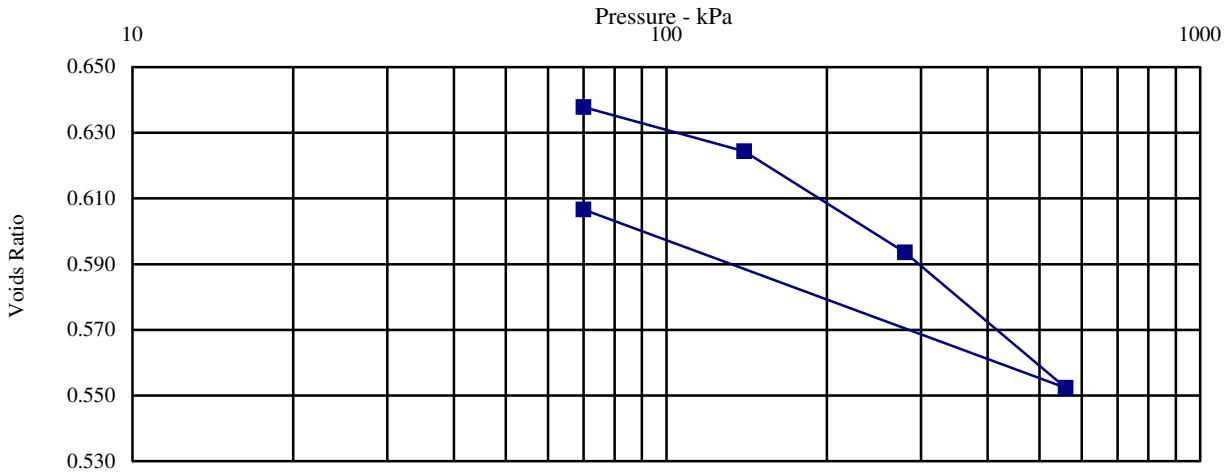
BS 1377: Part 5: 1990

Hole Number: **BH05** **Depth (m):** **3.50**

Sample Number: **Sample Type:** **U**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	22							
Bulk Density (Mg/m3):	1.94	0	-	70	0.231	218.594	Method used to	
Dry Density (Mg/m3):	1.59	70	-	140	0.117	0.867	determine CV:	t90
Voids Ratio:	0.665	140	-	280	0.136	0.307	Nominal temperature	
Degree of saturation:	87.8	280	-	560	0.092	0.230	during test ' C:	20
Height (mm):	20.01	560	-	70	0.071	0.178	Remarks:	
Diameter (mm)	75.24						See summary of soils description.	
Particle Density (Mg/m3):	2.65							
Assumed								





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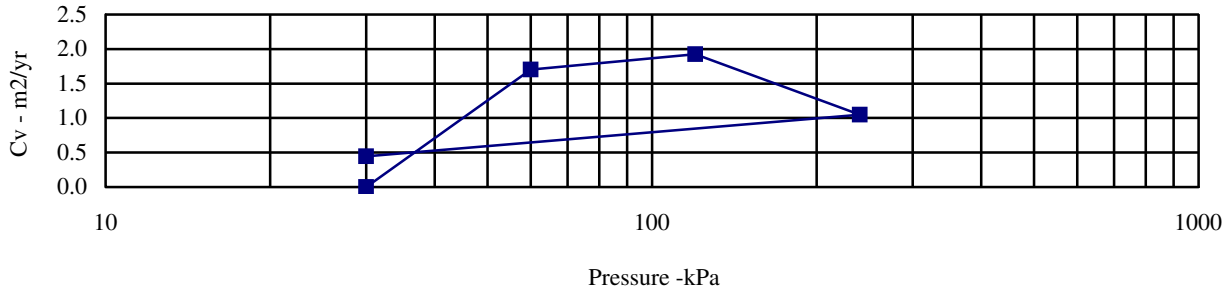
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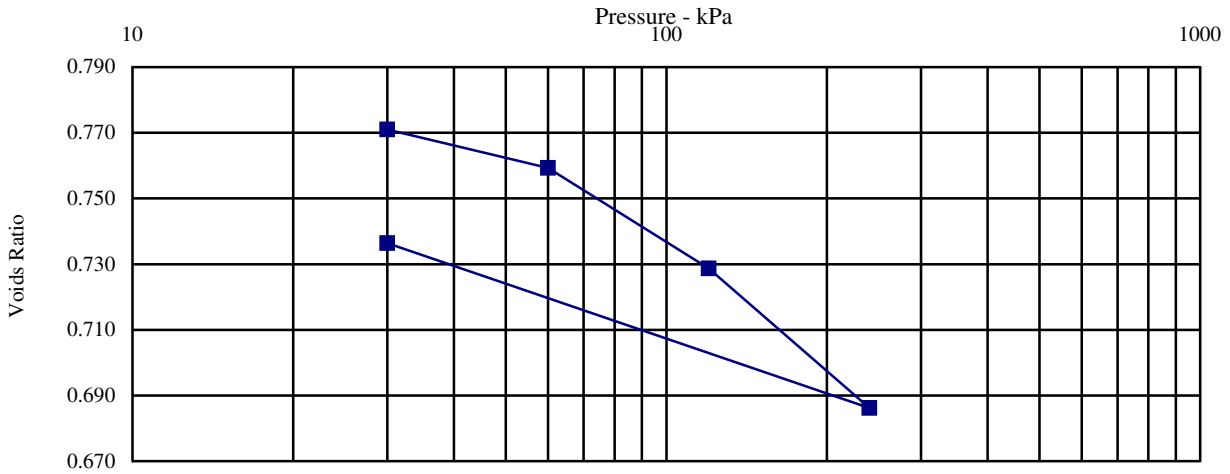
BS 1377: Part 5: 1990

Hole Number: **BH06** **Depth (m):** **1.50**

Sample Number: **Sample Type:** **U**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	28							
Bulk Density (Mg/m3):	1.92	0	-	30	Swelling	Swelling	Method used to	
Dry Density (Mg/m3):	1.51	30	-	60	0.221	1.701	determine CV:	t90
Voids Ratio:	0.759	60	-	120	0.290	1.925	Nominal temperature	
Degree of saturation:	96.1	120	-	240	0.205	1.051	during test ' C:	20
Height (mm):	19.97	240	-	30	0.142	0.444	Remarks:	
Diameter (mm)	75.2						See summary of soils description.	
Particle Density (Mg/m3):	2.65							
Assumed								





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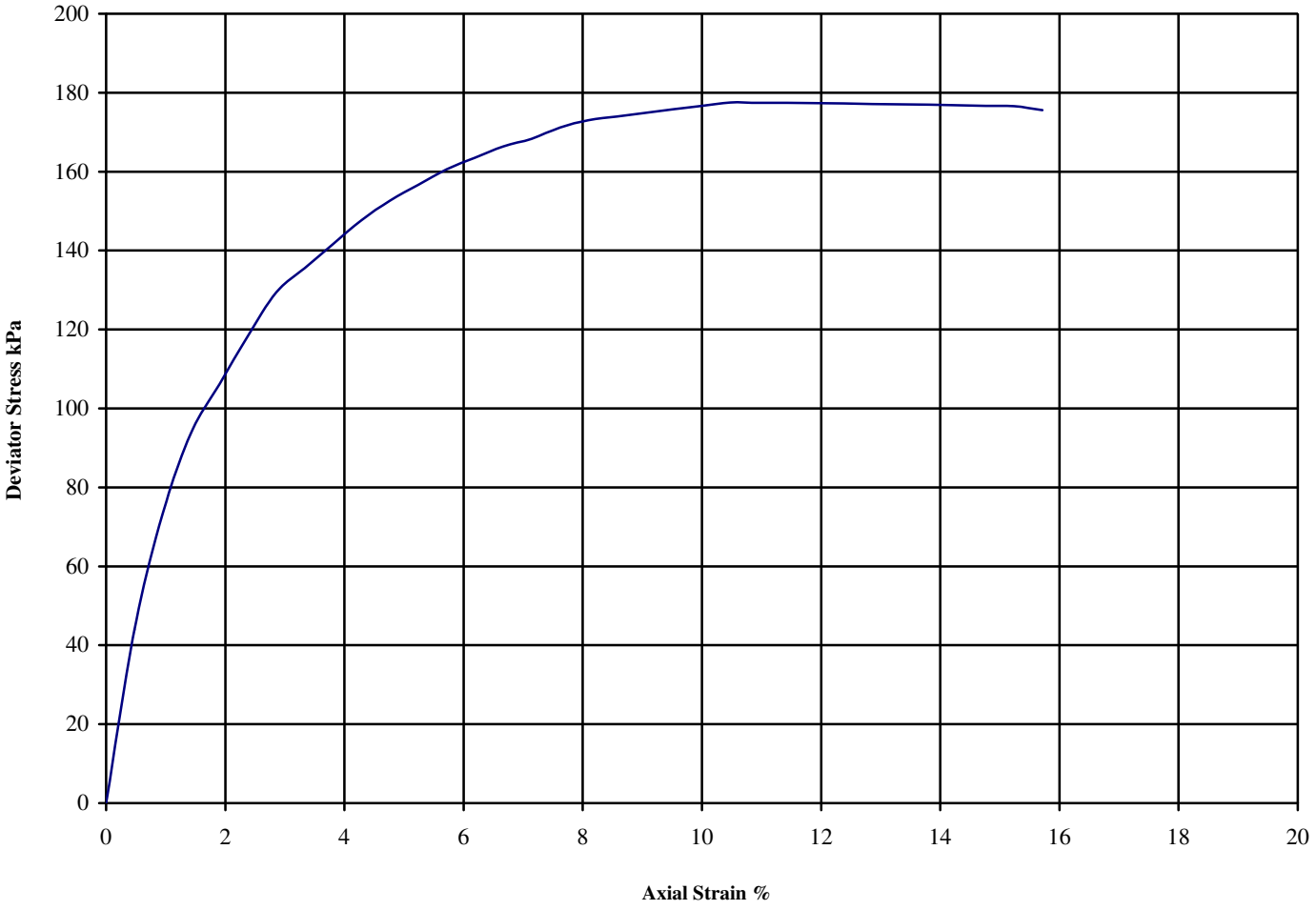
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH01** **Depth (m):** **1.50-1.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	24	1.94	1.56	30	178	89	10.5	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

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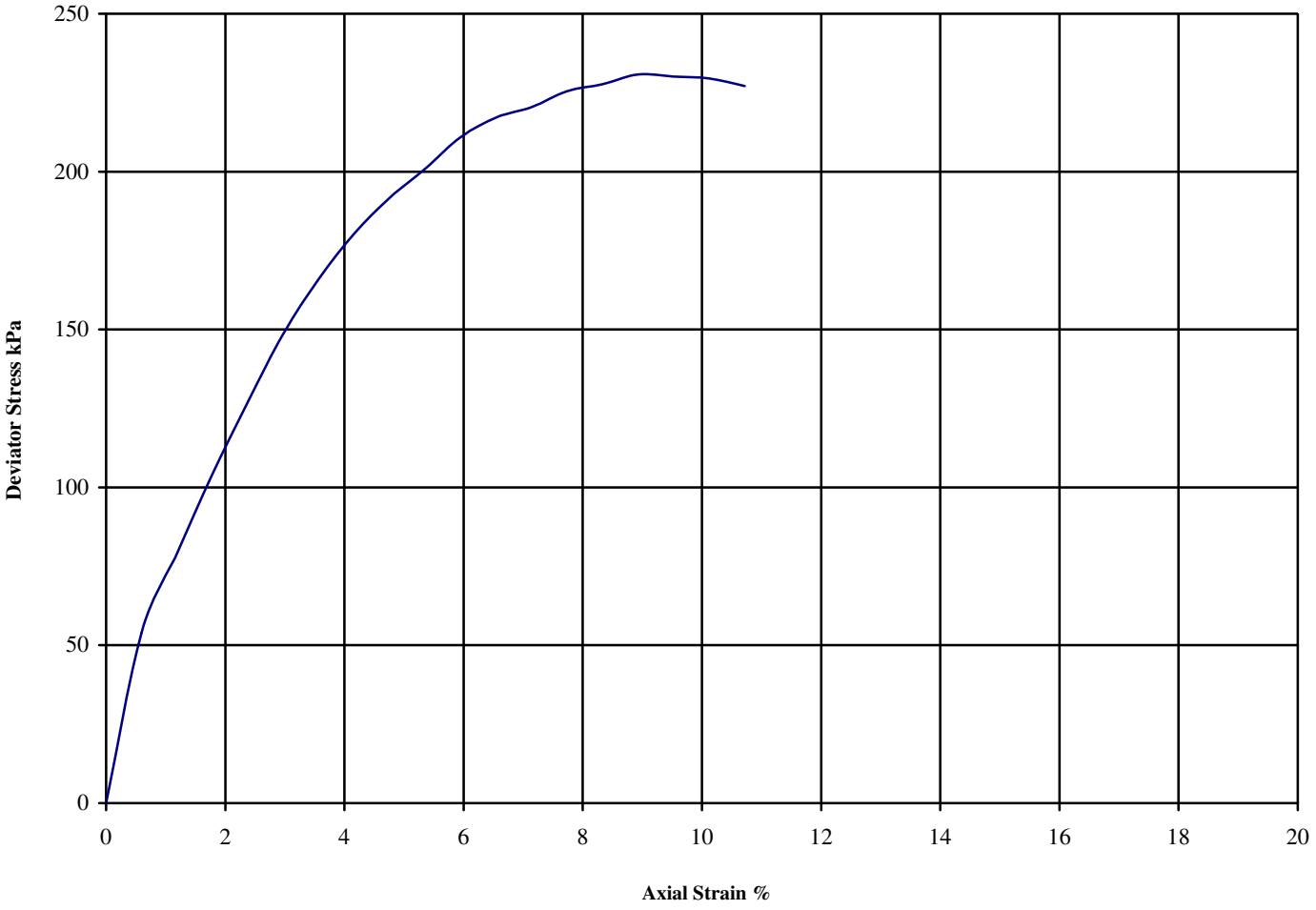
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH01** **Depth (m):** **3.50-3.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		168.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	25	2.02	1.62	70	231	115	8.9	Brittle	Sample taken from top of tube Rate of strain = 2.3 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.36 kPa See summary of soil descriptions.

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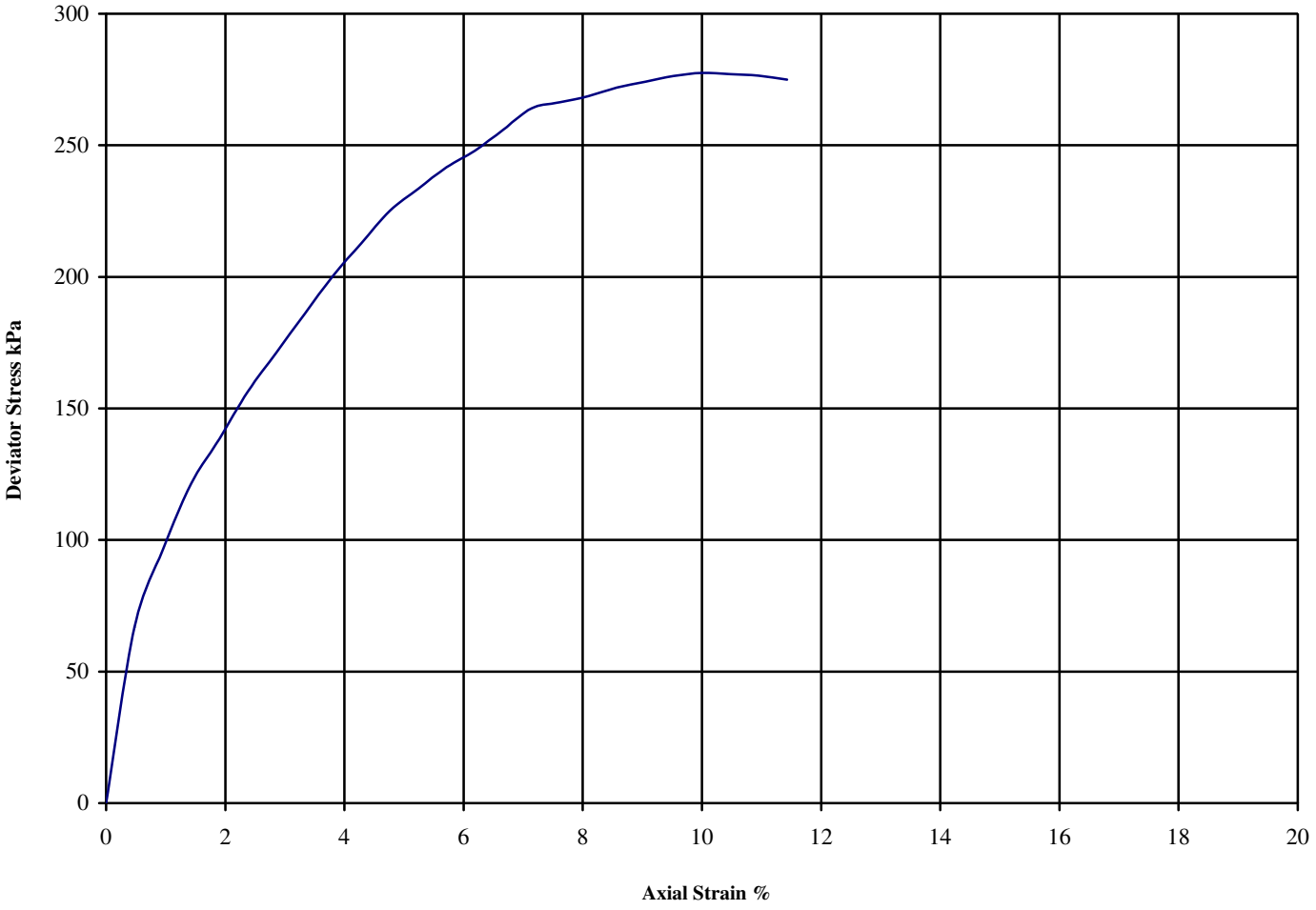
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH01 **Depth (m):** 6.50-6.95

Sample Number: **Sample Type:** U



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	24	2.03	1.64	130	278	139	10.0	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

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Contract No: PSL14/3901

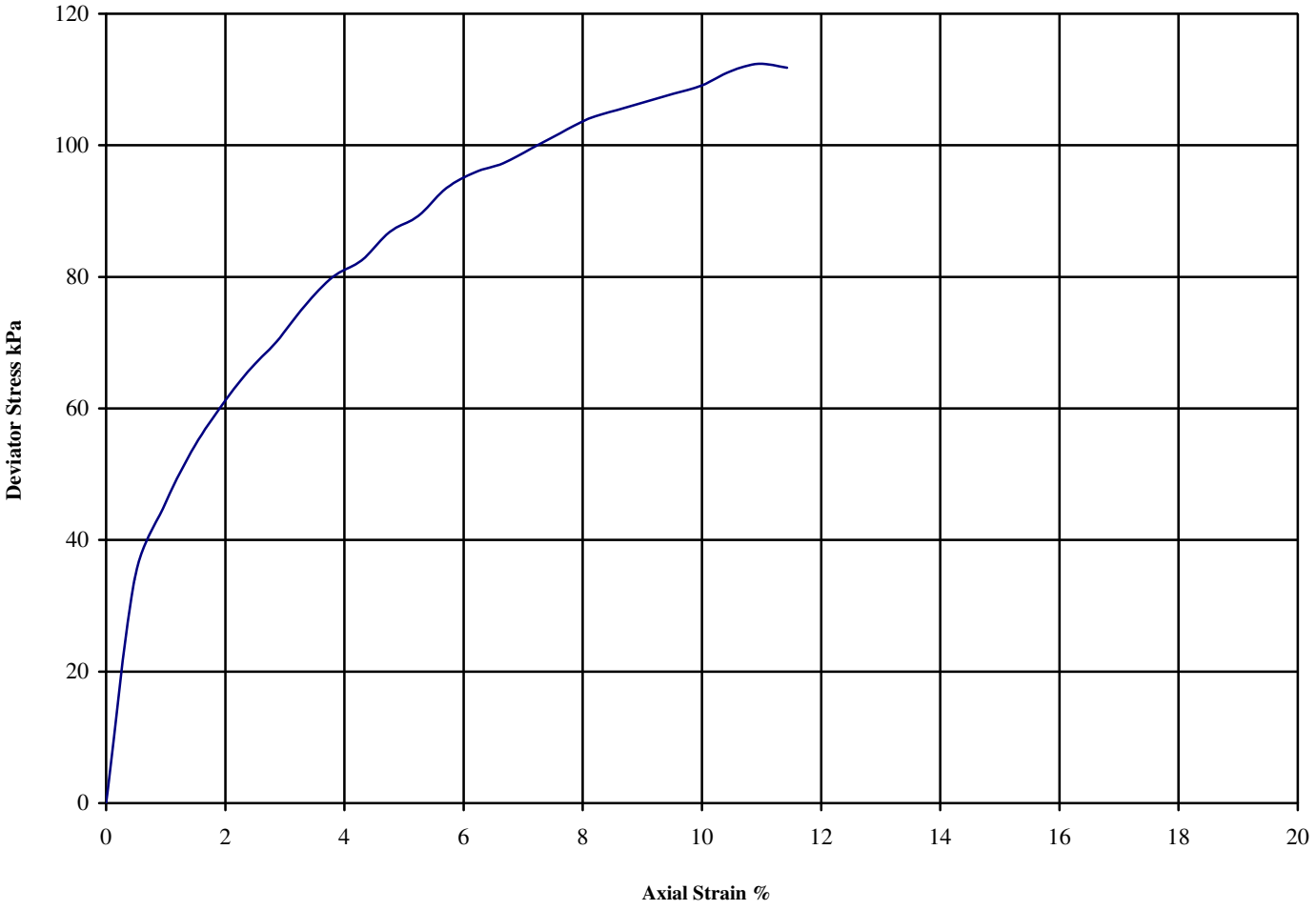
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH02** **Depth (m):** **2.50-2.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	26	2.00	1.59	50	112	56	11.0	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

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Contract No: PSL14/3901

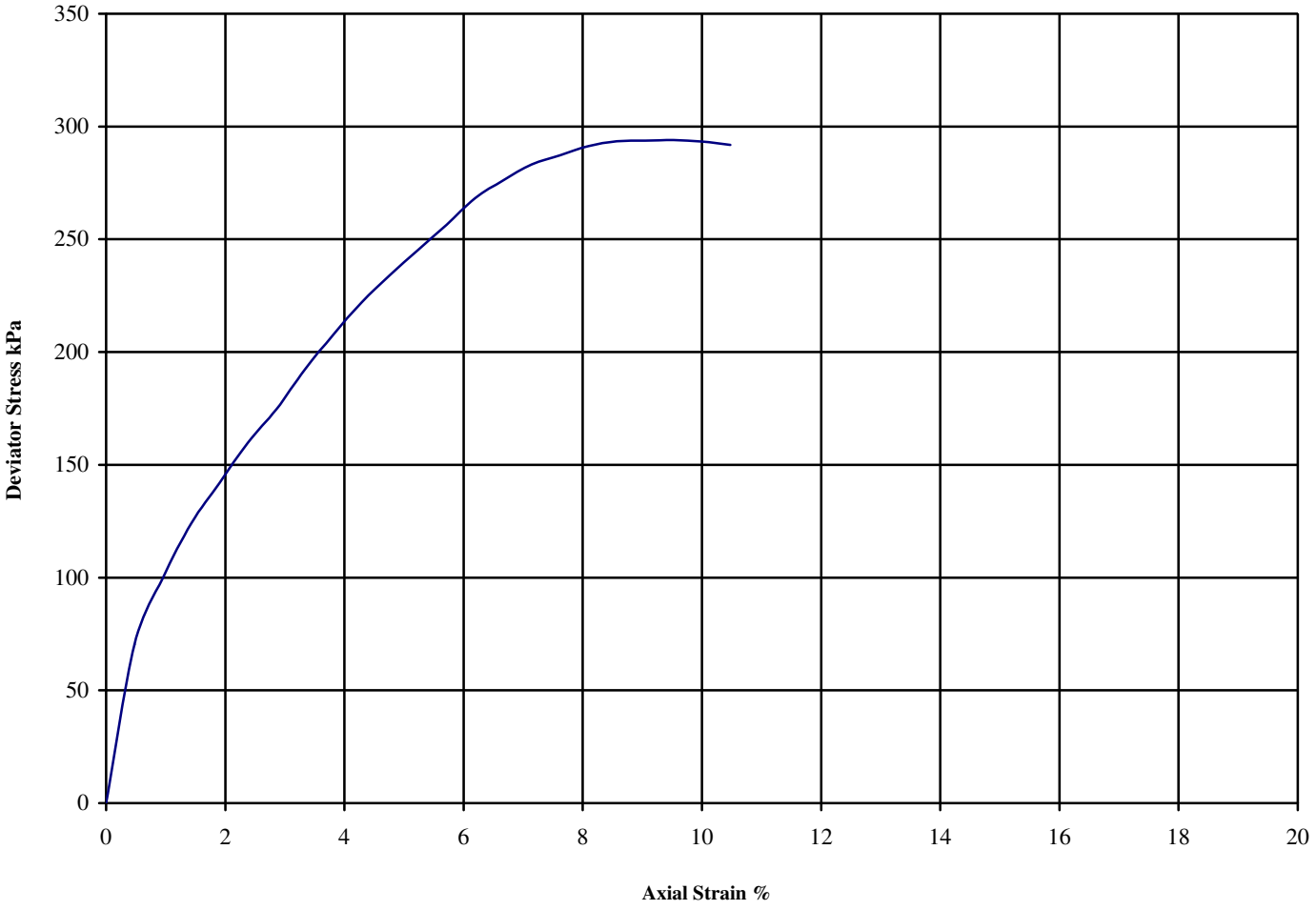
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH02 **Depth (m):** 7.50-7.95

Sample Number: **Sample Type:** U



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	24	2.04	1.65	150	294	147	9.5	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	22/08/14		22/08/14

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IMPERIAL WAY, READING.

Contract No: PSL14/3901

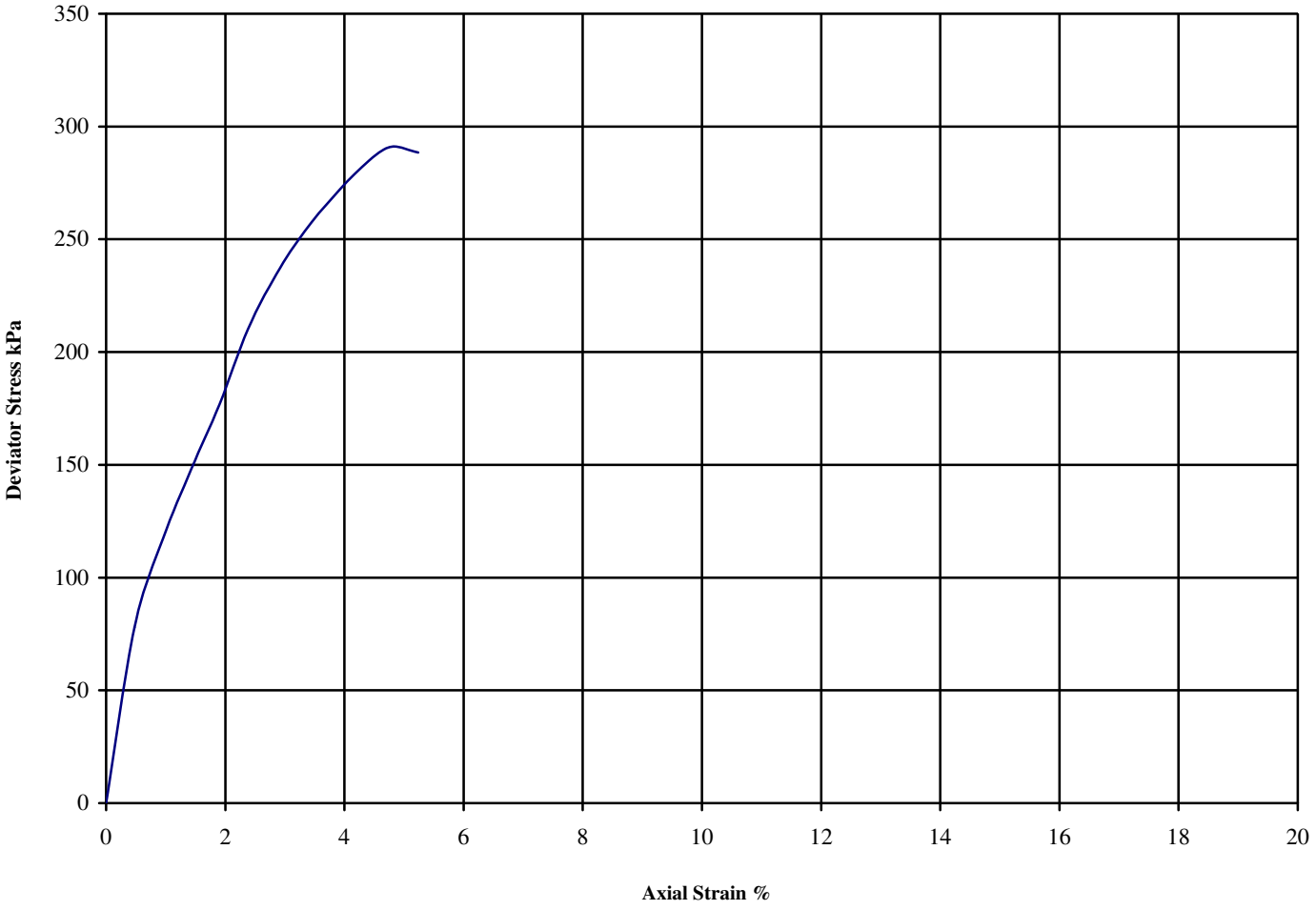
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH03** **Depth (m):** **8.50-8.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	23	2.06	1.67	90	291	145	4.8	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.36 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	22/08/14		22/08/14

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IMPERIAL WAY, READING.

Contract No: PSL14/3901

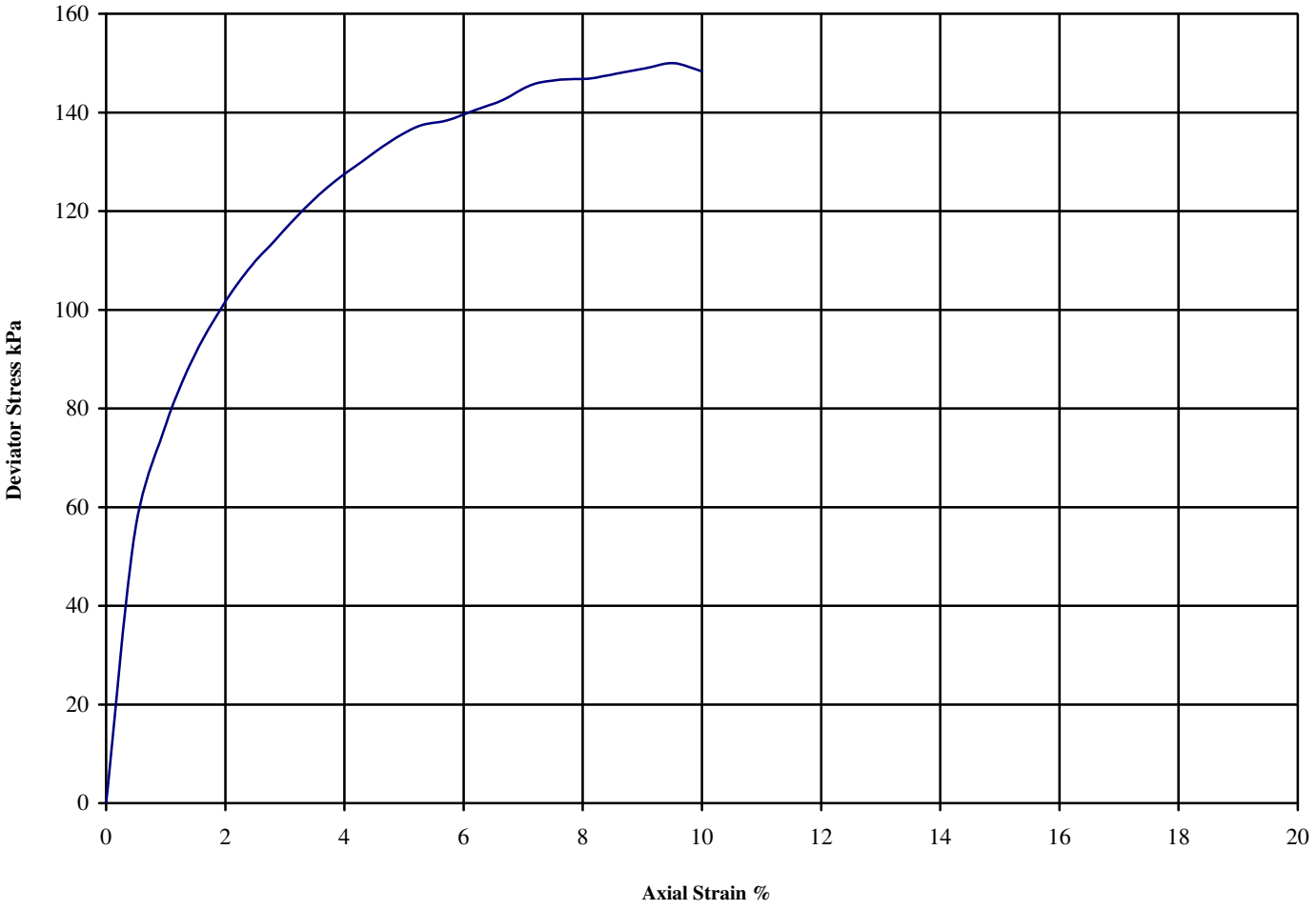
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH04** **Depth (m):** **3.50-3.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	29	1.89	1.47	70	150	75	9.5	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	22/08/14		22/08/14

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IMPERIAL WAY, READING.

Contract No: PSL14/3901

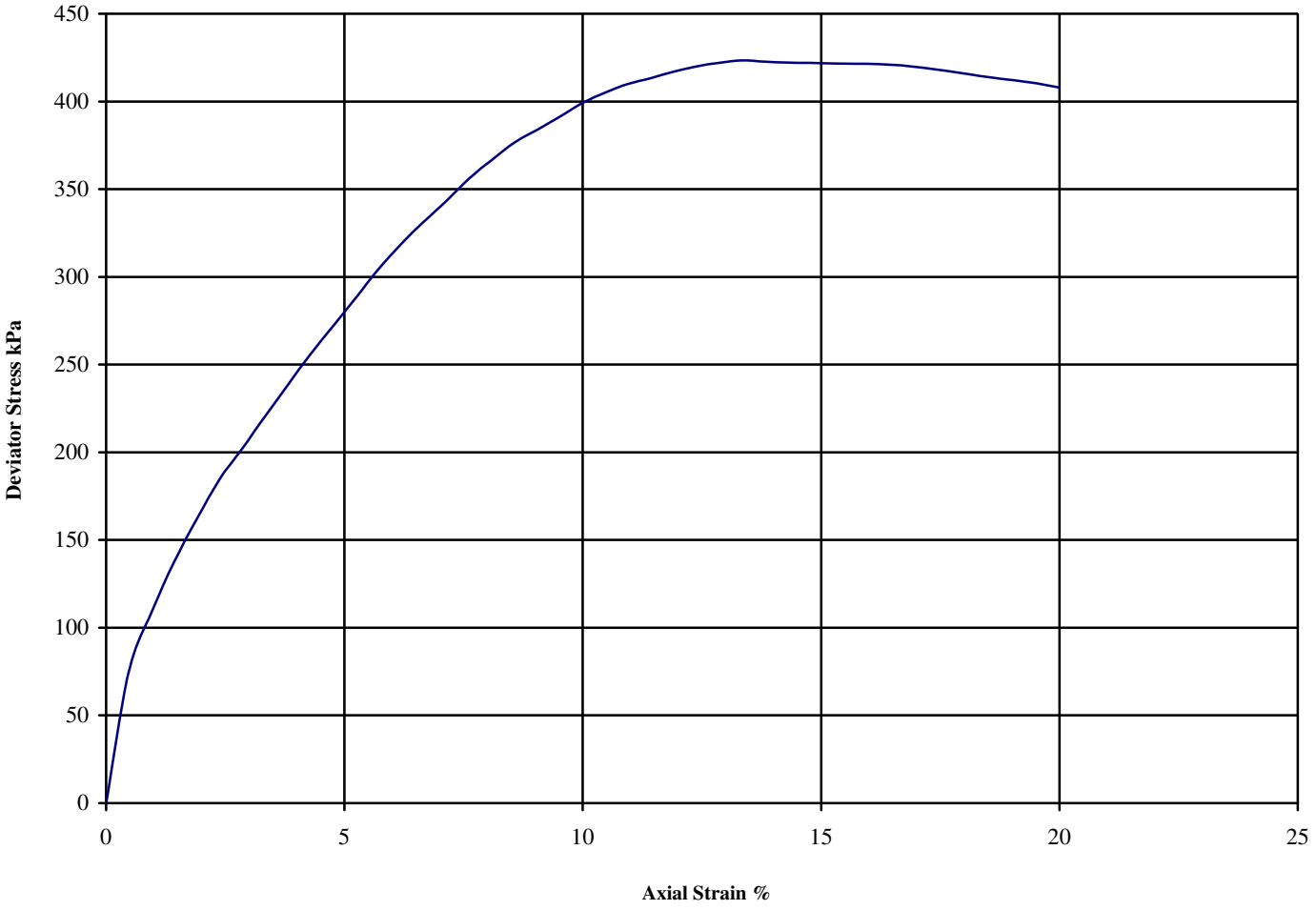
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH04** **Depth (m):** **14.50-14.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	22	2.00	1.63	290	423	212	13.3	Compound	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	22/08/14		22/08/14

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Contract No: PSL14/3901

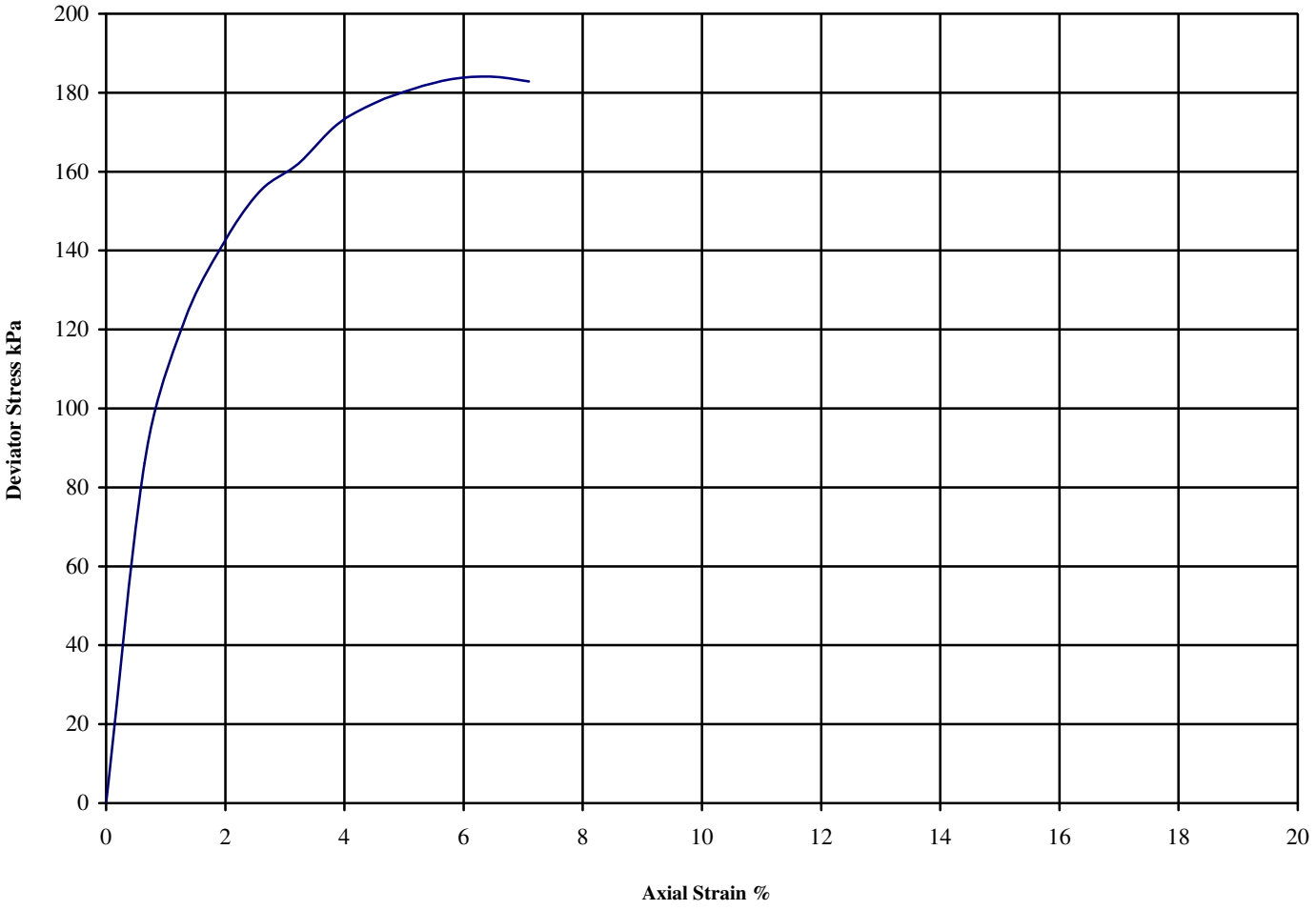
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH05** **Depth (m):** **3.50-3.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		155.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	25	1.96	1.56	70	184	92	6.5	Compound	Sample taken from top of tube Rate of strain = 2.5 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.36 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	22/08/14		22/08/14

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IMPERIAL WAY, READING.

Contract No: PSL14/3901

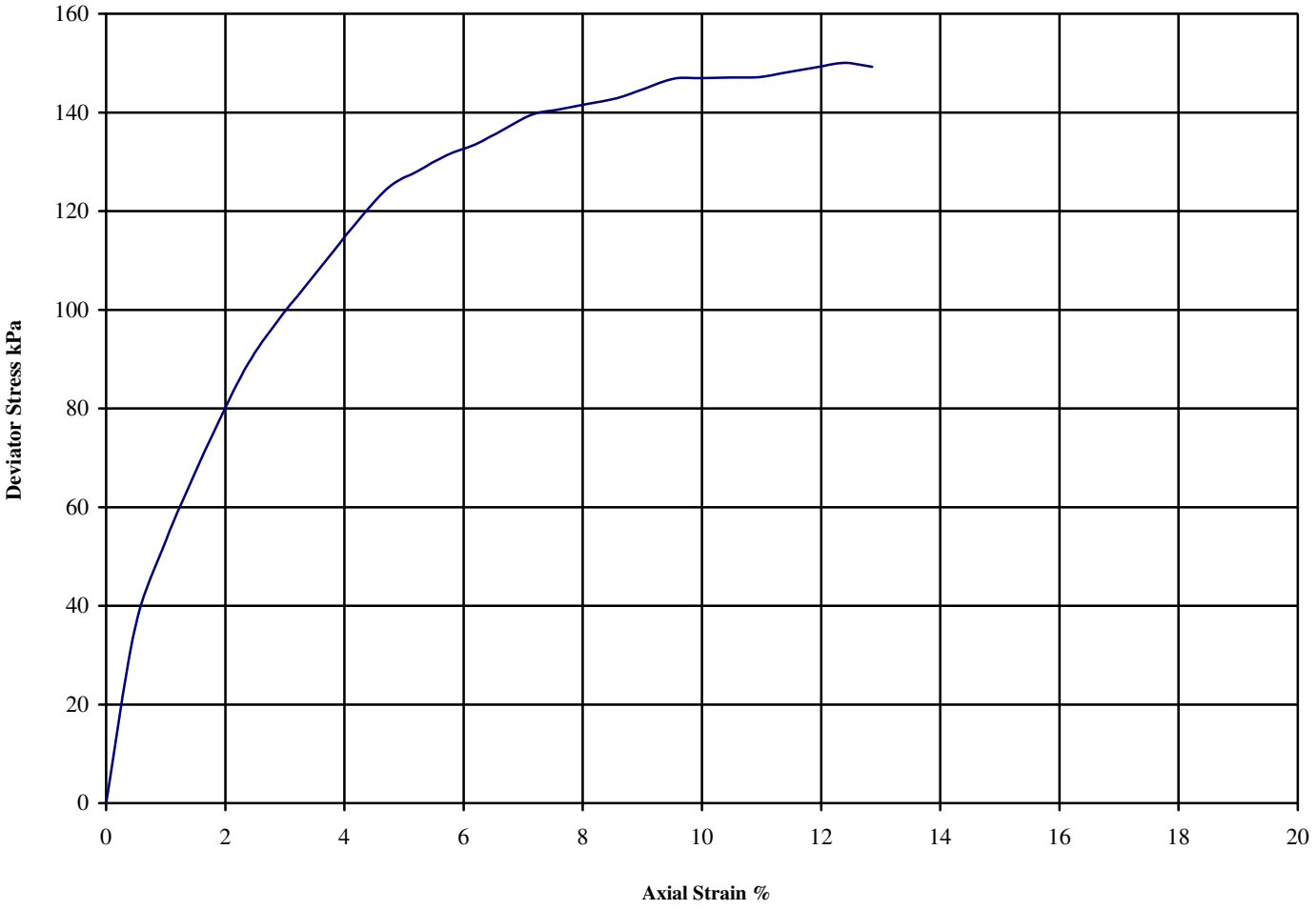
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: BH06 **Depth (m):** 1.50-1.95

Sample Number: **Sample Type:** U



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	28	2.00	1.56	30	150	75	12.4	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	22/08/14		22/08/14

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IMPERIAL WAY, READING.

Contract No: PSL14/3901

SUMMARY OF LABORATORY HAND VANE TESTS

Hole Number	Sample Number	Sample Type	Depth m	Moisture Content %	Shear Strength kPa	Description
BH01		U	10.50	22	>120	Stiff dark brown slightly sandy CLAY.
BH02		U	4.50	25	>120	Stiff dark brown slightly sandy CLAY.
BH03		U	8.50	23	109	Stiff dark brown slightly sandy CLAY.
BH03		U	12.50	24	>120	Stiff dark brown slightly sandy CLAY.
BH04		U	6.50	24	>120	Stiff dark brown slightly sandy CLAY.
BH04		U	10.50	23	74	Firm dark brown slightly sandy CLAY.
BH05		U	5.50	27	>120	Stiff dark brown slightly sandy CLAY.
BH06		U	3.50	28	90	Stiff dark brown slightly sandy CLAY.
BH06		U	5.50	25	>120	Stiff dark brown slightly sandy CLAY.
BH06		U	9.50	23	84	Stiff dark brown slightly sandy CLAY.

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Compiled by	Date	Checked by	Date	Approved by	Date
	21/08/14		22/08/14		22/08/14

IMPERIAL WAY, READING.

Contract No: PSL14/3901

Client Ref: C2611

Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781

Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich
Cheshire
CW9 5JL

Attention :	William Griffiths
Date :	7th August, 2014
Your reference :	C2611
Our reference :	Test Report 14/8727 Batch 1
Location :	Imperial Way Reading
Date samples received :	1st August, 2014
Status :	Final report
Issue :	1

Seven samples were received for analysis on 1st August, 2014. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Phil Sommerton BSc
Project Manager

Bob Millward BSc FRSC
Principal Chemist

Client Name: Brownfield Solutions Limited
Reference: C2611
Location: Imperial Way Reading
Contact: William Griffiths
JE Job No.: 14/8727

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1	2	3	4	5	6	7				LOD/LOR	Units	Method No.
Sample ID	BH01 2.5	BH01 12.5	BH02 9.5	BH03 1.0	BH03 2.5	BH6 1.95	BH6 6.0						
Depth	2.5	12.5	9.5	1.0-1.5	2.5-3.0	1.95-2.0	6.0						
COC No / misc													
Containers	T	T	T	B	B	T	T						
Sample Date	<>	<>	<>	<>	<>	<>	<>						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1						
Date of Receipt	01/08/2014	01/08/2014	01/08/2014	01/08/2014	01/08/2014	01/08/2014	01/08/2014						
Sulphur	0.02	0.99	0.91	0.05	0.04	0.02	0.98				<0.01	%	TM30/PM15
Total Sulphate BRE	0.03	0.26	0.16	0.10	0.06	0.02	0.14				<0.01	%	TM50/PM15
Magnesium	0.0120	0.1297 A	0.0710	<0.0001	0.0001	0.0062	0.0655				<0.0001	g/l	TM30/PM20
Natural Moisture Content	9.3	10.0	17.9	11.2	11.8	11.0	10.2				<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	<0.6	4.0	4.2	<0.6	<0.6	<0.6	<0.6				<0.6	mg/kg	TM38/PM20
Chloride (2:1 Ext BRE) #	0.011	0.097	0.047	0.015	0.009	0.012	0.026				<0.002	g/l	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE) #	<0.0025	<0.0025	<0.0025	0.0045	<0.0025	<0.0025	<0.0025				<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0914	0.9146	0.5344	0.1288	0.0975	0.0553	0.5305				<0.0015	g/l	TM38/PM20
pH #	8.65	7.81	7.97	10.99	11.16	8.25	7.89				<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Brownfield Solutions Limited

Matrix : Solid

Reference: C2611

Location: Imperial Way Reading

Contact: William Griffiths

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
14/8727	1					Samples were received at a temperature above 9°C.
14/8727	1	BH01 2.5	2.5	1	All analyses	No sampling date given
14/8727	1	BH01 12.5	12.5	2	All analyses	No sampling date given
14/8727	1	BH02 9.5	9.5	3	All analyses	No sampling date given
14/8727	1	BH03 1.0	1.0-1.5	4	All analyses	No sampling date given
14/8727	1	BH03 2.5	2.5-3.0	5	All analyses	No sampling date given
14/8727	1	BH6 1.95	1.95-2.0	6	All analyses	No sampling date given
14/8727	1	BH6 6.0	6.0	7	All analyses	No sampling date given

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/8727

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
OC	Outside Calibration Range
A	x5 Dilution

JE Job No: 14/8727

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM15	In-house method based on USEPA 3010A. Acid digestion of dried and crushed solid samples using Aqua Regia reflux.			AD	Yes
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM20	Solid samples are extracted with two parts de-ionised water to one part solid material for analysis of the extract for various parameters.			AD	Yes
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM20	Solid samples are extracted with two parts de-ionised water to one part solid material for analysis of the extract for various parameters.	Yes		AD	Yes
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM20	Solid samples are extracted with two parts de-ionised water to one part solid material for analysis of the extract for various parameters.			AR	Yes
TM50	Total Sulphate by ICP-OES	PM15	In-house method based on USEPA 3010A. Acid digestion of dried and crushed solid samples using Aqua Regia reflux.			AD	Yes
TM73	pH in by Metrohm	PM11	1:2.5 soil/water extraction	Yes		AR	No

APPENDIX E
Limitations

Limitations

This ground investigation was conducted and has been prepared for the sole internal use and reliance of the Client, Waterman EED. This report shall not be relied upon or transferred to any other parties without the express written authorisation of BSL. If an unauthorised third party comes into possession of this report they rely on it at their risk and the authors owe them no duty of care or skill.

The investigation carried out on the site has been conducted to provide the best information and assessment on the ground conditions within site access and budgetary constraints. Exploratory holes only investigate a small area in relation to the overall site area and can therefore only provide a general indication of overall site conditions. Therefore the findings, opinions, geotechnical and environmental recommendations within this report are based on the ground conditions encountered at each location. It should be noted that different ground conditions may exist that have not been identified within this investigation.

The occurrence of and depths to groundwater may vary seasonally due to changes in weather, it should be noted that any observations and recommendations made on groundwater within this report are based on a select number of site visits over a limited period of time and may not be fully representative of groundwater conditions on the site.

Although every effort has been made to position exploratory holes in the least sensitive areas of the site, exploratory hole positions were located approximately as part of this investigation and no guarantee can be given as to their accuracy. Consideration should be given to the possibility that exploratory holes excavated as part of this investigation and indeed any previous ground investigation work by others may be encountered beneath or within the influence of individual foundations. BSL cannot be held responsible for structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.

No existing manhole covers were lifted or drainage runs inspected during the course of this ground investigation. The site plans enclosed in this report should not be scaled off.

Appendix D. Groundwater and Ground Gas Monitoring Results

1st August 2014 (1 page)

7th August 2014 (1 page)

13th August 2014 (1 page)

29th August 2014 (1 page)

4th September 2014 (1 page)

Worton Grange, Reading ATM Pressure (mb): 1004 Visit 01/08/2014

Location	State (peak / steady)	Oxygen (%)	Carbon Monoxide (PPM)	Carbon Dioxide (%)	Methane (%)	Flow Rate (l/h)	Water Level (mbgl)
BH1	Peak	17.7	3	2.2	0	0	4.948
	Steady	17.6	0	2.2	0		
BH3	Peak	19.1	3	1.7	0	0	2.852
	Steady	19	0	1.6	0		
BH4	Peak	20.7	3	0	0	0	5.549
	Steady	12.8	0	0	0		
BH6	Peak	20	0	0	0.2	0	0.61
	Steady	20	0	0	0		
WS1	Peak	20.6	3	0.2	0.1	0	0.654
	Steady	20.6	0	0.2	0		
WS2	Peak	19.9	3	0.1	0	0	1.378
	Steady	19.9	0	0.1	0		

Worton Grange, Reading ATM Pressure (mb): 1015 Visit 07/08/2014

Location	State (peak / steady)	Oxygen (%)	Carbon Monoxide (PPM)	Carbon Dioxide (%)	Methane (%)	Flow Rate (l/h)	Water Level (mbgl)
BH1	Peak	17.8	0	2.4	0	0	4.947
	Steady	17.8	0	2.2	0		
BH3	Peak	18.2	0	2.2	0	0	2.67
	Steady	17.8	0	2.1	0		
BH4	Peak	17.4	1	0.2	0	0	4.258
	Steady	17.6	0	0.1	0		
BH6	Peak	20.4	3	0	0	0	0.554
	Steady	20.4	0	0	0		
WS1	Peak	20.3	3	0.3	0	0	0.487
	Steady	20.1	0	0.3	0		
WS2	Peak	19.7	1	0.1	0	0	0.928
	Steady	19.7	0	0.1	0		

Worton Grange, Reading ATM Pressure (mb): 1004 Visit 13/08/2014

Location	State (peak / steady)	Oxygen (%)	Carbon Monoxide (PPM)	Carbon Dioxide (%)	Methane (%)	Flow Rate (l/h)	Water Level (mbgl)
BH1	Peak	17.7	3	2.9	0	0	4.92
	Steady	17.1	0	2.9	0		
BH3	Peak	20.2	0	0.4	0	0	2.403
	Steady	20.2	0	0.4	0		
BH4	Peak	19.1	0	0.1	0	0	3.14
	Steady	19.1	0	0	0		
BH6	Peak	20.2	0	0	0	0	0.478
	Steady	20.1	0	0	0		
WS1	Peak	20	5	0.3	0	0	0.44
	Steady	19.5	0	0.3	0		
WS2	Peak	20.8	0	0	0	0	0.407
	Steady	20.8	0	0	0		

Worton Grange, Reading ATM Pressure (mb): 1007 Visit 29/08/2014

Location	State (peak / steady)	Oxygen (%)	Carbon Monoxide (PPM)	Carbon Dioxide (%)	Methane (%)	Flow Rate (l/h)	Water Level (mbgl)
BH1	Peak	20.6	1	3.1	0	0	4.87
	Steady	20.6	0	0.1	0		
BH3	Peak	18.1	0	2.2	0	0	2.587
	Steady	18	0	2.2	0		
BH4	Peak	18.7	1	0.1	0	0	1.559
	Steady	18.7	0	0	0		
BH6	Peak	20.4	3	0	0	0	0.54
	Steady	20.4	0	0	0		
WS1*	Peak						0
	Steady						
WS2	Peak	20.6	3	0	0	0	0.446
	Steady	20.6	0	0	0		

*Window sample WS1 was water logged and therefore gas monitoring was not possible.

Worton Grange, Reading ATM Pressure (mb): 1015 Visit 04/09/2014

Location	State (peak / steady)	Oxygen (%)	Carbon Monoxide (PPM)	Carbon Dioxide (%)	Methane (%)	Flow Rate (l/h)	Water Level (mbgl)
BH1	Peak	20.4	1	0.7	0	0	4.964
	Steady	20.3	0	0.4	0		
BH3	Peak	19.8	1	1.7	0	0	2.729
	Steady	19.8	0	1.7	0		
BH4	Peak	19.8	1	0.6	0	0	1.508
	Steady	19.8	0	0	0		
BH6	Peak	20.8	0	0	0	0	0.511
	Steady	20.8	0	0	0		
WS1	Peak	20.8	0	0	0	0	0.392
	Steady	20.8	0	0	0		
WS2	Peak	19.3	1	0.1	0	0	1.14
	Steady	19.3	0	0.1	0		

Appendix E. Soil and Groundwater Chemical Analysis

S14_4408 MCERTS Report Soil	(29 pages)
S14_4428 MCERTS Report Soil	(42 pages)
S14_4561 MCERTS Report Soil	(45 pages)
S14_4614 MCERTS Report Soil	(60 pages)
W18_1756 MCERTS Report Water	(16 pages)
W18_2428 MCERTS Report Water	(24 pages)

Our Ref: EFS/144408M (Ver. 2)
Your Ref:

August 13, 2014

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Mr M Amos
Waterman EED
Merchants House
Wapping Road
Bristol
BS1 4RW

For the attention of Mr M Amos

Dear Mr Amos

Sample Analysis - Imperial Way

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 01/09/14 when they will be discarded. Please call 01283 554463 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

S Stone
Project Co-ordinator
01283 554463

Environmental Chemistry, ESG, P.O. Box 100, Burton-upon-trent, DE15 0XD Tel: 01283 554400 Fax: 01283 554422
Environmental Scientifics Group Limited.
Registered No: 2880501

TEST REPORT

1252

Report No. EFS/144408M (Ver. 2)

Waterman EED
Merchants House
Wapping Road
Bristol
BS1 4RW

Site: Imperial Way

The 3 samples described in this report were registered for analysis by ESG on 21-Jul-2014. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 13-Aug-2014

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Pages 5 to 7)
Table of GRO Results (Page 8)
Table of TPH (Si) banding (UK-CWG) (Page 9)
GC-FID Chromatograms (Pages 10 to 15)
Sub Contracted Analysis Results (Pages 16 to 22)
Analytical and Deviating Sample Overview (Pages 23 to 24)
Table of Additional Report Notes (Page 25)
Table of Method Descriptions (Page 26)
Table of Report Notes (Page 27)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns

Operations Director
Laboratory and Analytical Business

Date of Issue: 13-Aug-2014

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Method Codes :			AMMAR	ELESULP	GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPSOIL	ICPSOIL	ICPWSS
Method Reporting Limits :			0.5	20	0.2	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16	1	0.1	10
Accreditation Code:			UM	UM		UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Exchange.Ammonium AR**	**Elemental Sulphur**	**GRO (AA-UK) HSA-GCFID**	**Boron (H20 Soluble)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**Barium.**	**Beryllium.**	**SO4-- (H2O sol) mg/l**
1419400	ES001 TP9 0.10 (NVM)	15-Jul-14	<0.50§	<20§	Req §	<0.50§	23.54§	1.076§	9.66§	3§	18.01§	<0.50§	9§	<0.50§	55.63§	121§	<0.10§	36§
1419401	ES002 TP5 0.40	15-Jul-14	<0.5	<20	Req	0.5	69.4	0.84	10.5	4.7	46.5	<0.49	11.6	<0.5	192.7	3790	0.120	274
1419402	ES003 TP9 1.00	15-Jul-14	0.9	<21	Req	1.6	11.8	0.29	46.8	24.8	19.1	<0.5	41.5	1.2	78.2	143	1.08	124

ESG Environmental Scientifics Group
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Client Name Waterman EED

Contact Mr M Amos

Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144408M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Units :			pH Units	mg/kg	mg/kg		%	mg/kg	% M/M	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Method Codes :			PHSOIL	SFAPI	SFAPI	Sub002a	TMSS	TPHUSSI	FOCS	ICPMSS	KoneNO3	SFAS	Sub036	Sub036	Sub036	Sub036	Sub036	Sub036
Method Reporting Limits :				0.5	0.5		0.2	10	0.04	0.6	1.5	0.5						
Accreditation Code:			UM	UM	UM	U	U		N	N	N	N	N		N		N	N
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**pH units (AR)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**^Asbestos Screen**	**Tot.Moisture @ 105C**	**TPH by GCFID (Si-UKCWG)>44**	**S.O.M. % (Calc)**	**Vanadium (MS)**	**Nitrate:**	**Sulphide as S (AR)**	**^Phenol**	**^Trimethylphenols**	**^Cresols**	**^Naphthols**	**^Xylenols**	**^Total Phenols**
1419400	ES001 TP9 0.10 (NVM)	**15-Jul-14**	9.1 §	<0.50§	<0.50§	NAIIS	0.6 §	Req §	9.28	10	<1.5	0.8	0.191	<0.01	<0.01	<0.01	<0.015	<0.236
1419401	ES002 TP5 0.40	**15-Jul-14**	9.3	<0.5	<0.5	NAIIS	2.2	Req *	1.24	9.2	<1.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055
1419402	ES003 TP9 1.00	**15-Jul-14**	8.6	<0.6	<0.6	NAIIS	21.2	Req *	0.96	57.9	<1.6	<0.6	0.0242	<0.01	0.0363	<0.01	<0.015	<0.0955

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Client Name **Waterman EED**

Contact Mr M Amos

Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144408M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

		Units :	% M/M	mg/kg															
		Method Codes :	WSLM59	PAHMSUS															
		Method Reporting Limits :	0.02																
		Accreditation Code:	N																
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Total Organic Carbon**	**PAH (16) by GCMS inc. Sum 8**															
1419400	ES001 TP9 0.10 (NVM)	**15-Jul-14**	5.38	Req §															
1419401	ES002 TP5 0.40	**15-Jul-14**	0.72	Req															
1419402	ES003 TP9 1.00	**15-Jul-14**	0.56	Req															

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Client Name	**Waterman EED**
Contact	Mr M Amos

Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144408M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appr opriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES001 TP9 0.10 (NVM)	**Job Number:**	S14_4408M
LIMS ID Number:	CL1419400	**Date Booked in:**	21-Jul-14
QC Batch Number:	140630	**Date Extracted:**	30-Jul-14
Quantitation File:	Initial Calibration	**Date Analysed:**	31-Jul-14
Directory:	3114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**N**
Acenaphthylene	208-96-8	-	< 0.08	-	N
Acenaphthene	83-32-9	-	< 0.08	-	N
Fluorene	86-73-7	-	< 0.08	-	N
Phenanthrene	85-01-8	-	< 0.08	-	N
Anthracene	120-12-7	-	< 0.08	-	N
Fluoranthene	206-44-0	-	< 0.08	-	N
Pyrene	129-00-0	-	< 0.08	-	N
Benzo[a]anthracene	56-55-3	-	< 0.08	-	N
Chrysene	218-01-9	-	< 0.08	-	N
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	N
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	N
Benzo[a]pyrene	50-32-8	-	< 0.08	-	N
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	N
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	N
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-	N
Total (USEPA16) PAHs	-	-	< 1.29	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.56	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	104
Acenaphthene-d10	98
Phenanthrene-d10	99
Chrysene-d12	100
Perylene-d12	101

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	87
Terphenyl-d14	62

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES002 TP5 0.40	**Job Number:**	S14_4408M
LIMS ID Number:	CL1419401	**Date Booked in:**	21-Jul-14
QC Batch Number:	140630	**Date Extracted:**	30-Jul-14
Quantitation File:	Initial Calibration	**Date Analysed:**	31-Jul-14
Directory:	3114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**UM**
Acenaphthylene	208-96-8	-	< 0.08	-	U
Acenaphthene	83-32-9	-	< 0.08	-	UM
Fluorene	86-73-7	-	< 0.08	-	UM
Phenanthrene	85-01-8	-	< 0.08	-	UM
Anthracene	120-12-7	-	< 0.08	-	U
Fluoranthene	206-44-0	-	< 0.08	-	UM
Pyrene	129-00-0	-	< 0.08	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.08	-	UM
Chrysene	218-01-9	-	< 0.08	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.08	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	UM
Benzo[g,h,i]perylene	191-24-2	12.86	0.08	60	UM
Total (USEPA16) PAHs	-	-	< 1.31	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.57	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	107
Acenaphthene-d10	98
Phenanthrene-d10	97
Chrysene-d12	101
Perylene-d12	115

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	81
Terphenyl-d14	57

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES003 TP9 1.00	**Job Number:**	S14_4408M
LIMS ID Number:	CL1419402	**Date Booked in:**	21-Jul-14
QC Batch Number:	140630	**Date Extracted:**	30-Jul-14
Quantitation File:	Initial Calibration	**Date Analysed:**	31-Jul-14
Directory:	3114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 1.62	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.71	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	114
Acenaphthene-d10	101
Phenanthrene-d10	104
Chrysene-d12	114
Perylene-d12	132

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	79
Terphenyl-d14	58

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Gasoline Range Organics
(BTEX and Aromatic/Aliphatic Carbon Ranges)

Customer and Site Details: Waterman EED : Imperial Way
Job Number: S14_4408M
Directory: E:\TES\DATA\2014\080114HSA_GC9\140801 2014-08-01 10-58-32\008F0801.D
Method: HEADSPACE GCFID
Accreditation Code: UM

Matrix: Soil
Date Booked in: 21-Jul-14
Date extracted: 01-Aug-14
Date Analysed: 01-Aug-14, 13:24:
Units: mg/kg

*** Sample data with an asterisk are not UKAS accredited.**

		BTEX				Aromatics		Aliphatics		Total GRO
Sample ID	**Client ID**	**Benzene**	**Toluene**	**Ethyl benzene**	**Xylenes**	**C5 - C7**	**>C7 - C8**	**C5 - C6**	**>C6 - C8**	**C5 - C10**
CL1419401	ES002 TP5 0.40	<0.010	<0.010	<0.010	<0.020	<0.01	<0.01	<0.2	<0.2	<0.2

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

ALIPHATIC / AROMATIC FRACTION BY GC/FID

Customer and Site Details: Waterman EED : Imperial Way
Job Number: S14_4408M
QC Batch Number: 140630
Directory: D:\TES\DATA\Y2013\02\073114TPH_GC3\029F3801.D
Method: Ultra Sonic

Separation: Silica gel
Eluents: Hexane, DCM

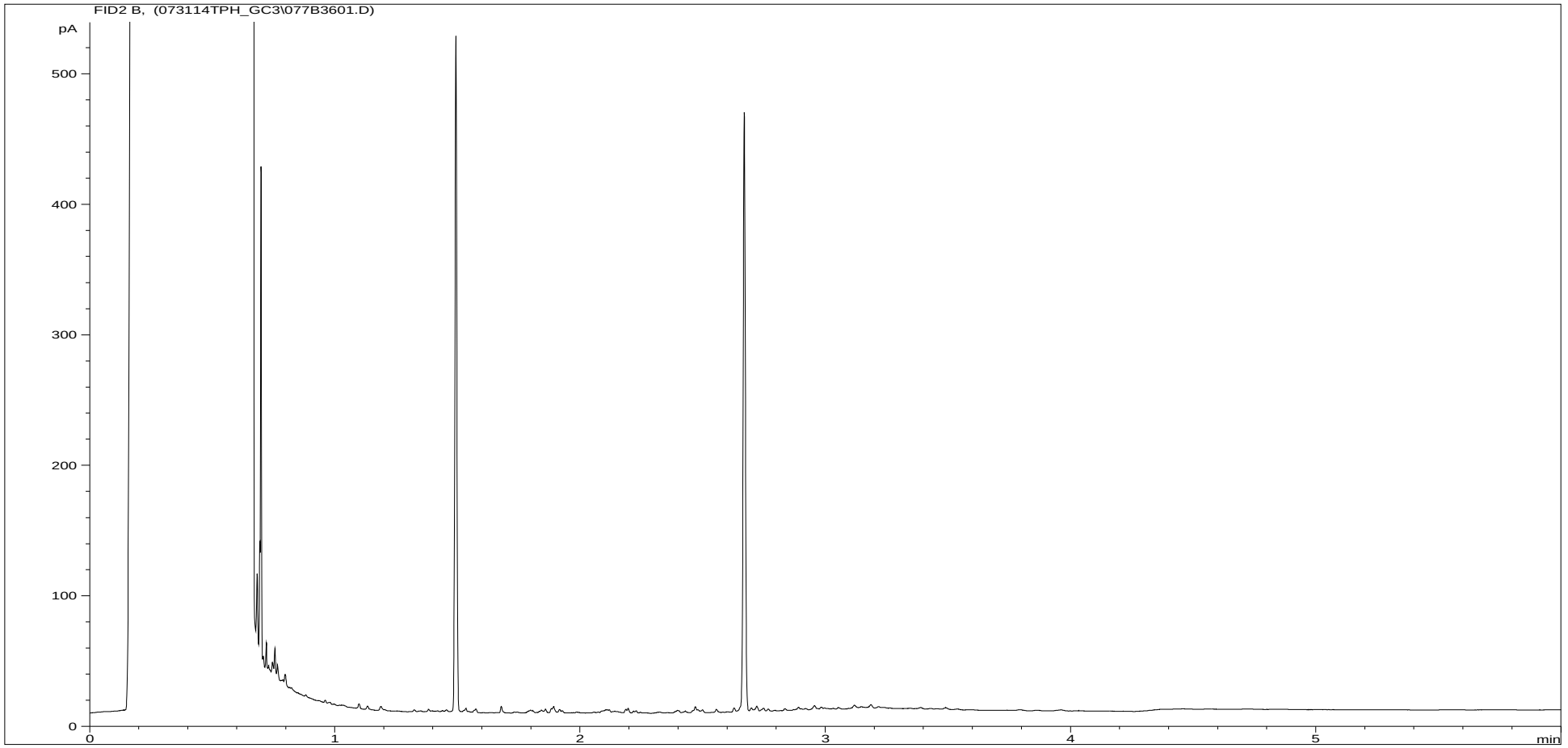
Matrix: Soil
Date Booked in: 21-Jul-14
Date Extracted: 30-Jul-14
Date Analysed: 31-Jul-14

This sample data is not MCERTS accredited.
Ba * This sample data is not ISO17025 accredited.

			Concentration, (mg/kg) - as dry weight.												
			>C8 - C10	>C8 - C10	>C10 - C12	>C10 - C12	>C12 - C16	>C12 - C16	>C16 - C35	>C16 - C21	>C35 - C44*	>C21 - C35	>C35 - C44*	>C8 - C44*	>C8 - C44*
	Sample ID	Client ID	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aromatics	Aliphatics	Aromatics
*	CL1419400	ES001 TP9 0.10 (NVM)	<4	<4	<4	<4	<4	<4	12.9	<4	<5.65	<8.81	<5.65	<20	<20
*	CL1419401	ES002 TP5 0.40	<4	<4	<4	<4	<4	<4	396	5.86	616	537	782	1010	1330
*	CL1419402	ES003 TP9 1.00	<5	<5	<5	<5	<5	<5	22	<5	<7.13	<11.12	<7.13	26.8	<25

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appropriate, in accordance with the MCERTS standard.

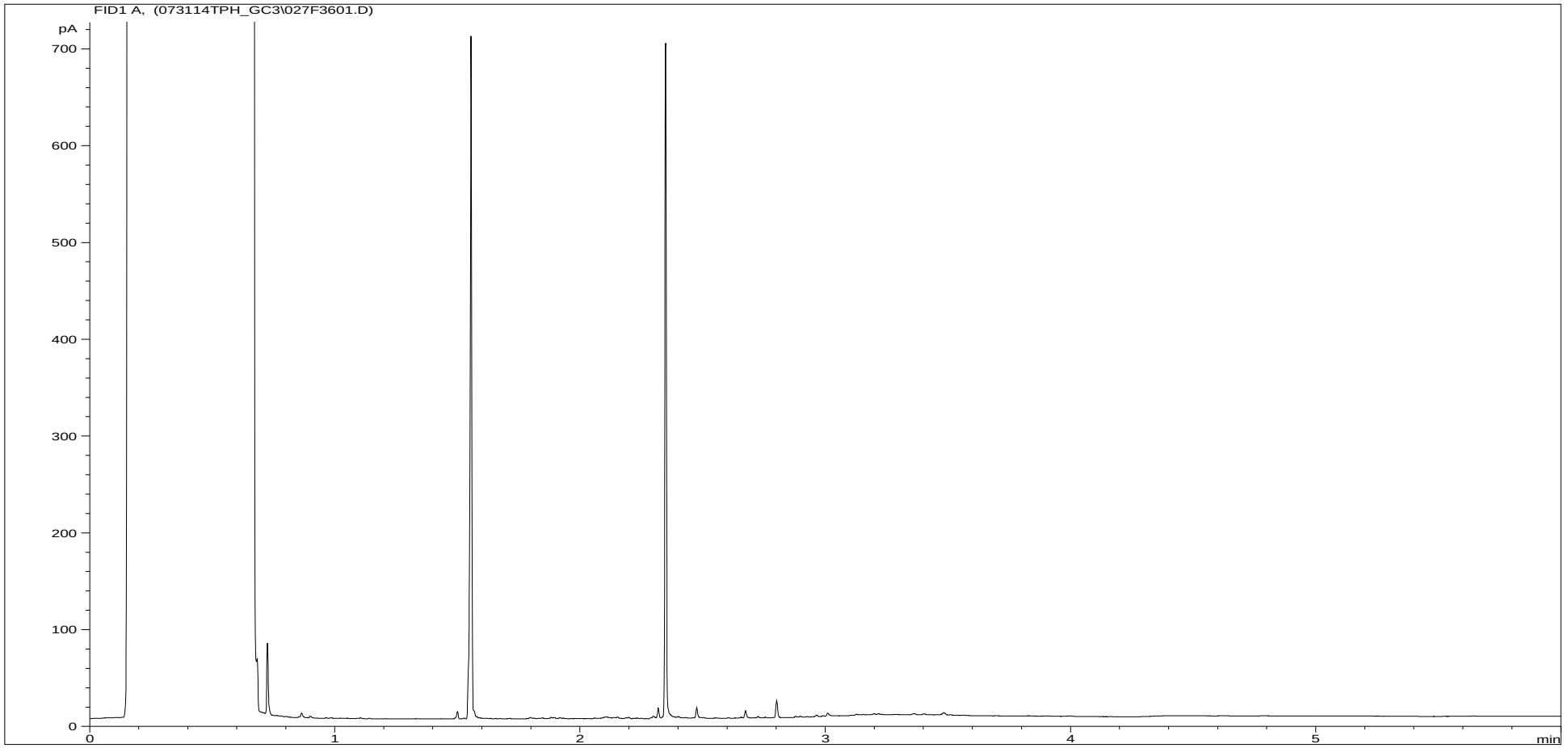
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1419400ALI	**Job Number:**	S14_4408M
Multiplier:	15.68	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES001 TP9 0.10 (NVM)
Acquisition Date/Time:	31-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073114TPH_GC3\077B3601.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

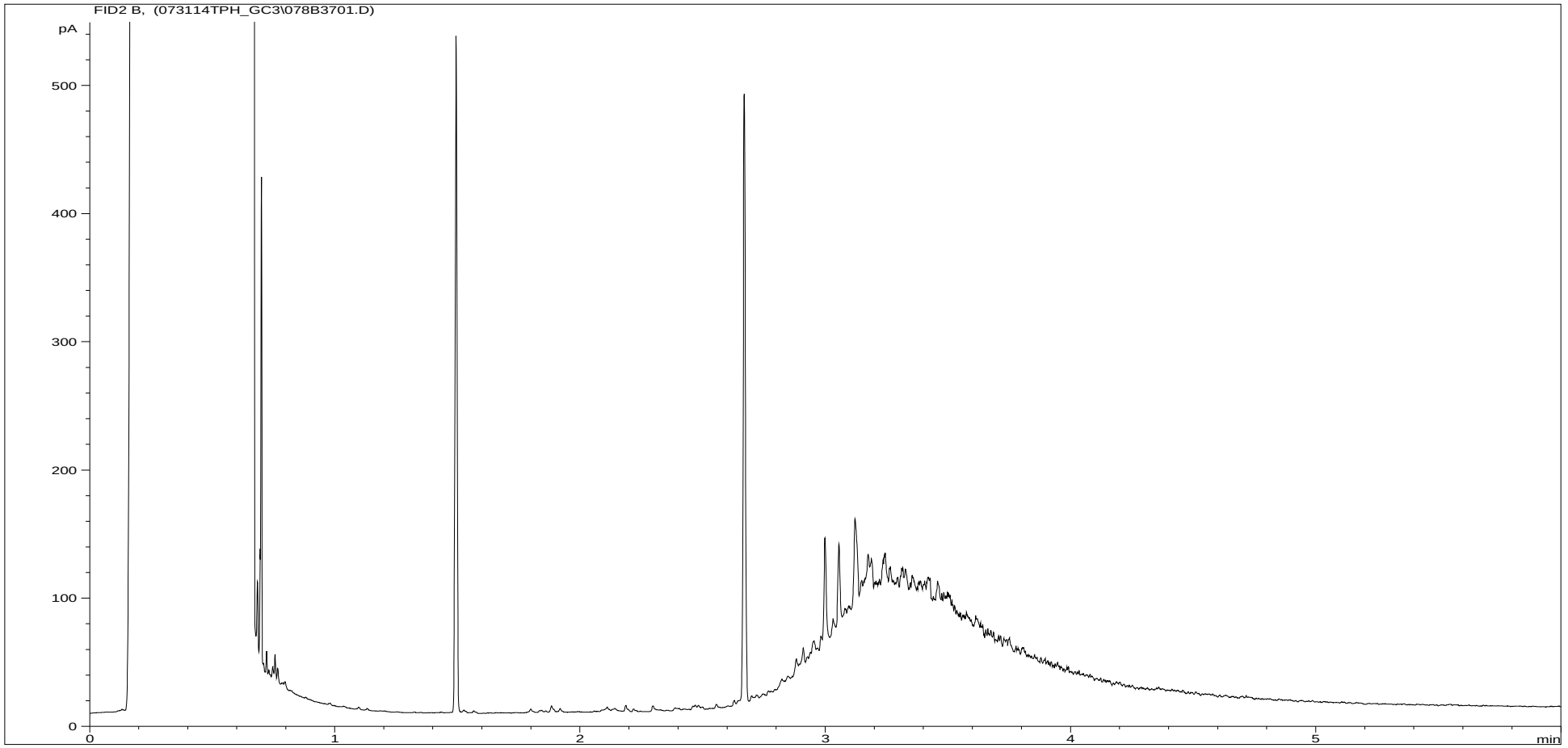
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1419400ARO	**Job Number:**	S14_4408M
Multiplier:	12.48	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES001 TP9 0.10 (NVM)
Acquisition Date/Time:	31-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073114TPH_GC3\027F3601.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

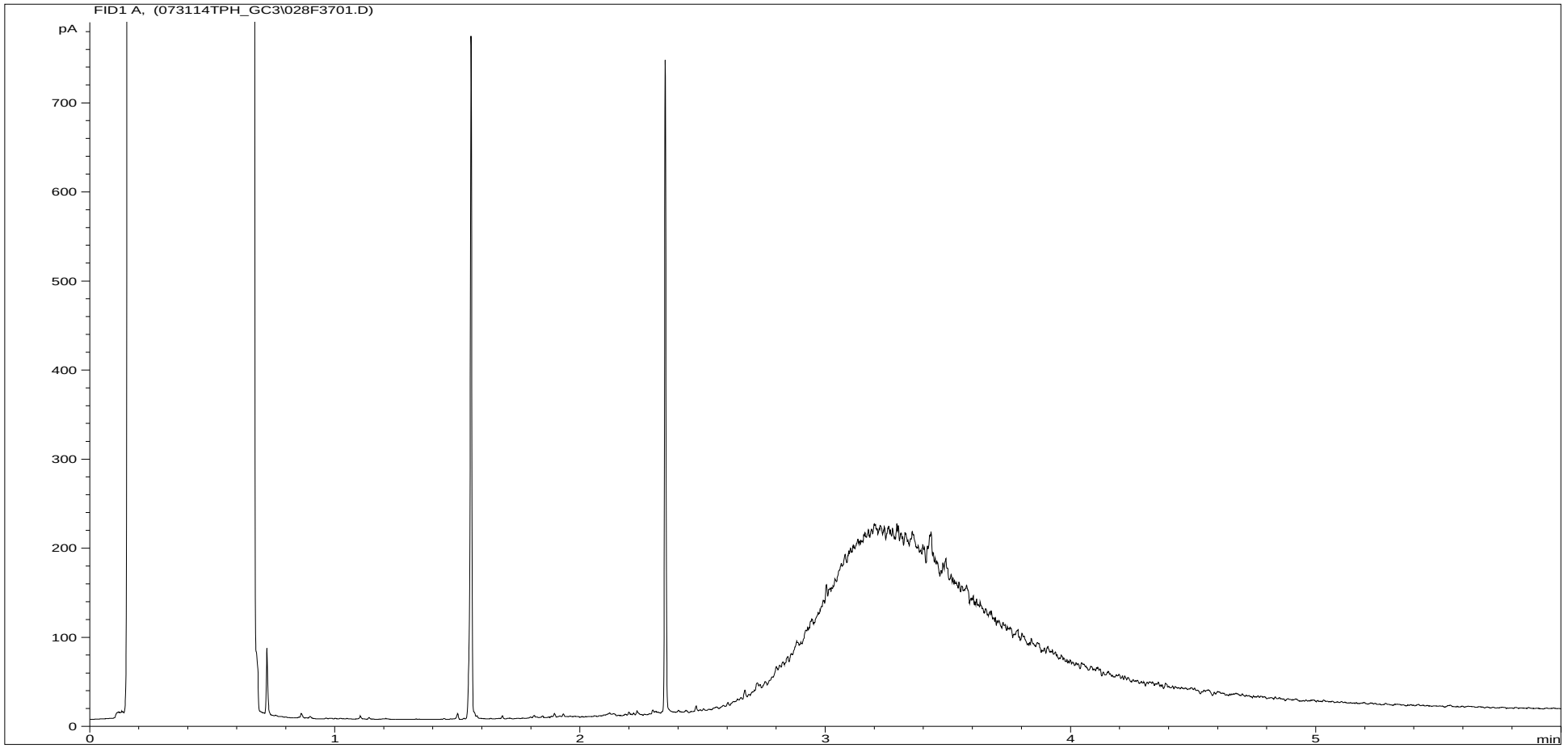
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1419401ALI	**Job Number:**	S14_4408M
Multiplier:	15.84	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES002 TP5 0.40
Acquisition Date/Time:	31-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073114TPH_GC3\078B3701.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

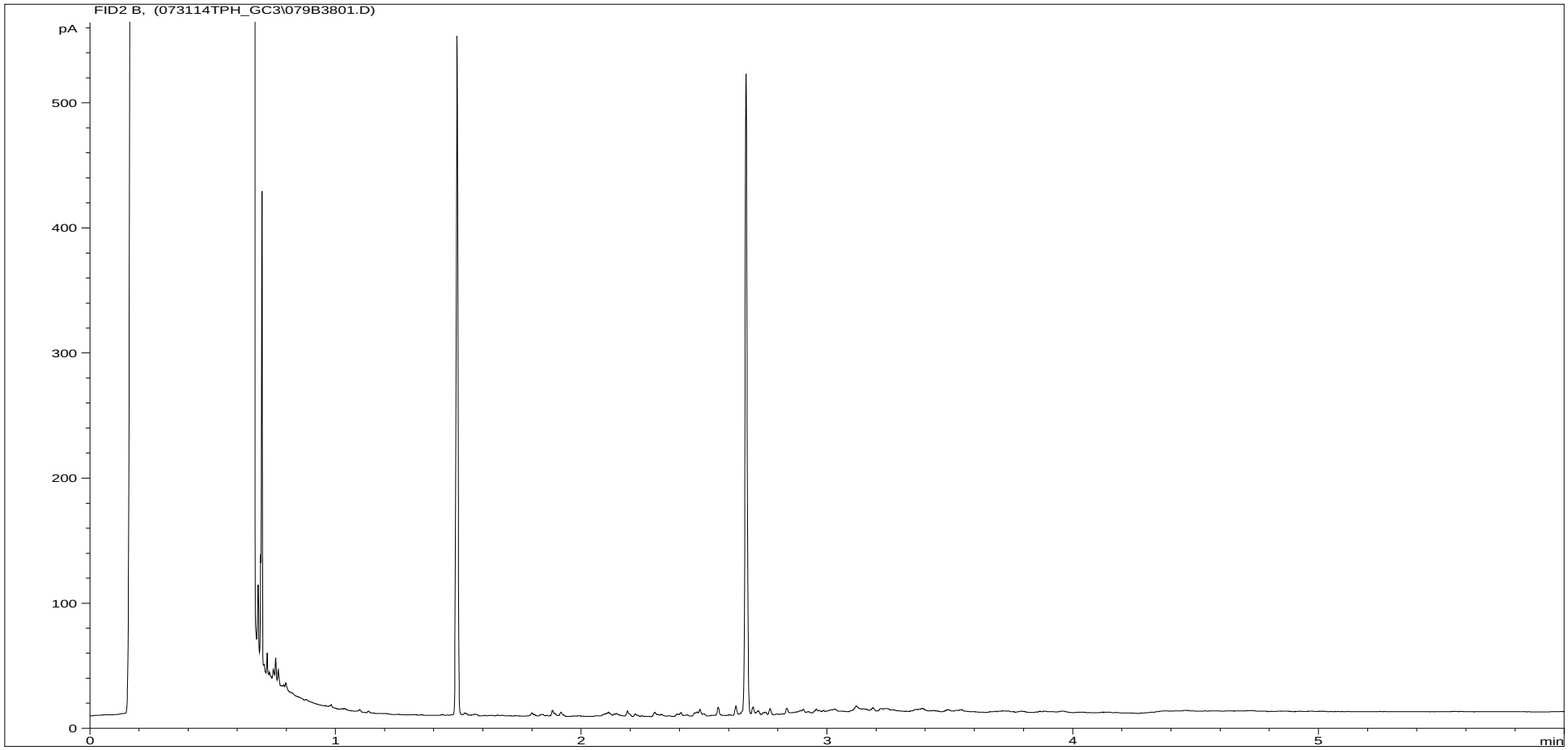
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1419401ARO	**Job Number:**	S14_4408M
Multiplier:	12.16	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES002 TP5 0.40
Acquisition Date/Time:	31-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073114TPH_GC3\028F3701.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

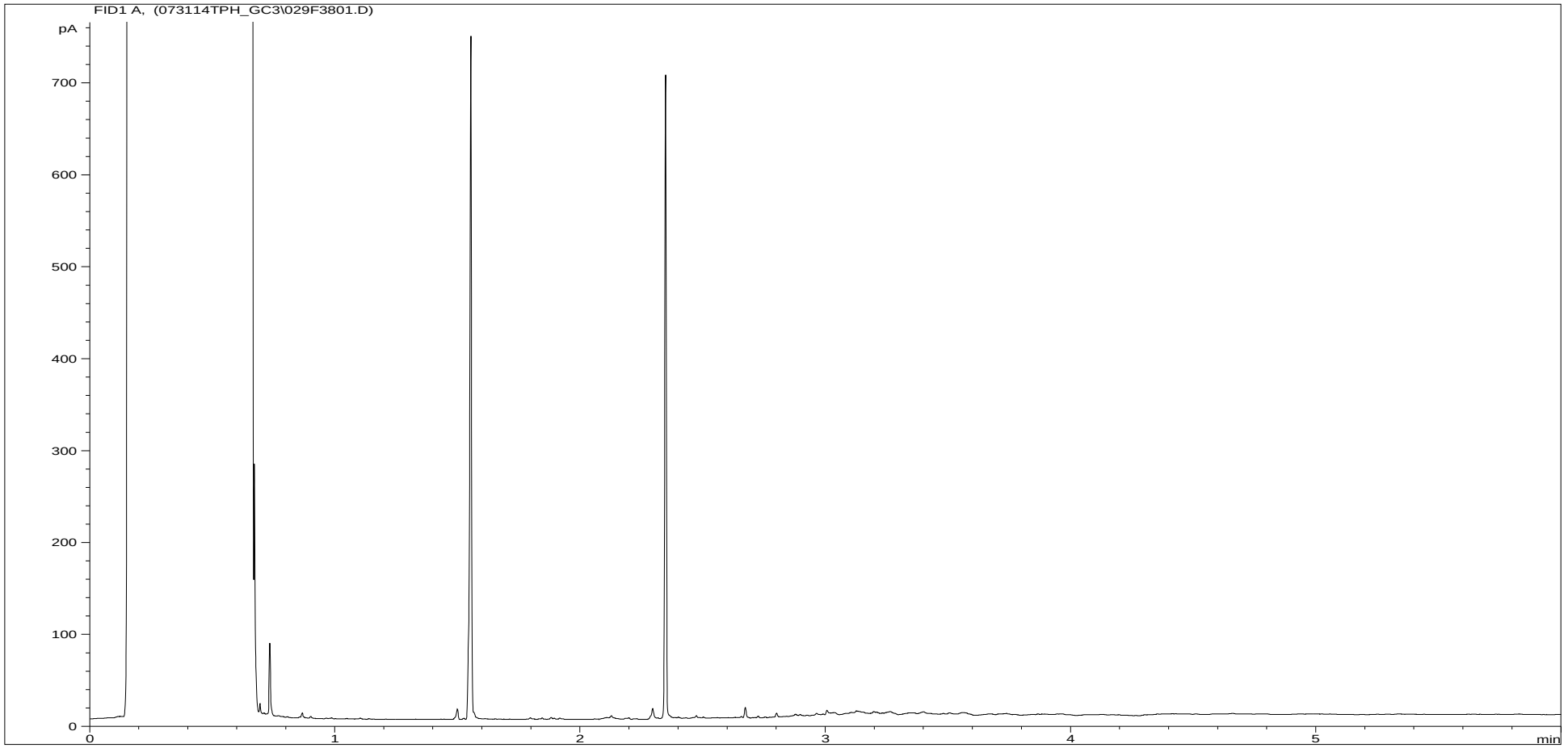
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1419402ALI	**Job Number:**	S14_4408M
Multiplier:	16	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES003 TP9 1.00
Acquisition Date/Time:	31-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073114TPH_GC3\079B3801.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1419402ARO	**Job Number:**	S14_4408M
Multiplier:	12	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES003 TP9 1.00
Acquisition Date/Time:	31-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073114TPH_GC3\029F3801.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

ALcontrol Laboratories

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Hawarden
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Tel: (01244) 528700
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Website: www.alcontrol.com

Environmental Scientifics Group
Bretby Business Park
Ashby Road
Burton on Trent
Staffordshire
DE15 0YZ
Attention: Customer Services

Post Certification Report

Date:	12 August 2014	**Location:**	Not Specified
Customer:	H_SCIENT_BOT	**No. Of Samples Received:**	3
Your Reference:	Not Specified	**Samples Scheduled:**	3
[SDG] and Samples	9730475,9730476,9730477		

Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Alcontrol Laboratories is a trading division of ALcontrol UK Limited
Registered Office: Units 7 & 8 Hawarden Business Park, Manor Road, Hawarden, Deeside, CH5 3US. Registered in England and Wales No. 4057291.

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
9730475	S1419400			
9730476	S1419401			
9730477	S1419402			

Only received samples which have had analysis scheduled will be shown on the following pages.

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Results Legend					
X Test N No Determination Possible	Lab Sample No(s)		9730475	9730476	9730477
	Customer Sample Reference		S1419400	S1419401	S1419402
	AGS Reference				
	Depth (m)				
	Container		60ml VOC (ALE215)	60ml VOC (ALE215)	60ml VOC (ALE215)
Phenols by HPLC (S)	All	NDPs: 0 Tests: 3	X	X	X
Sample description	All	NDPs: 0 Tests: 3	X	X	X

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Results Legend		Customer Sample Ref.	S1419400	S1419401	S1419402			
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.	Depth (m)						
diss.filt	Dissolved / filtered sample.	Sample Type	Soil/Solid	Soil/Solid	Soil/Solid			
tot.unfilt	Total / unfiltered sample.	Date Sampled	-	-	-			
*	subcontracted test.	Date Received	01/08/2014	01/08/2014	01/08/2014			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.	SDG Ref	140801-133	140801-133	140801-133			
		Lab Sample No.(s)	9730475	9730476	9730477			
1-5&+§@	Sample deviation (see appendix)	AGS Reference						
Component	**LOD/Units**	**Method**						
Moisture Content Ratio (% of as received sample)	%	PM024	- §	- §	- §			
Phenol	<0.01 mg/kg	TM062 (S)	0.191 § M	<0.01 § M	0.0242 § M			
Cresols	<0.01 mg/kg	TM062 (S)	<0.01 § M	<0.01 § M	0.0363 § M			
Xylenols	<0.015 mg/kg	TM062 (S)	<0.015 § M	<0.015 § M	<0.015 § M			
1-Naphthol	<0.01 mg/kg	TM062 (S)	<0.01 §	<0.01 §	<0.01 §			
2,3,5-Trimethylphenol	<0.01 mg/kg	TM062 (S)	<0.01 § M	<0.01 § M	<0.01 § M			
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)	0.191 § M	<0.035 § M	0.0605 § M			

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10-7

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample [1]	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC		

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Test Completion Dates

Lab Sample No(s)	9730475	9730476	9730477
Customer Sample Ref.	S1419400	S1419401	S1419402
AGS Ref.			
Depth			
Type	SOLID	SOLID	SOLID
Phenols by HPLC (S)	12-Aug-2014	12-Aug-2014	12-Aug-2014
Sample description	02-Aug-2014	02-Aug-2014	02-Aug-2014

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5 -C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before presevation was performed
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -
Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Analytical and Deviating Sample Overview

Customer Waterman EED
Site Imperial Way
Report No S144408M

Consignment No S42456
Date Logged 21-Jul-2014

Report Due 01-Aug-2014

ID Number	Description	MethodID	AMMAR	CustServ	ELESULP	FOCS	GROHSA	ICPBOR	ICPMSS									ICPSOIL		ICPWSS	KoneNO3	MCertS	PAHMSUS	PHSOIL	SFAPI	
		Sampled	Exchange.Ammonium AR	Report B	Elemental Sulphur	S.O.M. % (Calc)	GRO (AA-UK) HSA-GCFID	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Vanadium (MS)	Zinc (MS)	Barium.	Beryllium.	SO4-- (H2O sol) mg/l	Nitrate:	MCertS Analysis	PAH (16) by GCMS inc. Sum 8	pH units (AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
			✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓
CL/1419400	ES001 TP9 0.10	15/07/14	E		E		E																		E		
CL/1419401	ES002 TP5 0.40	15/07/14	E		E		E																		E		
CL/1419402	ES003 TP9 1.00	15/07/14	E		E		E																		E		

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S144408M

Customer Waterman EED
Site Imperial Way
Report No S144408M

Consignment No S42456
Date Logged 21-Jul-2014

Report Due 01-Aug-2014

ID Number	Description	MethodID	SFAS	Sub002a	Sub036					TMSS	TPHUSSI	WSLM59
		Sampled	Sulphide as S (AR)	^Asbestos Screen	^Phenol	^Trimethylphenols	^Cresols	^Naphthols	^Xylenols	^Total Phenols	Tot.Moisture @ 105C	TPH by GCFID (Si-UKCWG)>44	Total Organic Carbon
				✓							✓	✓	
CL/1419400	ES001 TP9 0.10	15/07/14										EF	
CL/1419401	ES002 TP5 0.40	15/07/14										EF	
CL/1419402	ES003 TP9 1.00	15/07/14										EF	

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
GROHSA	CL/1419401	Due to matrix interference, the Internal Standard recovery for this Test is below the required QMS specification. This has been confirmed by repeating the analysis. All other Laboratory Process Controls meet the requirements of the QMS. These circumstances should be taken into consideration when utilising the data.

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	AMMAR	As Received	Determination of Exchangeable Ammonium in Soil using potassium chloride extraction, discrete colorimetric detection
Soil	ELESULP	Oven Dried @ < 35℃	Determination of Elemental Sulphur using Solvent Extraction followed by HPLC detection.
Soil	FOCS	Oven Dried @ < 35℃	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35℃	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35℃	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	ICPSOIL	Oven Dried @ < 35℃	Determination of Metals in soil samples by aqua regia digestion followed by ICPOES detection
Soil	ICPWSS	Oven Dried @ < 35℃	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	KoneNO3	Oven Dried @ < 35℃	Determination of Nitrate in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SFAS	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHUSSI	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection including quantitation of Aromatic and Aliphatic fractions.
Soil	WSLM59	Oven Dried @ < 35℃	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Waterman EED

Site : Imperial Way

Report Number : S14_4408

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1419400	ES001 TP9 0.10 (NVM)	Grey TARMAC
CL/1419401	ES002 TP5 0.40	Brown Stone SILT
CL/1419402	ES003 TP9 1.00	Brown CLAY

Our Ref: EFS/144428M (Ver. 2)
Your Ref:

August 13, 2014

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Mr M Amos
Waterman EED
Merchants House
Wapping Road
Bristol
BS1 4RW

For the attention of Mr M Amos

Dear Mr Amos

Sample Analysis - Imperial Way

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 02/09/14 when they will be discarded. Please call 01283 554463 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

S Stone
Project Co-ordinator
01283 554463

Environmental Chemistry, ESG, P.O. Box 100, Burton-upon-trent, DE15 0XD Tel: 01283 554400 Fax: 01283 554422
Environmental Scientifics Group Limited.
Registered No: 2880501

TEST REPORT

1252

Report No. EFS/144428M (Ver. 2)

Waterman EED
Merchants House
Wapping Road
Bristol
BS1 4RW

Site: Imperial Way

The 7 samples described in this report were registered for analysis by ESG on 22-Jul-2014. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 13-Aug-2014

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Pages 5 to 11)
Table of GRO Results (Page 12)
Table of TPH (Si) banding (UK-CWG) (Page 13)
GC-FID Chromatograms (Pages 14 to 27)
Sub Contracted Analysis Results (Pages 28 to 35)
Table of Asbestos Results (Page 36)
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On behalf of
ESG :
Declan Burns

Operations Director
Laboratory and Analytical Business

Date of Issue: 13-Aug-2014

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Method Codes :			AMMAR	ELESULP	GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPSOIL	ICPSOIL	ICPWSS
Method Reporting Limits :			0.5	20	0.2	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16	1	0.1	10
Accreditation Code:			UM	UM		UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Exchange.Ammonium AR**	**Elemental Sulphur**	**GRO (AA-UK) HSA-GCFID**	**Boron (H20 Soluble)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**Barium.**	**Beryllium.**	**SO4-- (H2O sol) mg/l**
1419465	TP1 0.2	17-Jul-14	0.5	<20	Req	0.6	14.6	0.36	12.4	5.8	15.6	<0.5	11.0	<0.5	77.2	434	0.196	69
1419466	TP02 0.4	17-Jul-14	<0.5	<20	Req	0.5	35	0.44	7.5	3.4	23.8	<0.5	8.4	<0.5	86.1	1350	<0.1	196
1419467	TP04 0.4	17-Jul-14	<0.5	<20	Req	0.5	30.4	0.5	9.0	3.5	20.5	<0.5	8.3	<0.5	94.7	1290	<0.1	73
1419468	TP06 0.4	16-Jul-14	<0.5	<21	Req	1	7.9	0.28	17.0	12.0	84.7	<0.5	13.5	<0.5	55.7	96.4	0.276	117
1419469	TP07 0.4	17-Jul-14	<0.5	<20	Req	<0.5	27.7	0.54	5.5	2.8	18.5	<0.5	6.6	<0.5	97.5	1220	<0.1	208
1419470	TP8 0.4	16-Jul-14	<0.5	<20	Req	<0.5	48.9	0.84	6.1	3	27.3	<0.5	8	<0.5	153.3	2260	<0.1	109
1419471	TP10 0.25	17-Jul-14	<0.5	<20	Req	0.5	36.6	0.57	8.1	3.3	18.3	<0.5	8.5	<0.5	114.4	1470	<0.1	41

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Client Name Waterman EED

Contact Mr M Amos

Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144428M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Units :			pH Units	mg/kg	mg/kg		%	mg/kg	% M/M	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Method Codes :			PHSOIL	SFAPI	SFAPI	Sub002a	TMSS	TPHUSSI	FOCS	ICPMSS	KoneNO3	SFAS	Sub036	Sub036	Sub036	Sub036	Sub036	Sub036
Method Reporting Limits :				0.5	0.5		0.2	10	0.04	0.6	1.5	0.5						
Accreditation Code:			UM	UM	UM	U	U		N	N	N	N	N		N		N	N
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**pH units (AR)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**^Asbestos Screen**	**Tot.Moisture @ 105C**	**TPH by GCFID (Si-UKCWG)>44**	**S.O.M. % (Calc)**	**Vanadium (MS)**	**Nitrate:**	**Sulphide as S (AR)**	**^Phenol**	**^Trimethylphenols**	**^Cresols**	**^Naphthols**	**^Xylenols**	**^Total Phenols**
1419465	TP1 0.2	17-Jul-14	8.9	<0.5	<0.5	NAIIS	4.5	Req	1.53	21.0	<1.5	0.6	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055
1419466	TP02 0.4	17-Jul-14	11.3	<0.5	<0.5	NAIIS	4.7	Req	1.05	7.4	<1.5	<0.5	0.02	<0.01	<0.01	<0.01	<0.015	<0.065
1419467	TP04 0.4	17-Jul-14	12.3	<0.5	<0.5	NAIIS	6.3	Req	1.21	6.9	<1.5	<0.5	0.122	<0.01	<0.01	<0.01	<0.015	<0.167
1419468	TP06 0.4	16-Jul-14	11.9	<0.5	3.0	CH	8.7	Req	1.12	19.5	14.7	<0.5	0.243	<0.01	<0.01	<0.01	<0.015	<0.288
1419469	TP07 0.4	17-Jul-14	11.6	<0.5	<0.5	NAIIS	5.1	Req	0.99	4.1	<1.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055
1419470	TP8 0.4	16-Jul-14	9.3	<0.5	<0.5	NAIIS	2.8	Req	0.76	4.6	<1.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055
1419471	TP10 0.25	17-Jul-14	12.2	<0.5	<0.5	NAIIS	6.5	Req	0.97	6.3	<1.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055

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Client Name Waterman EED

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Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144428M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

		Units :	% M/M	mg/kg															
		Method Codes :	WSLM59	PAHMSUS															
		Method Reporting Limits :	0.02																
		Accreditation Code:	N																
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Total Organic Carbon**	**PAH (16) by GCMS inc. Sum 8**															
1419465	TP1 0.2	**17-Jul-14**	0.89	Req															
1419466	TP02 0.4	**17-Jul-14**	0.61	Req															
1419467	TP04 0.4	**17-Jul-14**	0.70	Req															
1419468	TP06 0.4	**16-Jul-14**	0.65	Req															
1419469	TP07 0.4	**17-Jul-14**	0.58	Req															
1419470	TP8 0.4	**16-Jul-14**	0.44	Req															
1419471	TP10 0.25	**17-Jul-14**	0.56	Req															

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Client Name	**Waterman EED**
Contact	Mr M Amos

Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144428M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP1 0.2	**Job Number:**	S14_4428M
LIMS ID Number:	CL1419465	**Date Booked in:**	22-Jul-14
QC Batch Number:	140615	**Date Extracted:**	24-Jul-14
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Jul-14
Directory:	724MS17.PAH\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**UM**
Acenaphthylene	208-96-8	-	< 0.08	-	U
Acenaphthene	83-32-9	-	< 0.08	-	UM
Fluorene	86-73-7	-	< 0.08	-	UM
Phenanthrene	85-01-8	-	< 0.08	-	UM
Anthracene	120-12-7	-	< 0.08	-	U
Fluoranthene	206-44-0	-	< 0.08	-	UM
Pyrene	129-00-0	-	< 0.08	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.08	-	UM
Chrysene	218-01-9	-	< 0.08	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.08	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-	UM
Total (USEPA16) PAHs	-	-	< 1.34	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.59	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	100
Acenaphthene-d10	95
Phenanthrene-d10	99
Chrysene-d12	103
Perylene-d12	96

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	101
Terphenyl-d14	71

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP02 0.4	**Job Number:**	S14_4428M
LIMS ID Number:	CL1419466	**Date Booked in:**	22-Jul-14
QC Batch Number:	140615	**Date Extracted:**	24-Jul-14
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Jul-14
Directory:	724MS17.PAH\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**UM**
Acenaphthylene	208-96-8	-	< 0.08	-	U
Acenaphthene	83-32-9	-	< 0.08	-	UM
Fluorene	86-73-7	-	< 0.08	-	UM
Phenanthrene	85-01-8	-	< 0.08	-	UM
Anthracene	120-12-7	-	< 0.08	-	U
Fluoranthene	206-44-0	-	< 0.08	-	UM
Pyrene	129-00-0	-	< 0.08	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.08	-	UM
Chrysene	218-01-9	-	< 0.08	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.08	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-	UM
Total (USEPA16) PAHs	-	-	< 1.34	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.59	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	99
Acenaphthene-d10	93
Phenanthrene-d10	94
Chrysene-d12	94
Perylene-d12	85

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	103
Terphenyl-d14	70

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP04 0.4	**Job Number:**	S14_4428M
LIMS ID Number:	CL1419467	**Date Booked in:**	22-Jul-14
QC Batch Number:	140615	**Date Extracted:**	24-Jul-14
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Jul-14
Directory:	724MS17.PAH\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Total (USEPA16) PAHs	-	-	< 1.37	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.60	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	92
Acenaphthene-d10	85
Phenanthrene-d10	83
Chrysene-d12	76
Perylene-d12	66

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	103
Terphenyl-d14	68

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP06 0.4	**Job Number:**	S14_4428M
LIMS ID Number:	CL1419468	**Date Booked in:**	22-Jul-14
QC Batch Number:	140615	**Date Extracted:**	24-Jul-14
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Jul-14
Directory:	724MS17.PAH\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	4.55	0.18	97	UM
Fluorene	86-73-7	4.94	0.14	96	UM
Phenanthrene	85-01-8	5.81	5.38	100	UM
Anthracene	120-12-7	5.87	0.71	94	U
Fluoranthene	206-44-0	7.18	6.20	95	UM
Pyrene	129-00-0	7.48	4.53	95	UM
Benzo[a]anthracene	56-55-3	9.18	1.54	98	UM
Chrysene	218-01-9	9.23	1.39	99	UM
Benzo[b]fluoranthene	205-99-2	10.71	1.77	99	UM
Benzo[k]fluoranthene	207-08-9	10.75	0.60	99	UM
Benzo[a]pyrene	50-32-8	11.14	1.26	98	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.52	0.82	100	UM
Dibenzo[a,h]anthracene	53-70-3	12.56	0.18	96	UM
Benzo[g,h,i]perylene	191-24-2	12.84	0.72	96	UM
Total (USEPA16) PAHs	-	-	< 25.61	-	N
Total (Oil Guide 8) PAHs	-	-	7.57	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	93
Acenaphthene-d10	87
Phenanthrene-d10	90
Chrysene-d12	99
Perylene-d12	99

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	103
Terphenyl-d14	71

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP07 0.4	**Job Number:**	S14_4428M
LIMS ID Number:	CL1419469	**Date Booked in:**	22-Jul-14
QC Batch Number:	140615	**Date Extracted:**	24-Jul-14
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Jul-14
Directory:	724MS17.PAH\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**UM**
Acenaphthylene	208-96-8	-	< 0.08	-	U
Acenaphthene	83-32-9	-	< 0.08	-	UM
Fluorene	86-73-7	-	< 0.08	-	UM
Phenanthrene	85-01-8	-	< 0.08	-	UM
Anthracene	120-12-7	-	< 0.08	-	U
Fluoranthene	206-44-0	-	< 0.08	-	UM
Pyrene	129-00-0	-	< 0.08	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.08	-	UM
Chrysene	218-01-9	-	< 0.08	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.08	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-	UM
Total (USEPA16) PAHs	-	-	< 1.35	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.59	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	92
Acenaphthene-d10	85
Phenanthrene-d10	85
Chrysene-d12	86
Perylene-d12	79

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	90
Terphenyl-d14	62

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP8 0.4	**Job Number:**	S14_4428M
LIMS ID Number:	CL1419470	**Date Booked in:**	22-Jul-14
QC Batch Number:	140615	**Date Extracted:**	24-Jul-14
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Jul-14
Directory:	724MS17.PAH\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**UM**
Acenaphthylene	208-96-8	-	< 0.08	-	U
Acenaphthene	83-32-9	-	< 0.08	-	UM
Fluorene	86-73-7	-	< 0.08	-	UM
Phenanthrene	85-01-8	-	< 0.08	-	UM
Anthracene	120-12-7	-	< 0.08	-	U
Fluoranthene	206-44-0	-	< 0.08	-	UM
Pyrene	129-00-0	-	< 0.08	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.08	-	UM
Chrysene	218-01-9	-	< 0.08	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.08	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-	UM
Total (USEPA16) PAHs	-	-	< 1.32	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.58	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	98
Acenaphthene-d10	92
Phenanthrene-d10	95
Chrysene-d12	98
Perylene-d12	90

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	102
Terphenyl-d14	72

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP10 0.25	**Job Number:**	S14_4428M
LIMS ID Number:	CL1419471	**Date Booked in:**	22-Jul-14
QC Batch Number:	140615	**Date Extracted:**	24-Jul-14
Quantitation File:	Initial Calibration	**Date Analysed:**	24-Jul-14
Directory:	724MS17.PAH\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Total (USEPA16) PAHs	-	-	< 1.37	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.60	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	98
Acenaphthene-d10	92
Phenanthrene-d10	93
Chrysene-d12	95
Perylene-d12	88

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	100
Terphenyl-d14	69

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Gasoline Range Organics
(BTEX and Aromatic/Aliphatic Carbon Ranges)

Customer and Site Details: Waterman EED : Imperial Way
Job Number: S14_4428M
Directory: E:\TES\DATA\2014\073114HSA_GC9\140731 2014-07-31 17-43-16\013F1301.D
Method: HEADSPACE GCFID
Accreditation Code: UM

Matrix: Soil
Date Booked in: 22-Jul-14
Date extracted: 31-Jul-14
Date Analysed: 31-Jul-14, 21:42:3
Units: mg/kg

*** Sample data with an asterisk are not UKAS accredited.**

		BTEX				Aromatics		Aliphatics		Total GRO
Sample ID	**Client ID**	**Benzene**	**Toluene**	**Ethyl benzene**	**Xylenes**	**C5 - C7**	**>C7 - C8**	**C5 - C6**	**>C6 - C8**	**C5 - C10**
CL1419465	TP1 0.2	<0.010	<0.010	<0.010	<0.021	<0.01	<0.01	<0.2	<0.2	0.28
CL1419466	TP02 0.4	<0.010	<0.010	<0.010	<0.021	<0.01	<0.01	<0.2	<0.2	0.24
CL1419467	TP04 0.4	<0.011	<0.011	<0.011	<0.021	<0.01	<0.01	<0.2	<0.2	0.24
CL1419468	TP06 0.4	<0.011	<0.011	<0.011	<0.022	<0.01	<0.01	<0.2	<0.2	<0.2
CL1419469	TP07 0.4	<0.011	<0.011	<0.011	<0.021	<0.01	<0.01	<0.2	<0.2	0.21
CL1419470	TP8 0.4	<0.010	<0.010	<0.010	<0.021	<0.01	<0.01	<0.2	<0.2	0.26
CL1419471	TP10 0.25	<0.011	<0.011	<0.011	<0.021	<0.01	<0.01	<0.2	<0.2	0.27

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

ALIPHATIC / AROMATIC FRACTION BY GC/FID

Customer and Site Details: Waterman EED : Imperial Way
Job Number: S14_4428M
QC Batch Number: 140615
Directory: D:\TES\DATA\Y2013\02\072514TPH_GC3\088B4401.D
Method: Ultra Sonic

Separation: Silica gel
Eluents: Hexane, DCM

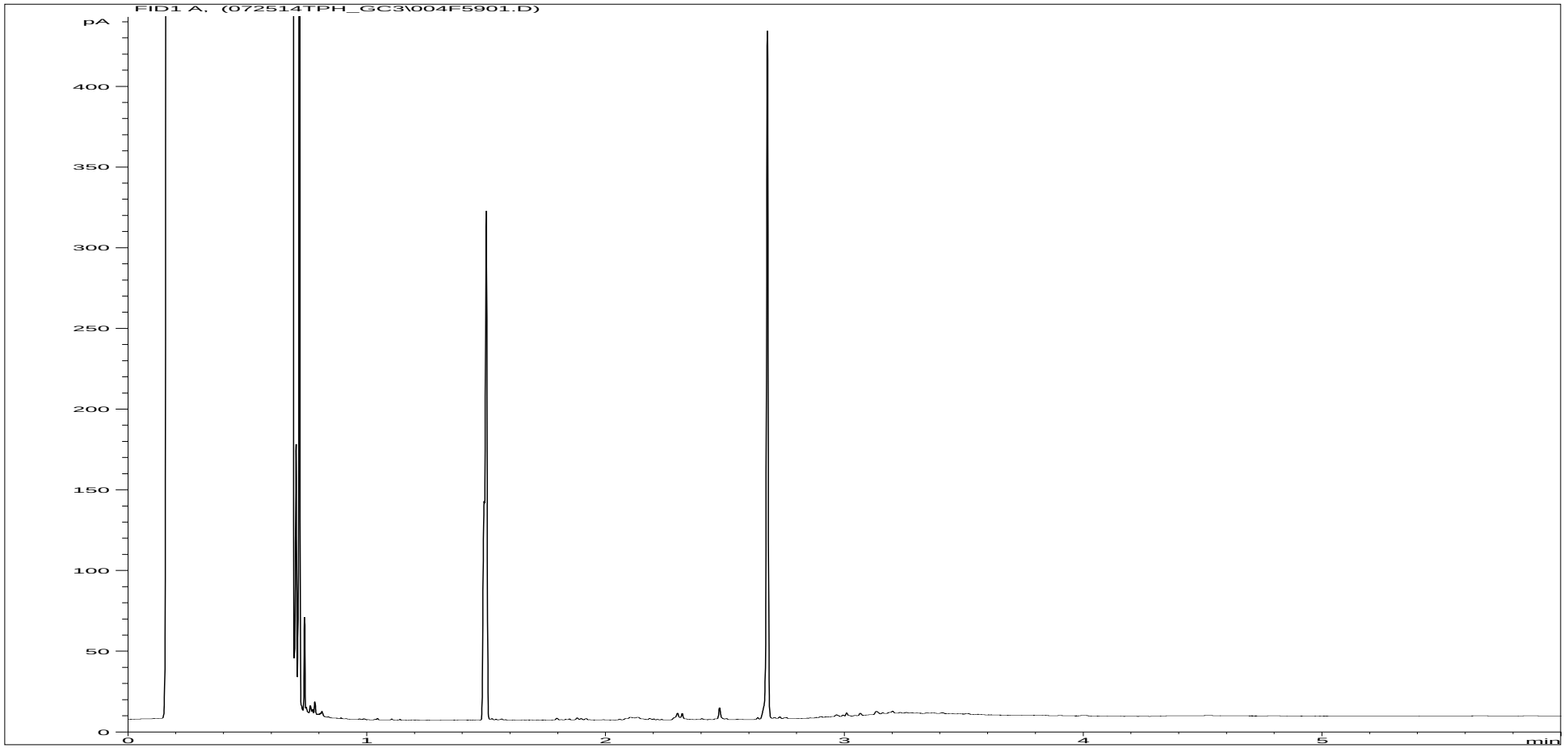
Matrix: Soil
Date Booked in: 22-Jul-14
Date Extracted: 24-Jul-14
Date Analysed: 25-Jul-14

This sample data is not MCERTS accredited.
Ba * This sample data is not ISO17025 accredited.

		Concentration, (mg/kg) - as dry weight.												
		>C8 - C10	>C8 - C10	>C10 - C12	>C10 - C12	>C12 - C16	>C12 - C16	>C16 - C35	>C16 - C21	>C35 - C44*	>C21 - C35	>C35 - C44*	>C8 - C44*	>C8 - C44*
Sample ID	**Client ID**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aromatics**	**Aliphatics**	**Aromatics**
CL1419465	TP1 0.2	<4	<4	<4	<4	<4	<4	16.2	<4	<5.88	16.2	18.3	22.4	42
CL1419466	TP02 0.4	<4	<4	<4	<4	<4	<4	15.5	<4	8.59	<9.19	<5.90	27.9	<21
CL1419467	TP04 0.4	<4	<4	<4	<4	<4	<4	14.7	<4	8.67	<9.35	<6.00	27	<21
CL1419468	TP06 0.4	<4	<4	<4	<4	<4	<4	205	39.1	48.6	175	87.4	258	307
CL1419469	TP07 0.4	<4	<4	<4	<4	<4	<4	18.1	<4	8.7	<9.23	<5.92	31.5	<21
CL1419470	TP8 0.4	<4	<4	<4	<4	<4	5.43	13.1	<4	8.1	10.9	<5.78	24.9	24
CL1419471	TP10 0.25	<4	<4	<4	<4	<4	<4	<12.7	<4	<6.01	13.5	<6.01	<21	21.7

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appropriate, in accordance with the MCERTS standard.

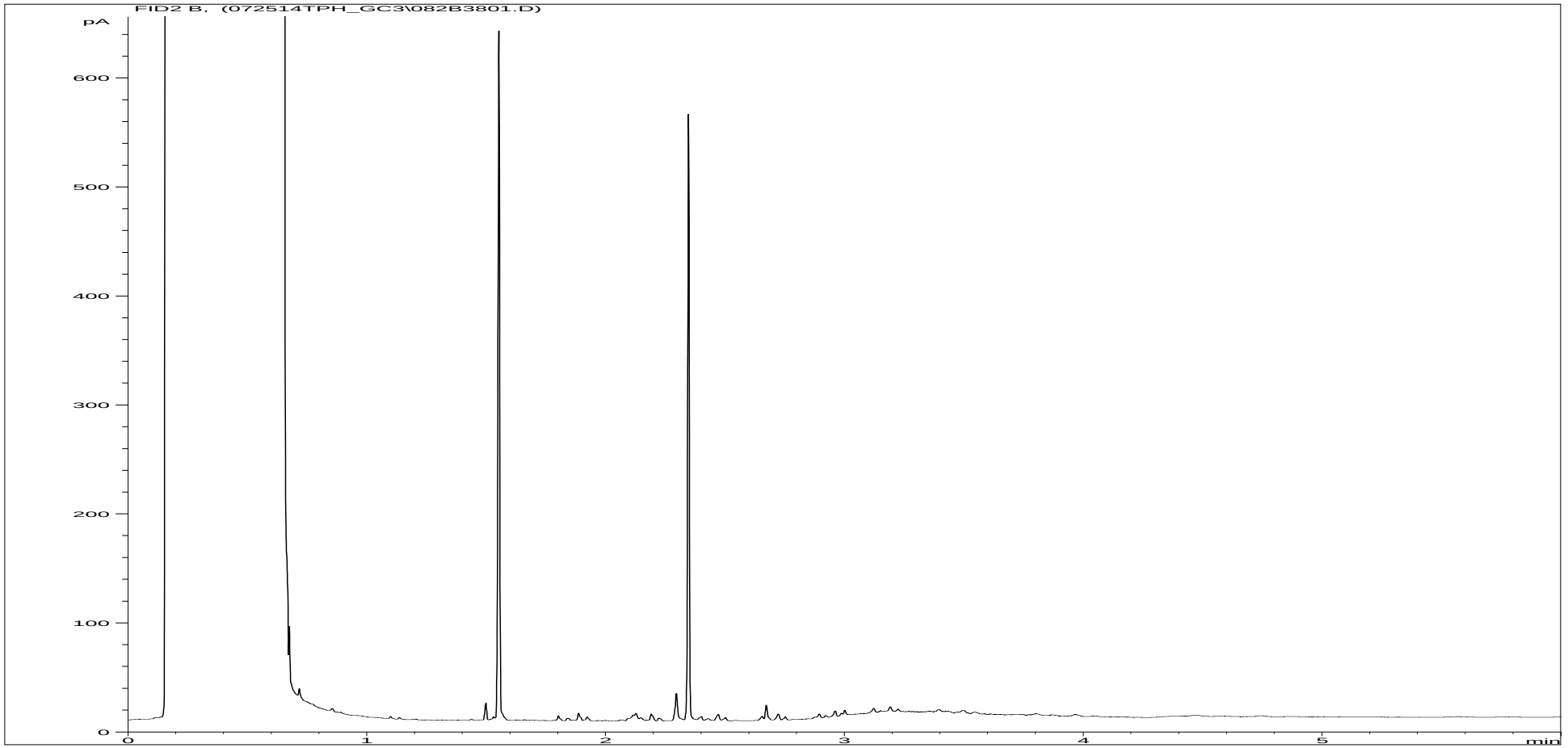
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1419465ALI	**Job Number:**	S14_4428M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP1 0.2
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\004F5901.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

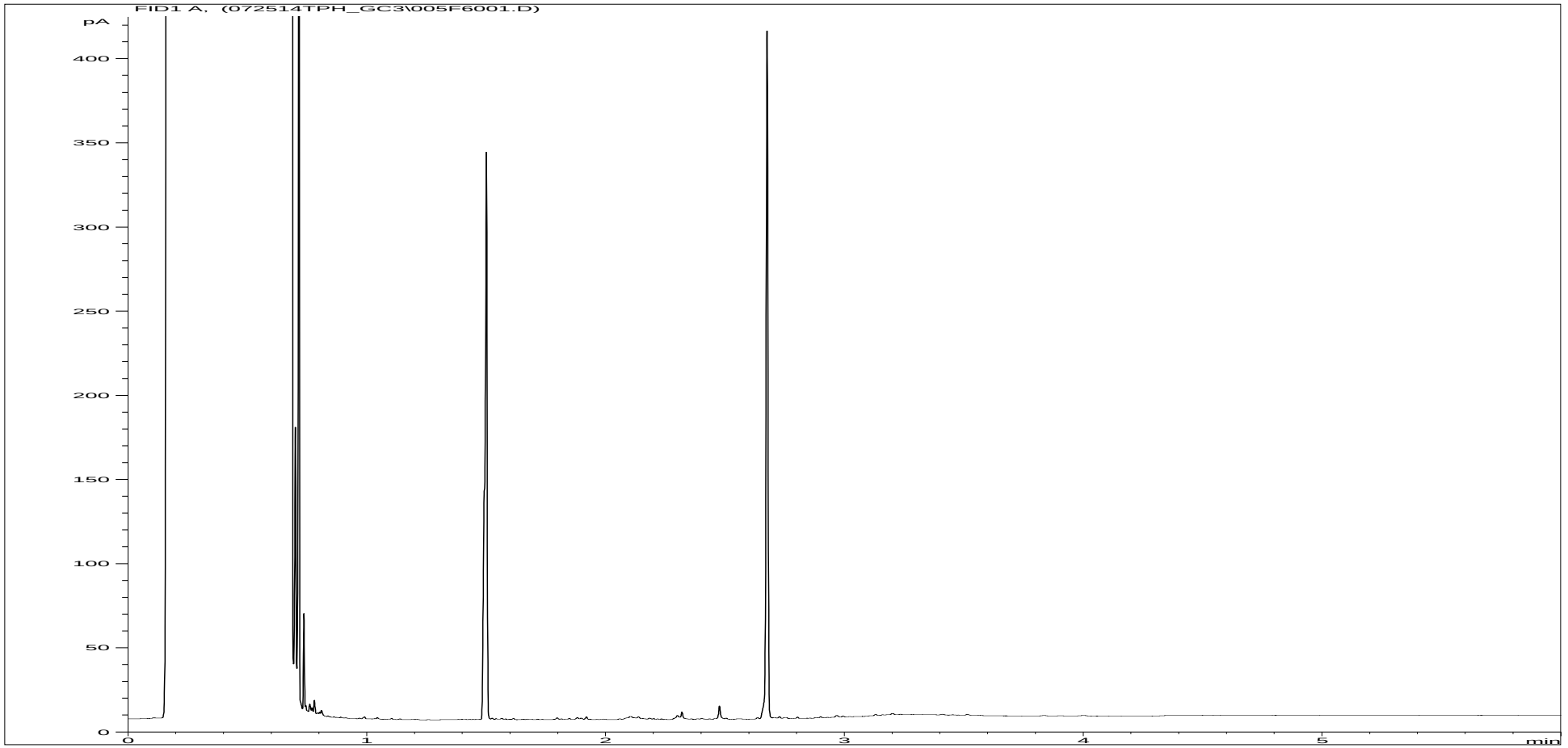
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1419465ARO	**Job Number:**	S14_4428M
Multiplier:	12	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP1 0.2
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\082B3801.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

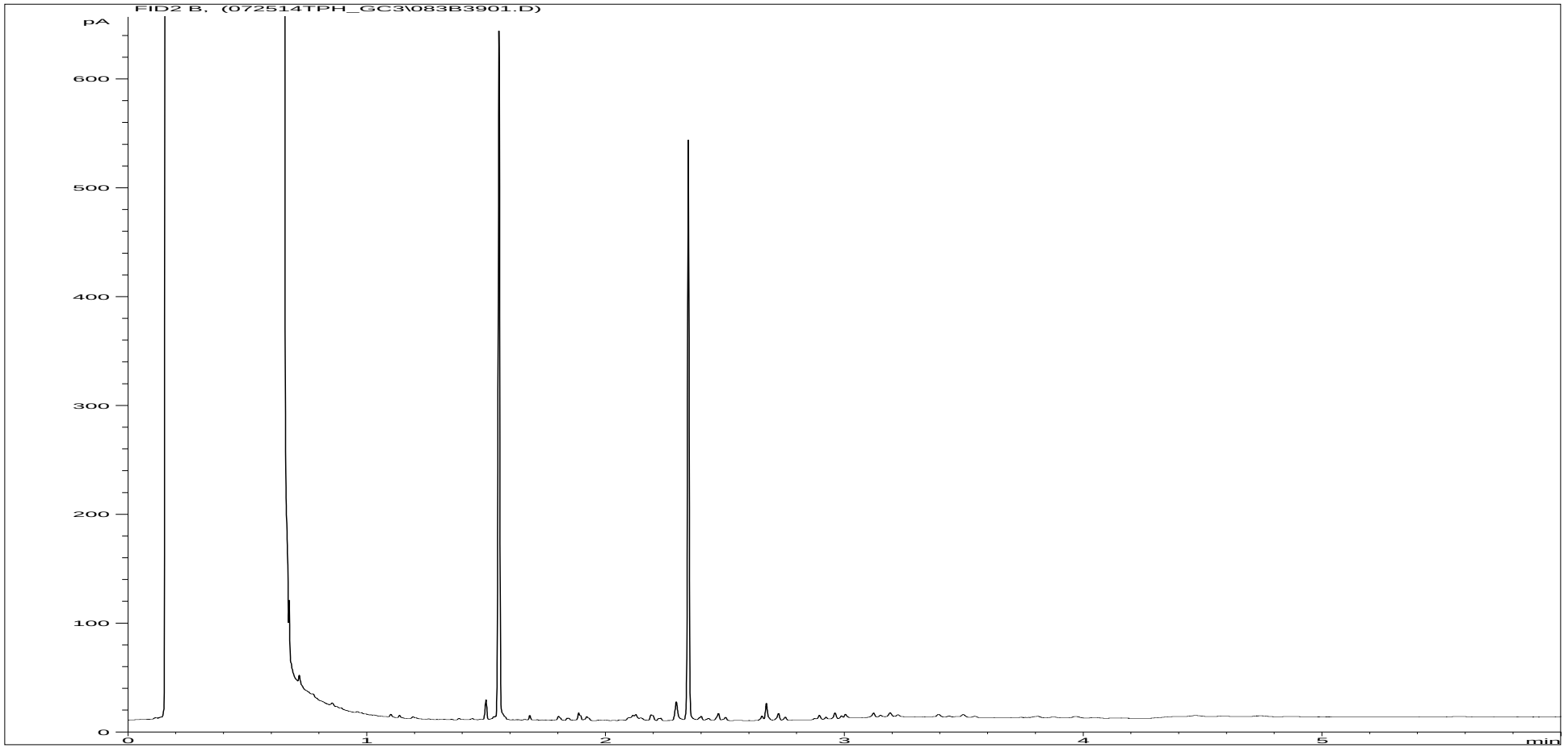
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1419466ALI	**Job Number:**	S14_4428M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP02 0.4
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\005F6001.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

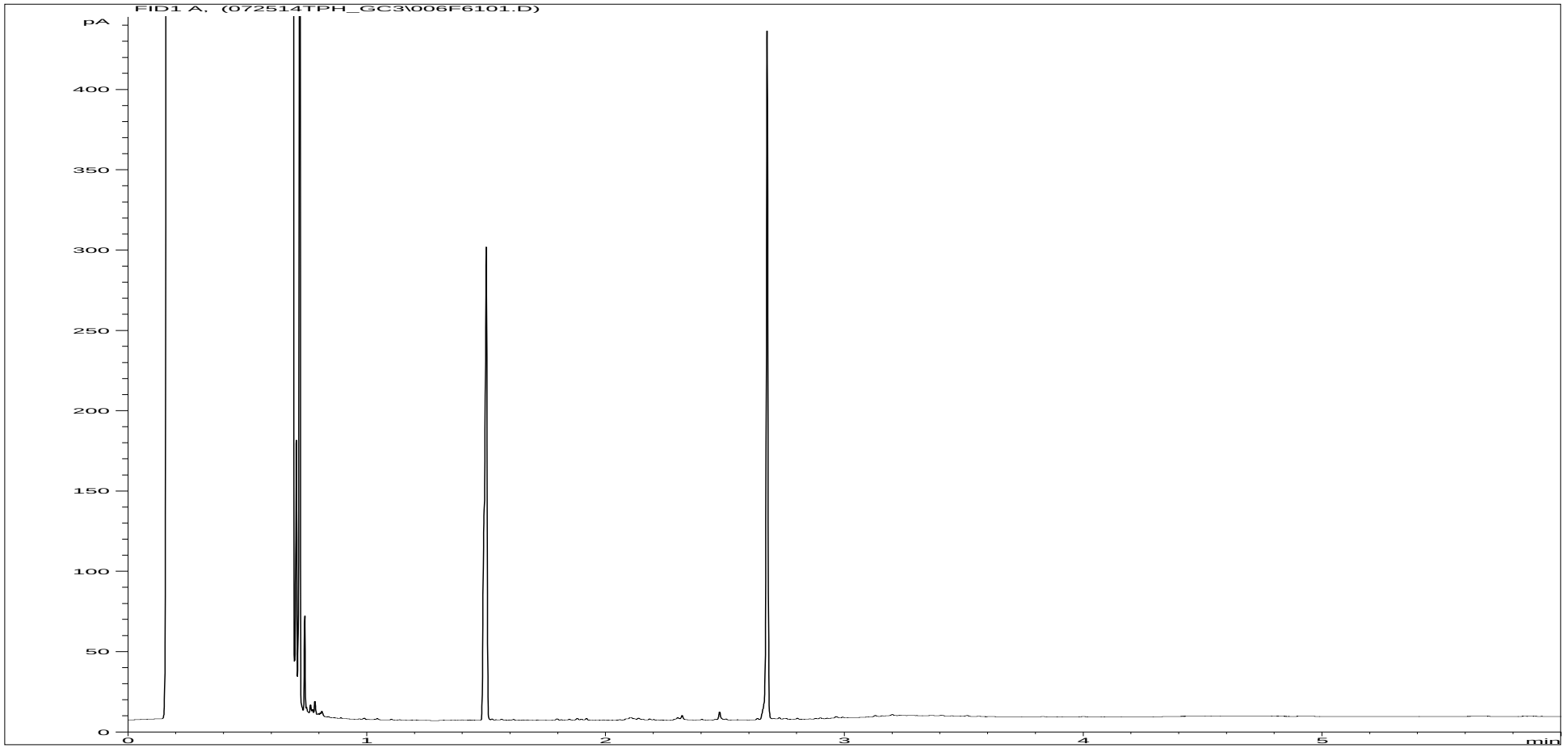
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1419466ARO	**Job Number:**	S14_4428M
Multiplier:	12	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP02 0.4
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\083B3901.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

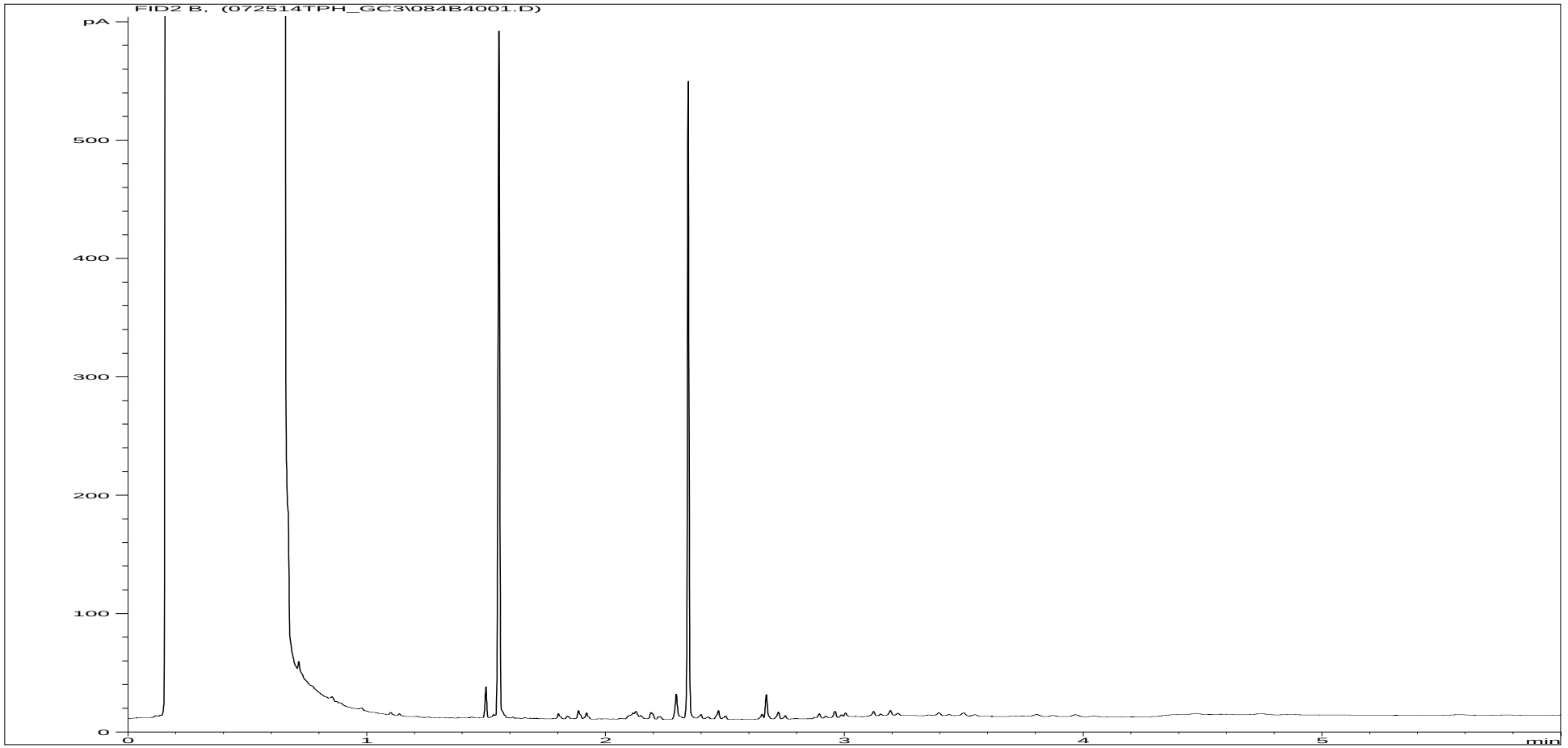
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1419467ALI	**Job Number:**	S14_4428M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP04 0.4
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\006F6101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

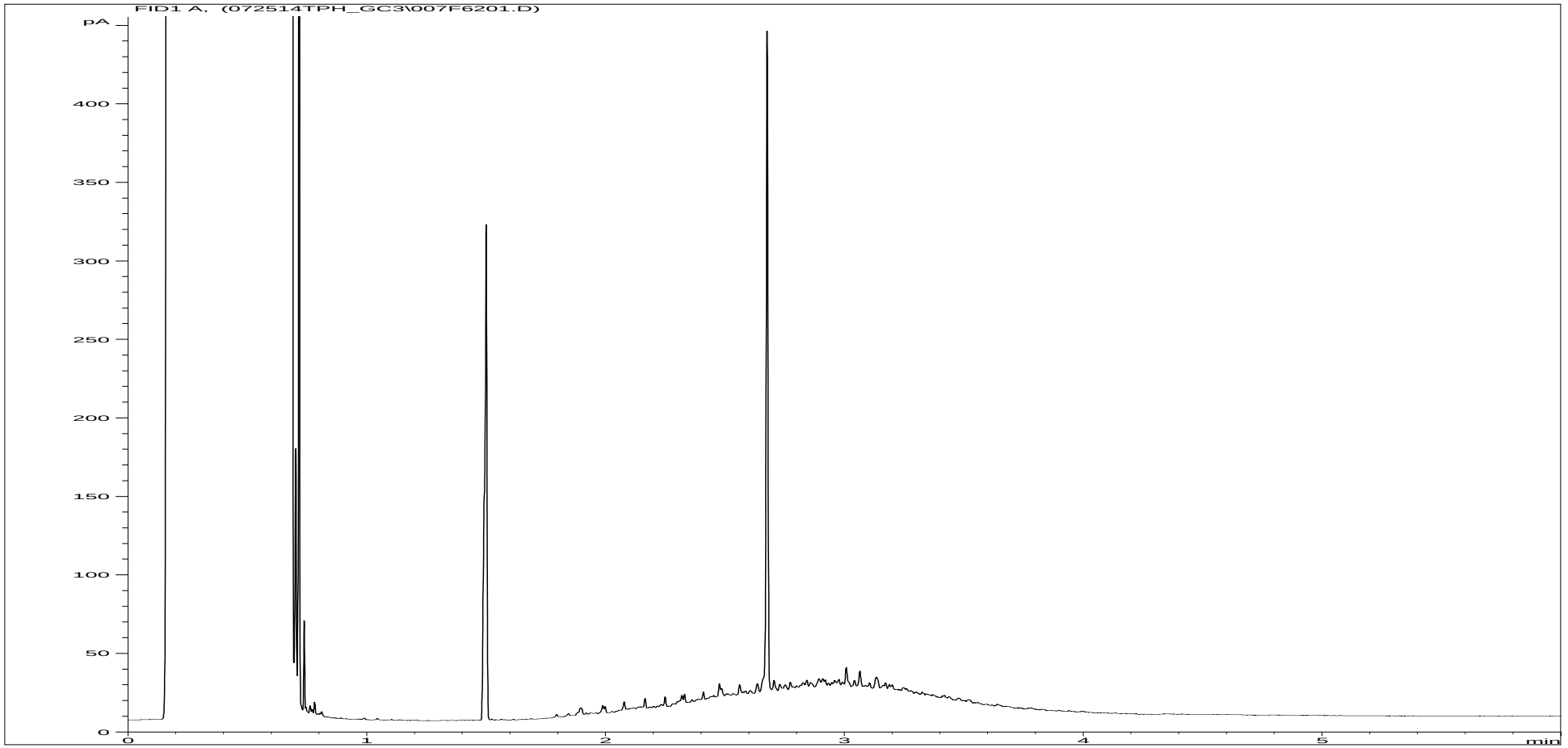
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1419467ARO	**Job Number:**	S14_4428M
Multiplier:	12	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP04 0.4
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\084B4001.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

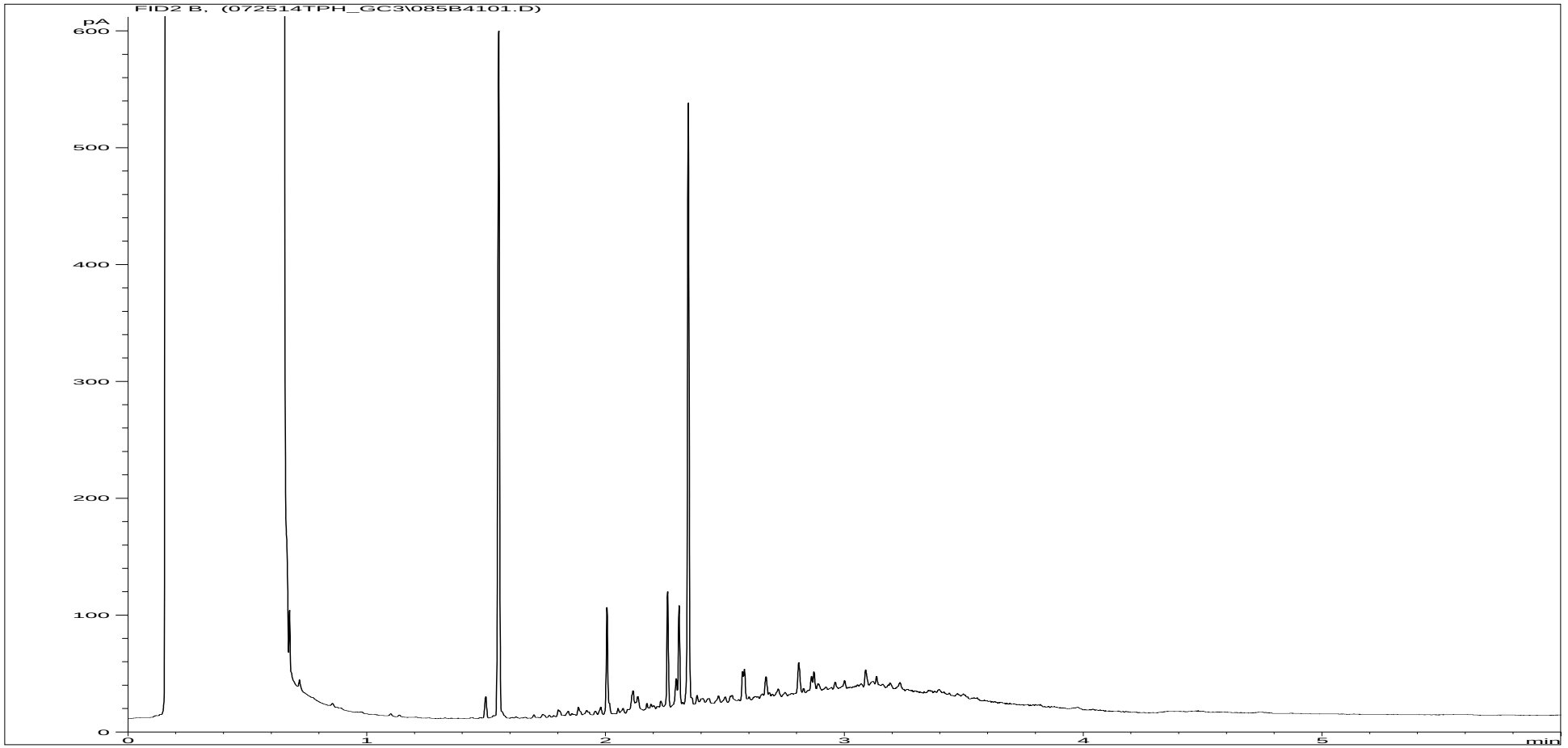
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1419468ALI	**Job Number:**	S14_4428M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP06 0.4
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\007F6201.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

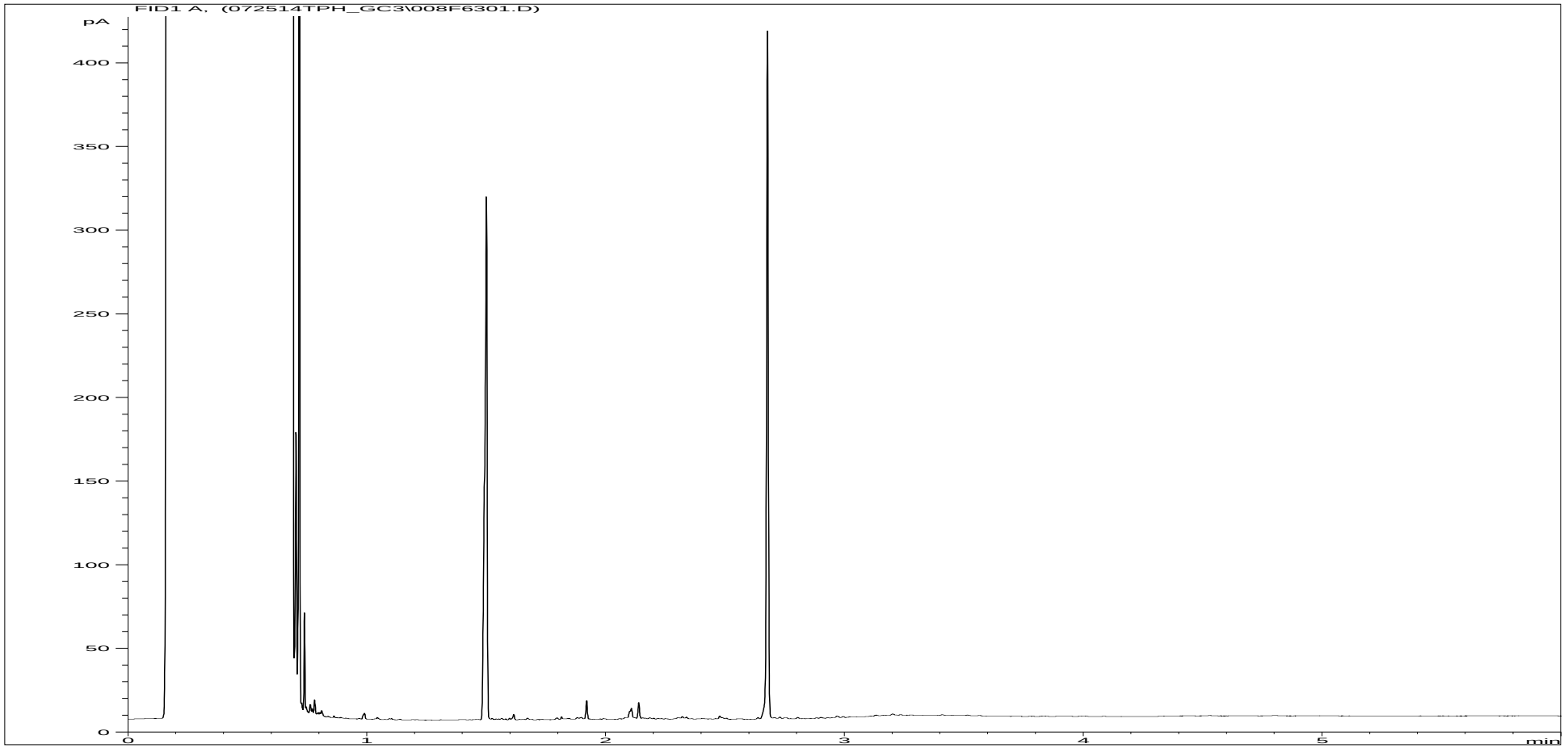
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1419468ARO	**Job Number:**	S14_4428M
Multiplier:	11.84	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP06 0.4
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\085B4101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

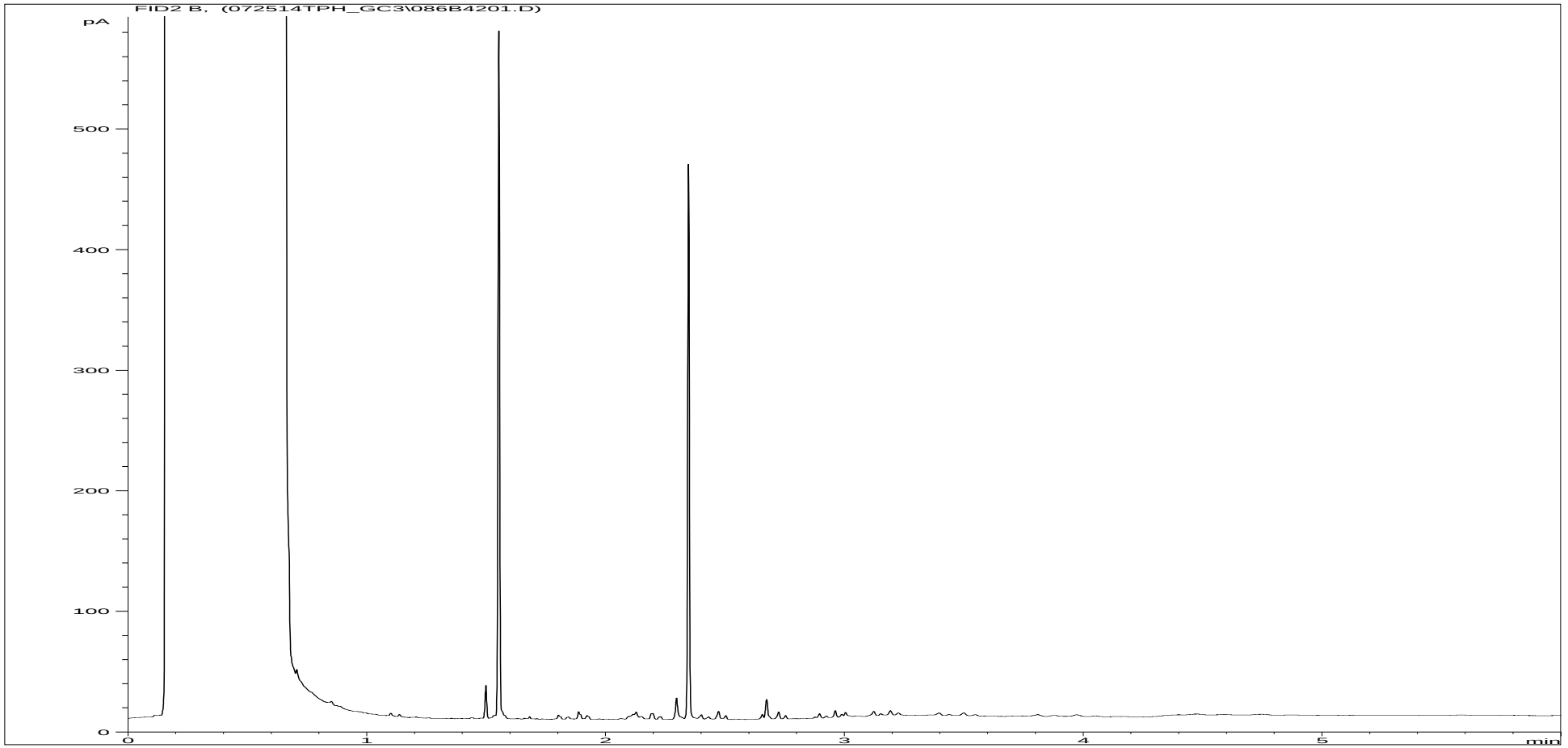
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1419469ALI	**Job Number:**	S14_4428M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP07 0.4
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\008F6301.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

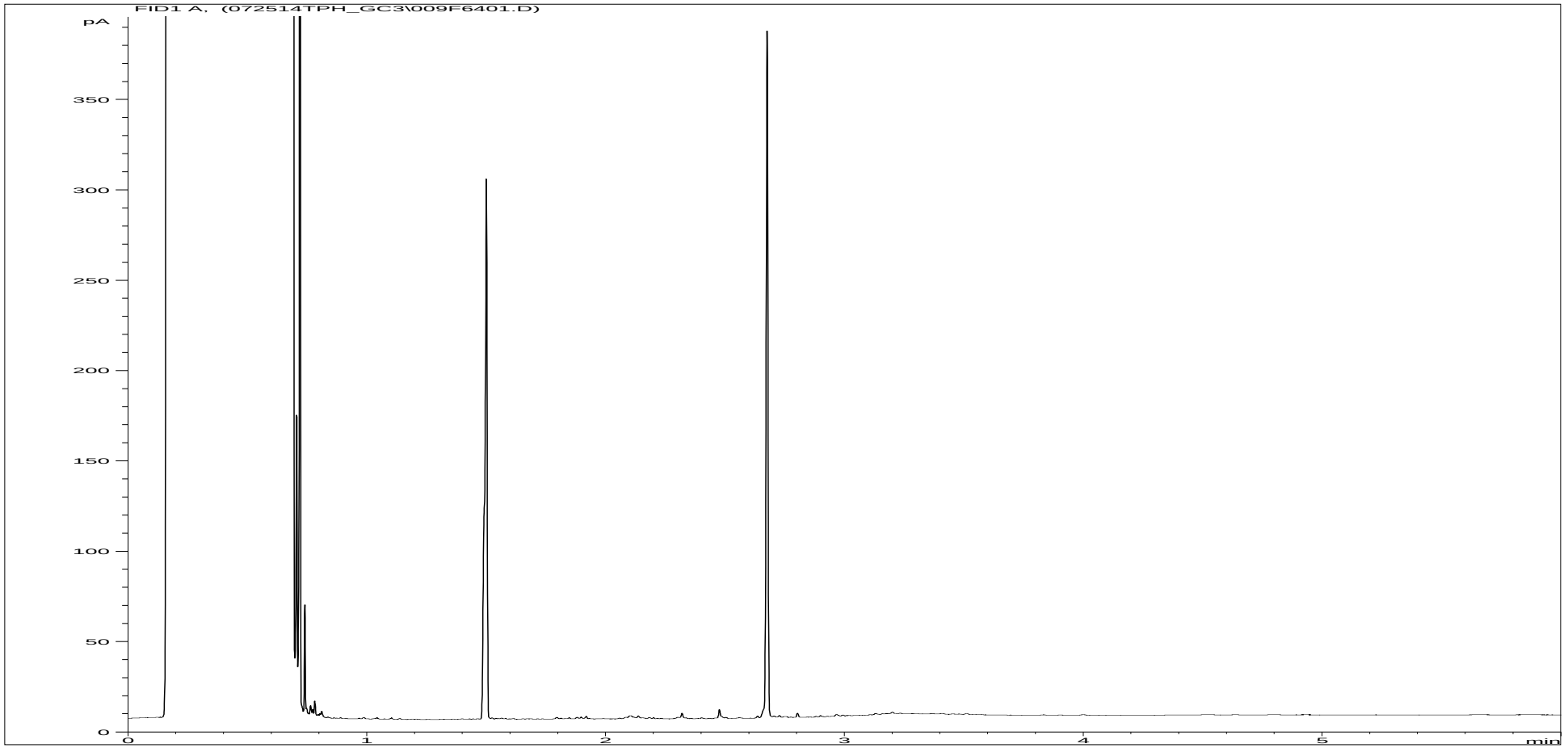
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1419469ARO	**Job Number:**	S14_4428M
Multiplier:	12.16	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP07 0.4
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\086B4201.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

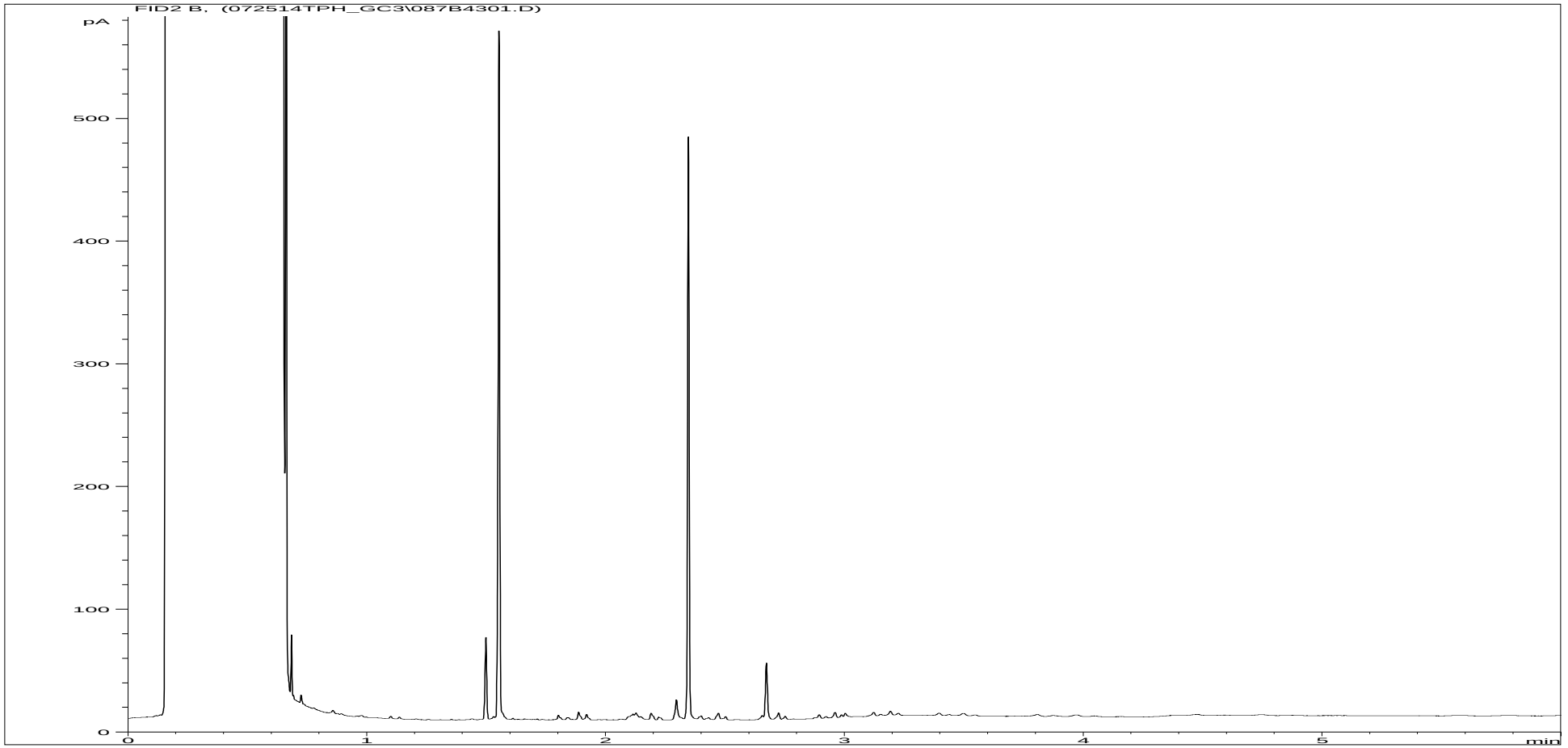
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1419470ALI	**Job Number:**	S14_4428M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP8 0.4
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\009F6401.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

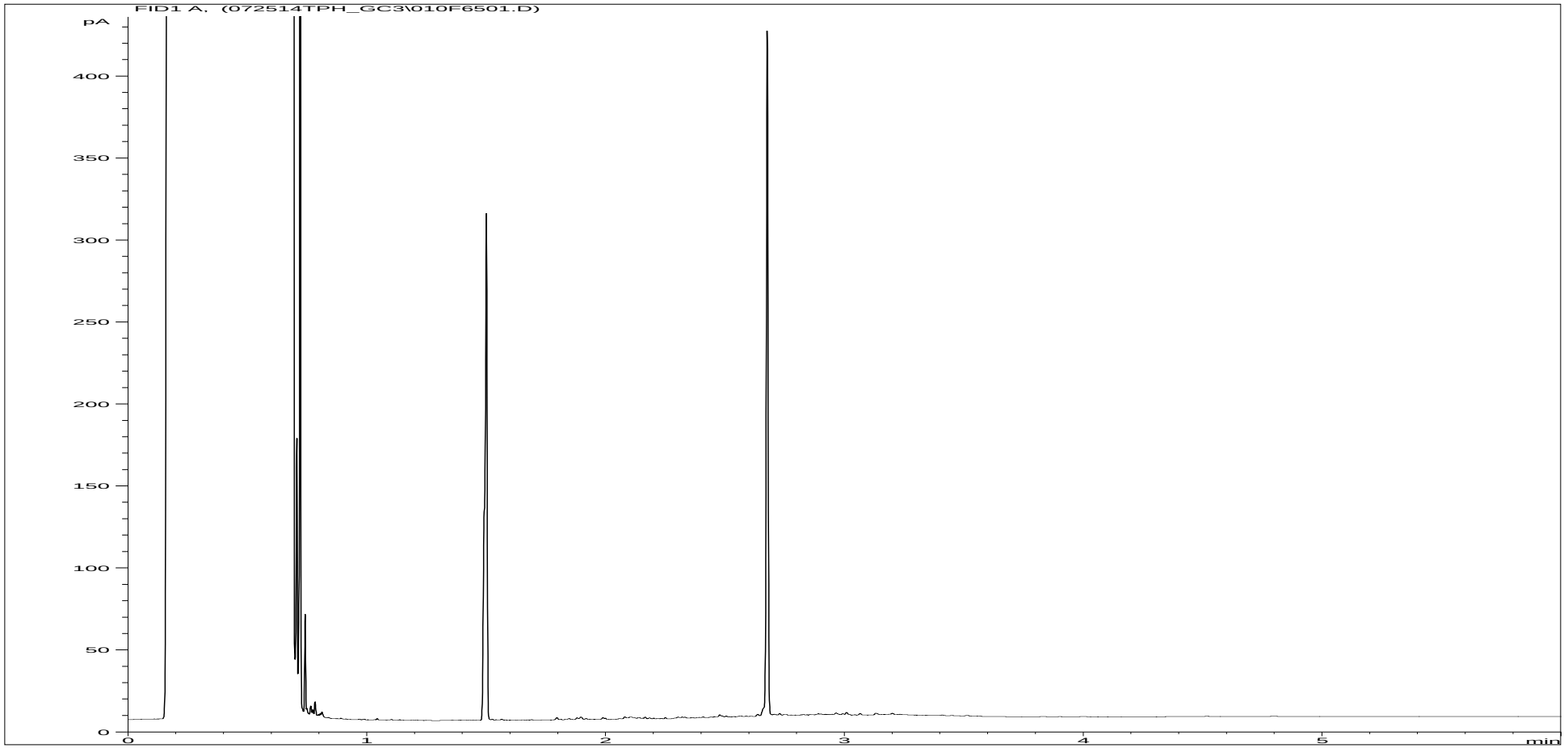
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1419470ARO	**Job Number:**	S14_4428M
Multiplier:	12	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP8 0.4
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\087B4301.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

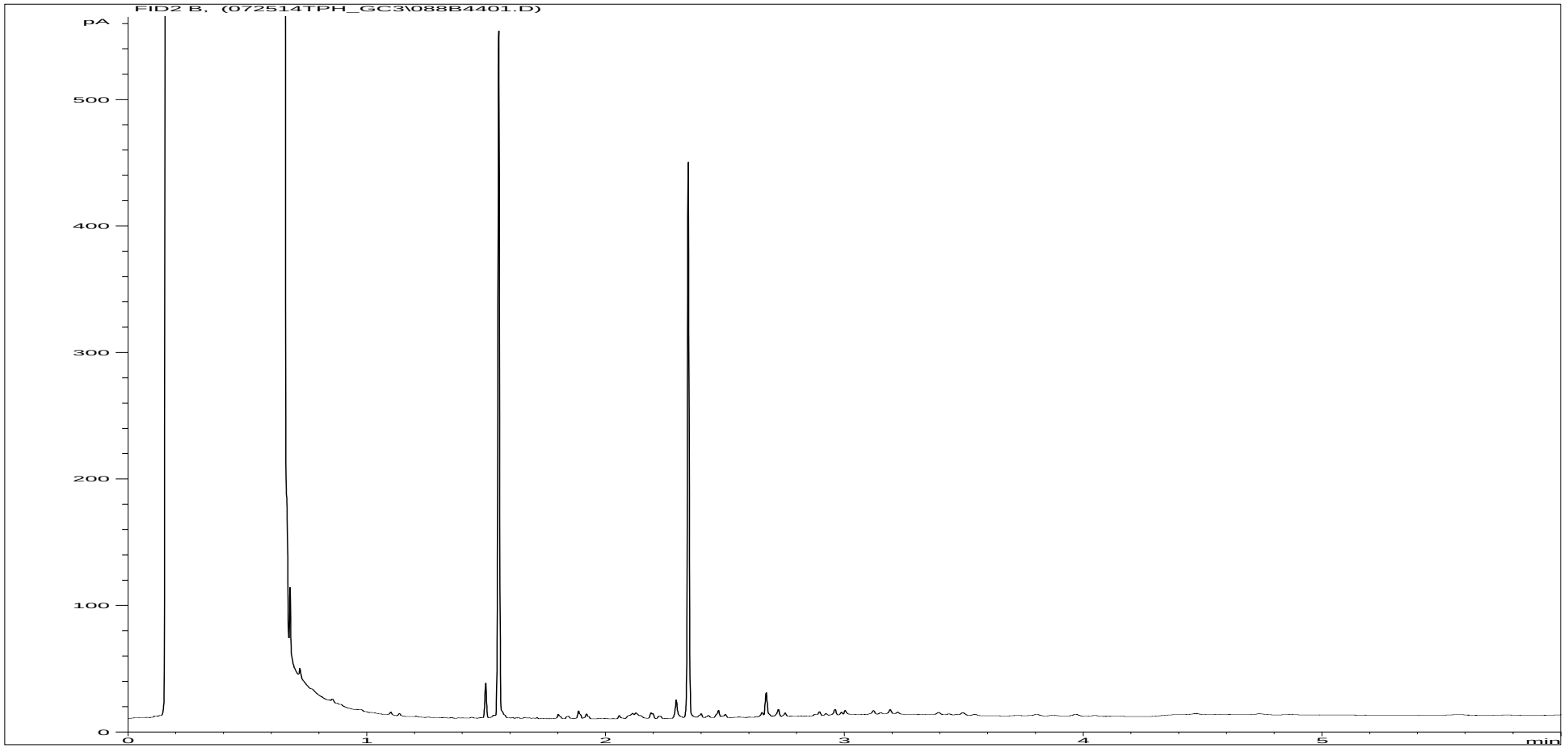
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1419471ALI	**Job Number:**	S14_4428M
Multiplier:	12	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP10 0.25
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\010F6501.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1419471ARO	**Job Number:**	S14_4428M
Multiplier:	11.84	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP10 0.25
Acquisition Date/Time:	25-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\072514TPH_GC3\088B4401.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

ALcontrol Laboratories

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Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: mkt@alcontrol.com
Website: www.alcontrol.com

Environmental Scientifics Group
Bretby Business Park
Ashby Road
Burton on Trent
Staffordshire
DE15 0YZ
Attention: Customer Services

Post Certification Report

Date:	12 August 2014	**Location:**	Not Specified
Customer:	H_SCIENT_BOT	**No. Of Samples Received:**	7
Your Reference:	Not Specified	**Samples Scheduled:**	7
[SDG] and Samples	9744868,9744869,9744871,9744872,9744874,9744875,9744876		

Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
9744868	S1419465 - TP1		0.20	17/07/2014
9744869	S1419466 - TP02		0.40	17/07/2014
9744871	S1419467 - TP04		0.40	17/07/2014
9744872	S1419468 - TP06		0.40	16/07/2014
9744874	S1419469 - TP07		0.40	17/07/2014
9744875	S1419470 - TP8		0.40	16/07/2014
9744876	S1419471 - TP10		0.25	17/07/2014

Only received samples which have had analysis scheduled will be shown on the following pages.

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Results Legend

X Test

N No Determination Possible

			Lab Sample No(s)	974486 8	974487 5	974486 9	974487 1	974487 2	974487 4	974487 6
			Customer Sample Reference	S1419465 - TP1	S1419470 - TP8	S1419466 - TP02	S1419467 - TP04	S1419468 - TP06	S1419469 - TP07	S1419471 - TP10
			AGS Reference							
			Depth (m)	0.20	0.40	0.40	0.40	0.40	0.40	0.25
			Container	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)
Phenols by HPLC (S)	All	NDPs: 0 Tests: 7		X	X	X	X	X	X	X
Sample description	All	NDPs: 0 Tests: 7		X	X	X	X	X	X	X

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Results Legend		Customer Sample Ref.	S1419465 - TP1	S1419470 - TP8	S1419466 - TP02	S1419467 - TP04	S1419468 - TP06	S1419469 - TP07
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.							
1-5&+§@	Sample deviation (see appendix)							
		Depth (m)	0.20	0.40	0.40	0.40	0.40	0.40
		Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
		Date Sampled	17/07/2014	16/07/2014	17/07/2014	17/07/2014	16/07/2014	17/07/2014
		Date Received	05/08/2014	05/08/2014	05/08/2014	05/08/2014	05/08/2014	05/08/2014
		SDG Ref	140805-19	140805-19	140805-19	140805-19	140805-19	140805-19
		Lab Sample No.(s)	9744868	9744875	9744869	9744871	9744872	9744874
		AGS Reference						
Component	**LOD/Units**	**Method**						
Moisture Content Ratio (% of as received sample)	%	PM024	2	0	0	1.3	1.4	0.53
Phenol	<0.01 mg/kg	TM062 (S)	<0.01 @#	<0.01 @#	0.02 @#	0.122 @#	0.243 @#	<0.01 @#
Cresols	<0.01 mg/kg	TM062 (S)	<0.01 @#	<0.01 @#	<0.01 @#	<0.01 @#	<0.01 @#	<0.01 @#
Xylenols	<0.015 mg/kg	TM062 (S)	<0.015 @#	<0.015 @#	<0.015 @#	<0.015 @#	<0.015 @#	<0.015 @#
1-Naphthol	<0.01 mg/kg	TM062 (S)	<0.01 @	<0.01 @	<0.01 @	<0.01 @	<0.01 @	<0.01 @
2,3,5-Trimethylphenol	<0.01 mg/kg	TM062 (S)	<0.01 @#	<0.01 @#	<0.01 @#	<0.01 @#	<0.01 @#	<0.01 @#
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)	<0.035 @#	<0.035 @#	<0.035 @#	0.122 @#	0.243 @#	<0.035 @#

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Results Legend		Customer Sample Ref.	S1419471 - TP10
#	ISO17025 accredited.		
M	mCERTS accredited.		
aq	Aqueous / settled sample.	Depth (m)	0.25
diss.filt	Dissolved / filtered sample.	Sample Type	Soil/Solid
tot.unfilt	Total / unfiltered sample.	Date Sampled	17/07/2014
*	subcontracted test.	Date Received	05/08/2014
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.	SDG Ref	140805-19
		Lab Sample No.(s)	9744876
1-5&+§@	Sample deviation (see appendix)	AGS Reference	

Component	LOD/Units	Method	
Moisture Content Ratio (% of as received sample)	%	PM024	2.1
Phenol	<0.01 mg/kg	TM062 (S)	<0.01 @#
Cresols	<0.01 mg/kg	TM062 (S)	<0.01 @#
Xylenols	<0.015 mg/kg	TM062 (S)	<0.015 @#
1-Naphthol	<0.01 mg/kg	TM062 (S)	<0.01 @
2,3,5-Trimethylphenol	<0.01 mg/kg	TM062 (S)	<0.01 @#
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)	<0.035 @#

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10-7

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample [1]	Surrogate Corrected
ASB_PREP				
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM062 (S)	National Grid Property Holdings Methods for Ihe Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC		

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Test Completion Dates

Lab Sample No(s)	9744868	9744875	9744869	9744871	9744872	9744874	9744876
Customer Sample Ref.	S1419465 - TP1	S1419470 - TP6	S1419466 - TP02	S1419467 - TP04	S1419468 - TP06	S1419469 - TP07	S1419471 - TP10
AGS Ref.							
Depth	0.20	0.40	0.40	0.40	0.40	0.40	0.25
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Phenols by HPLC (S)	11-Aug-2014	11-Aug-2014	11-Aug-2014	11-Aug-2014	11-Aug-2014	11-Aug-2014	11-Aug-2014
Sample description	06-Aug-2014	06-Aug-2014	06-Aug-2014	06-Aug-2014	06-Aug-2014	06-Aug-2014	06-Aug-2014

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors
employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5 -C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before presevation was performed
§	Sampled on date not provided
•	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -
Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

ASBESTOS ANALYSIS RESULTS - SOIL ANALYSIS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils

1089

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

Client:	ESG Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0488-08328**
For the attention of:	Waterman EED	**Report Date:**	**29/07/2014**
Site Address:	Imperial Way	**Project Number:**	**S144428**

Sample Number	Sample Date	Sample Location	Test Date	Total Sample Dry Weight (g)	Weight of <2mm Fraction (g)	Asbestos(g) in >8mm+>2mm	Asbestos(g) in <2mm	% Asbestos by weight of Total Dried Sample	Asbestos Fibre Types Identified
CL/1419465	17/07/14	TP1 0.2	29/07/2014					Screen Only	NAIIS
CL/1419466	17/07/14	TP02 0.4	29/07/2014					Screen Only	NAIIS
CL/1419467	17/07/14	TP04 0.4	29/07/2014					Screen Only	NAIIS
CL/1419468	16/07/14	TP06 0.4	29/07/2014					Screen & ID	Chrysotile(Free Fibres)
CL/1419469	17/07/14	TP07 0.4	29/07/2014					Screen Only	NAIIS
CL/1419470	16/07/14	TP8 0.4	29/07/2014					Screen Only	NAIIS
CL/1419471	17/07/14	TP10 0.25	29/07/2014					Screen Only	NAIIS

Keys

NAACR = Not Analysed at Clients Request

NAIIS = No Asbestos Identified in Sample (Screens Only)

NADIS = No Asbestos Detected in Sample (ID & Quant Only)

Name:	Louise James	Authorised Signatory:
Position:	Lab Project Manager	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on HSE document MDHS 90 - Asbestos Contaminated Land - Draft 5 - November 1997 (withdrawn). Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of fine fraction for asbestos content only includes fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0XD, UKAS Laboratory Number 1089.

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S144428M

Customer Waterman EED
Site Imperial Way
Report No S144428M

Consignment No S42494
Date Logged 22-Jul-2014

Report Due 04-Aug-2014

ID Number	Description	MethodID	AMMAR	CustServ	ELESULP	FOCS	GROHSA	ICPBOR	ICPMSS									ICPSOIL		ICPWSS	KoneNO3	MCertS	PAHMSUS	PHSOIL	SFAPI	
		Sampled	Exchange.Ammonium AR	Report B	Elemental Sulphur	S.O.M. % (Calc)	GRO (AA-UK) HSA-GCFID	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Vanadium (MS)	Zinc (MS)	Barium.	Beryllium.	SO4-- (H2O sol) mg/l	Nitrate:	MCertS Analysis	PAH (16) by GCMS inc. Sum 8	pH units (AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
			✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CL/1419465	TP1 0.2	17/07/14	E																								
CL/1419466	TP02 0.4	17/07/14	E																								
CL/1419467	TP04 0.4	17/07/14	E																								
CL/1419468	TP06 0.4	16/07/14	E		E		E																				
CL/1419469	TP07 0.4	17/07/14	E																								
CL/1419470	TP8 0.4	16/07/14	E		E		E																				
CL/1419471	TP10 0.25	17/07/14	E																								

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S144428M

Customer Waterman EED
Site Imperial Way
Report No S144428M

Consignment No S42494
Date Logged 22-Jul-2014

Report Due 04-Aug-2014

ID Number	Description	MethodID	SFAS	Sub002a	Sub036						TMSS	TPHUSSI	WSLM59
		Sampled	Sulphide as S (AR)	^Asbestos Screen	^Phenol	^Trimethylphenols	^Cresols	^Naphthols	^Xylenols	^Total Phenols	Tot.Moisture @ 105C	TPH by GCFID (Si-UKCWG)>44	Total Organic Carbon
				✓							✓	✓	
CL/1419465	TP1 0.2	17/07/14											
CL/1419466	TP02 0.4	17/07/14											
CL/1419467	TP04 0.4	17/07/14											
CL/1419468	TP06 0.4	16/07/14											
CL/1419469	TP07 0.4	17/07/14											
CL/1419470	TP8 0.4	16/07/14											
CL/1419471	TP10 0.25	17/07/14											

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

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E	Sample processing did not commence within the appropriate holding time
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Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	AMMAR	As Received	Determination of Exchangeable Ammonium in Soil using potassium chloride extraction, discrete colorimetric detection
Soil	ELESULP	Oven Dried @ < 35℃	Determination of Elemental Sulphur using Solvent Extraction followed by HPLC detection.
Soil	FOCS	Oven Dried @ < 35℃	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35℃	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35℃	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	ICPSOIL	Oven Dried @ < 35℃	Determination of Metals in soil samples by aqua regia digestion followed by ICPOES detection
Soil	ICPWSS	Oven Dried @ < 35℃	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	KoneNO3	Oven Dried @ < 35℃	Determination of Nitrate in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SFAS	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHUSSI	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection including quantitation of Aromatic and Aliphatic fractions.
Soil	WSLM59	Oven Dried @ < 35℃	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Waterman EED

Site : Imperial Way

Report Number : S14_4428

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1419465	TP1 0.2	Brown Stone SILT
CL/1419466	TP02 0.4	Brown Stone SAND
CL/1419467	TP04 0.4	Brown Stone SAND
CL/1419468	TP06 0.4	Brown Stone SAND
CL/1419469	TP07 0.4	Brown Stone SAND
CL/1419470	TP8 0.4	Brown Stone SAND
CL/1419471	TP10 0.25	Brown Stone SAND

Our Ref: EFS/144561M (Ver. 2)
Your Ref:

August 13, 2014

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
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Mr M Amos
Waterman EED
Merchants House
Wapping Road
Bristol
BS1 4RW

For the attention of Mr M Amos

Dear Mr Amos

Sample Analysis - Imperial Way

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 08/09/14 when they will be discarded. Please call 01283 554463 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

S Stone
Project Co-ordinator
01283 554463

Environmental Chemistry, ESG, P.O. Box 100, Burton-upon-trent, DE15 0XD Tel: 01283 554400 Fax: 01283 554422
Environmental Scientifics Group Limited.
Registered No: 2880501

TEST REPORT

1252

Report No. EFS/144561M (Ver. 2)

Waterman EED
Merchants House
Wapping Road
Bristol
BS1 4RW

Site: Imperial Way

The 8 samples described in this report were registered for analysis by ESG on 28-Jul-2014. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 13-Aug-2014

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
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Table of GRO Results (Page 13)
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On behalf of
ESG :
Declan Burns

Operations Director
Laboratory and Analytical Business

Date of Issue: 13-Aug-2014

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Method Codes :			AMMAR	ELESULP	GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPSOIL	ICPSOIL	ICPWSS
Method Reporting Limits :			0.5	20	0.2	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16	1	0.1	10
Accreditation Code:			UM	UM		UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Exchange.Ammonium AR**	**Elemental Sulphur**	**GRO (AA-UK) HSA-GCFID**	**Boron (H20 Soluble)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**Barium.**	**Beryllium.**	**SO4-- (H2O sol) mg/l**
1420003	ES 0.50 BH5	18-Jul-14	<0.6	<22	Req	1.4	13.0	0.3	23.4	15.3	31.5	<0.5	20	<0.5	75.0	293	0.616	202
1420004	ES 0.20 BH6 (NVM)	18-Jul-14	<0.56§	<20§	Req §	0.82§	22.32§	0.398§	11.11§	14.88§	15.70§	<0.51§	9.99§	<0.51§	94.59§	1200§	0.1407§	179§
1420005	ES 0.20 BH1	18-Jul-14	<0.5	<20	Req	<0.5	35.8	0.62	6.4	3.6	37.9	<0.5	7.6	<0.5	110.8	1760	<0.1	42
1420006	ES 1.00 BH1	18-Jul-14	1.2	<22	Req	1.7	15	0.27	33.1	19.1	20.2	<0.5	34.8	0.8	72.5	198	1.057	207
1420007	ES 0.50 BH4	18-Jul-14	1.9	<21	Req	1.3	8.6	<0.21	21.3	15.5	24.9	<0.5	19.4	<0.5	65.2	67.8	0.605	501
1420008	ES 0.50 BH3	18-Jul-14	3.6	<22	Req	1.0	8.9	0.42	22.9	11.5	21.7	<0.5	18.7	<0.5	56.8	315	0.511	309
1420009	ES 0.20 BH2	18-Jul-14	<0.5	<20	Req	0.5	21.2	0.47	8	3.4	23	<0.5	8	<0.5	81.4	1010	<0.1	127
1420010	ES 0.80 BH2	18-Jul-14	1.2	<20	Req	0.8	16	0.35	26.1	11.8	17.1	<0.5	22.9	<0.5	70.4	414	0.641	91

ESG Environmental Scientifics Group

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Client Name Waterman EED

Contact Mr M Amos

Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144561M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

		Units :	pH Units	mg/kg	mg/kg		%	mg/kg	% M/M	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		Method Codes :	PHSOIL	SFAPI	SFAPI	Sub002a	TMSS	TPHUSSI	FOCS	ICPMSS	KoneNO3	SFAS	Sub036	Sub036	Sub036	Sub036	Sub036	Sub036
		Method Reporting Limits :		0.5	0.5		0.2	10	0.04	0.6		0.5						
		Accreditation Code:	UM	UM	UM	U	U		N	N	N	N	N		N		N	N
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**pH units (AR)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**^Asbestos Screen**	**Tot.Moisture @ 105C**	**TPH by GCFID (Si-UKCWG)>44**	**S.O.M. % (Calc)**	**Vanadium (MS)**	**Nitrate 2:1 mg/kg**	**Sulphide as S (AR)**	**^Phenol**	**^Trimethylphenols**	**^Cresols**	**^Naphthols**	**^Xylenols**	**^Total Phenols**
1420003	ES 0.50 BH5	**18-Jul-14**	10.2	<0.6	<0.6	AM	17.6	Req	1.28	35.1	1.7	<0.6	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055
1420004	ES 0.20 BH6 (NVM)	**18-Jul-14**	8.9 §	<0.56§	<0.56§	NAIIS	10.6 §	Req §	0.88	8	0.5	<0.6	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055
1420005	ES 0.20 BH1	**18-Jul-14**	9.5	<0.5	<0.5	NAIIS	3.7	Req	1.28	4.8	<0.2	<0.5	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055
1420006	ES 1.00 BH1	**18-Jul-14**	8.8	<0.7	<0.7	NAIIS	23.9	Req	1.06	47.5	<0.2	<0.7	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055
1420007	ES 0.50 BH4	**18-Jul-14**	9.0	0.9	<0.6	NAIIS	19.0	Req	1.72	31.2	3.1	<0.6	<0.01	<0.01	0.0119	<0.01	<0.015	<0.0569
1420008	ES 0.50 BH3	**18-Jul-14**	11.4	<0.6	<0.6	NAIIS	19.1	Req	1.41	30.1	0.7	<0.6	0.0119	<0.01	0.0238	<0.01	<0.015	<0.0707
1420009	ES 0.20 BH2	**18-Jul-14**	9.4	<0.5	<0.5	NAIIS	5.3	Req	1.97	7	<0.2	0.6	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055
1420010	ES 0.80 BH2	**18-Jul-14**	9.1	<0.6	<0.6	NAIIS	14.7	Req	0.71	41	<0.2	<0.6	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055

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Contact Mr M Amos

Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
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Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

		Units :	% M/M	mg/kg															
		Method Codes :	WSLM59	PAHMSUS															
		Method Reporting Limits :	0.02																
		Accreditation Code:	N																
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Total Organic Carbon**	**PAH (16) by GCMS inc. Sum 8**															
1420003	ES 0.50 BH5	**18-Jul-14**	0.74	Req															
1420004	ES 0.20 BH6 (NVM)	**18-Jul-14**	0.51	Req §															
1420005	ES 0.20 BH1	**18-Jul-14**	0.74	Req															
1420006	ES 1.00 BH1	**18-Jul-14**	0.61	Req															
1420007	ES 0.50 BH4	**18-Jul-14**	1.00	Req															
1420008	ES 0.50 BH3	**18-Jul-14**	0.82	Req															
1420009	ES 0.20 BH2	**18-Jul-14**	1.14	Req															
1420010	ES 0.80 BH2	**18-Jul-14**	0.42	Req															

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Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144561M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appr opriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES 0.50 BH5	**Job Number:**	S14_4561M
LIMS ID Number:	CL1420003	**Date Booked in:**	28-Jul-14
QC Batch Number:	140626	**Date Extracted:**	06-Jan-85
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-14
Directory:	2914PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 1.55	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.68	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	83
Acenaphthene-d10	82
Phenanthrene-d10	80
Chrysene-d12	85
Perylene-d12	94

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	104
Terphenyl-d14	77

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES 0.20 BH6 (NVM)	**Job Number:**	S14_4561M
LIMS ID Number:	CL1420004	**Date Booked in:**	28-Jul-14
QC Batch Number:	140626	**Date Extracted:**	06-Jan-85
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-14
Directory:	2914PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**N**
Acenaphthylene	208-96-8	-	< 0.09	-	N
Acenaphthene	83-32-9	-	< 0.09	-	N
Fluorene	86-73-7	-	< 0.09	-	N
Phenanthrene	85-01-8	-	< 0.09	-	N
Anthracene	120-12-7	-	< 0.09	-	N
Fluoranthene	206-44-0	-	< 0.09	-	N
Pyrene	129-00-0	-	< 0.09	-	N
Benzo[a]anthracene	56-55-3	-	< 0.09	-	N
Chrysene	218-01-9	-	< 0.09	-	N
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	N
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	N
Benzo[a]pyrene	50-32-8	-	< 0.09	-	N
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	N
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	N
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	N
Total (USEPA16) PAHs	-	-	< 1.43	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.63	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	94
Acenaphthene-d10	89
Phenanthrene-d10	91
Chrysene-d12	95
Perylene-d12	105

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	103
Terphenyl-d14	76

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES 0.20 BH1	**Job Number:**	S14_4561M
LIMS ID Number:	CL1420005	**Date Booked in:**	28-Jul-14
QC Batch Number:	140626	**Date Extracted:**	06-Jan-85
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-14
Directory:	2914PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**UM**
Acenaphthylene	208-96-8	4.48	0.15	82	U
Acenaphthene	83-32-9	4.60	1.96	98	UM
Fluorene	86-73-7	5.01	0.48	98	UM
Phenanthrene	85-01-8	5.88	3.97	100	UM
Anthracene	120-12-7	5.94	0.78	91	U
Fluoranthene	206-44-0	7.26	18.30	99	UM
Pyrene	129-00-0	7.56	18.30	99	UM
Benzo[a]anthracene	56-55-3	9.28	2.20	93	UM
Chrysene	218-01-9	9.33	1.78	95	UM
Benzo[b]fluoranthene	205-99-2	10.83	1.65	98	UM
Benzo[k]fluoranthene	207-08-9	10.87	0.46	98	UM
Benzo[a]pyrene	50-32-8	11.27	0.79	98	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.69	0.36	92	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	UM
Benzo[g,h,i]perylene	191-24-2	13.01	0.29	58	UM
Total (USEPA16) PAHs	-	-	< 51.58	-	N
Total (Oil Guide 8) PAHs	-	-	< 7.32	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	75
Acenaphthene-d10	83
Phenanthrene-d10	84
Chrysene-d12	93
Perylene-d12	108

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	102
Terphenyl-d14	72

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES 1.00 BH1	**Job Number:**	S14_4561M
LIMS ID Number:	CL1420006	**Date Booked in:**	28-Jul-14
QC Batch Number:	140626	**Date Extracted:**	06-Jan-85
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-14
Directory:	2914PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.11	-	**UM**
Acenaphthylene	208-96-8	-	< 0.11	-	U
Acenaphthene	83-32-9	-	< 0.11	-	UM
Fluorene	86-73-7	-	< 0.11	-	UM
Phenanthrene	85-01-8	-	< 0.11	-	UM
Anthracene	120-12-7	-	< 0.11	-	U
Fluoranthene	206-44-0	-	< 0.11	-	UM
Pyrene	129-00-0	-	< 0.11	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.11	-	UM
Chrysene	218-01-9	-	< 0.11	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.11	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.11	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.11	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.11	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.11	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.11	-	UM
Total (USEPA16) PAHs	-	-	< 1.68	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.74	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	88
Acenaphthene-d10	88
Phenanthrene-d10	89
Chrysene-d12	97
Perylene-d12	117

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	101
Terphenyl-d14	74

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES 0.50 BH4	**Job Number:**	S14_4561M
LIMS ID Number:	CL1420007	**Date Booked in:**	28-Jul-14
QC Batch Number:	140626	**Date Extracted:**	06-Jan-85
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-14
Directory:	2914PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 1.58	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.69	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	86
Acenaphthene-d10	80
Phenanthrene-d10	77
Chrysene-d12	79
Perylene-d12	87

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	104
Terphenyl-d14	74

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES 0.50 BH3	**Job Number:**	S14_4561M
LIMS ID Number:	CL1420008	**Date Booked in:**	28-Jul-14
QC Batch Number:	140626	**Date Extracted:**	06-Jan-85
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-14
Directory:	2914PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 1.58	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.69	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	91
Acenaphthene-d10	86
Phenanthrene-d10	86
Chrysene-d12	89
Perylene-d12	102

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	103
Terphenyl-d14	75

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES 0.20 BH2	**Job Number:**	S14_4561M
LIMS ID Number:	CL1420009	**Date Booked in:**	28-Jul-14
QC Batch Number:	140626	**Date Extracted:**	06-Jan-85
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-14
Directory:	2914PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**UM**
Acenaphthylene	208-96-8	-	< 0.08	-	U
Acenaphthene	83-32-9	-	< 0.08	-	UM
Fluorene	86-73-7	-	< 0.08	-	UM
Phenanthrene	85-01-8	-	< 0.08	-	UM
Anthracene	120-12-7	-	< 0.08	-	U
Fluoranthene	206-44-0	-	< 0.08	-	UM
Pyrene	129-00-0	-	< 0.08	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.08	-	UM
Chrysene	218-01-9	-	< 0.08	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.08	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-	UM
Total (USEPA16) PAHs	-	-	< 1.35	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.59	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	79
Acenaphthene-d10	78
Phenanthrene-d10	76
Chrysene-d12	81
Perylene-d12	94

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	104
Terphenyl-d14	75

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	ES 0.80 BH2	**Job Number:**	S14_4561M
LIMS ID Number:	CL1420010	**Date Booked in:**	28-Jul-14
QC Batch Number:	140626	**Date Extracted:**	06-Jan-85
Quantitation File:	Initial Calibration	**Date Analysed:**	30-Jul-14
Directory:	2914PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Total (USEPA16) PAHs	-	-	< 1.50	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.66	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	75
Acenaphthene-d10	70
Phenanthrene-d10	66
Chrysene-d12	64
Perylene-d12	70

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	105
Terphenyl-d14	73

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Gasoline Range Organics
(BTEX and Aromatic/Aliphatic Carbon Ranges)

Customer and Site Details: Waterman EED : Imperial Way
Job Number: S14_4561M
Directory: E:\TES\DATA\2014\072914HSA_GC9\140729 2014-07-29 16-21-30\021F2101.D
Method: HEADSPACE GCFID
Accreditation Code: UM

Matrix: Soil
Date Booked in: 28-Jul-14
Date extracted: 29-Jul-14
Date Analysed: 29-Jul-14, 22:51:0
Units: mg/kg

*** Sample data with an asterisk are not UKAS accredited.**

		BTEX				Aromatics		Aliphatics		Total GRO
Sample ID	Client ID	Benzene	Toluene	Ethyl benzene	Xylenes	C5 - C7	>C7 - C8	C5 - C6	>C6 - C8	C5 - C10
CL1420003	ES 0.50 BH5	<0.012	<0.012	<0.012	<0.024	<0.01	<0.01	<0.2	<0.2	<0.2
* CL1420004	ES 0.20 BH6 (NVM)	<0.011	<0.011	<0.011	<0.022	<0.01	<0.01	<0.2	<0.2	<0.2
CL1420005	ES 0.20 BH1	<0.010	<0.010	<0.010	<0.021	<0.01	<0.01	<0.2	<0.2	<0.2
CL1420006	ES 1.00 BH1	<0.013	<0.013	<0.013	<0.026	<0.01	<0.01	<0.3	<0.3	<0.3
CL1420007	ES 0.50 BH4	<0.012	<0.012	<0.012	<0.025	<0.01	<0.01	<0.2	<0.2	<0.2
CL1420008	ES 0.50 BH3	<0.012	<0.012	<0.012	<0.025	<0.01	<0.01	<0.2	<0.2	<0.2
CL1420009	ES 0.20 BH2	<0.011	<0.011	<0.011	<0.021	<0.01	<0.01	<0.2	<0.2	<0.2
CL1420010	ES 0.80 BH2	<0.012	<0.012	<0.012	<0.023	<0.01	<0.01	<0.2	<0.2	<0.2

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

ALIPHATIC / AROMATIC FRACTION BY GC/FID

Customer and Site Details: Waterman EED : Imperial Way
Job Number: S14_4561M
QC Batch Number: 140626
Directory: D:\TES\DATA\Y2013\02\073014TPH_GC3\017F2101.D
Method: Ultra Sonic

Separation: Silica gel
Eluents: Hexane, DCM

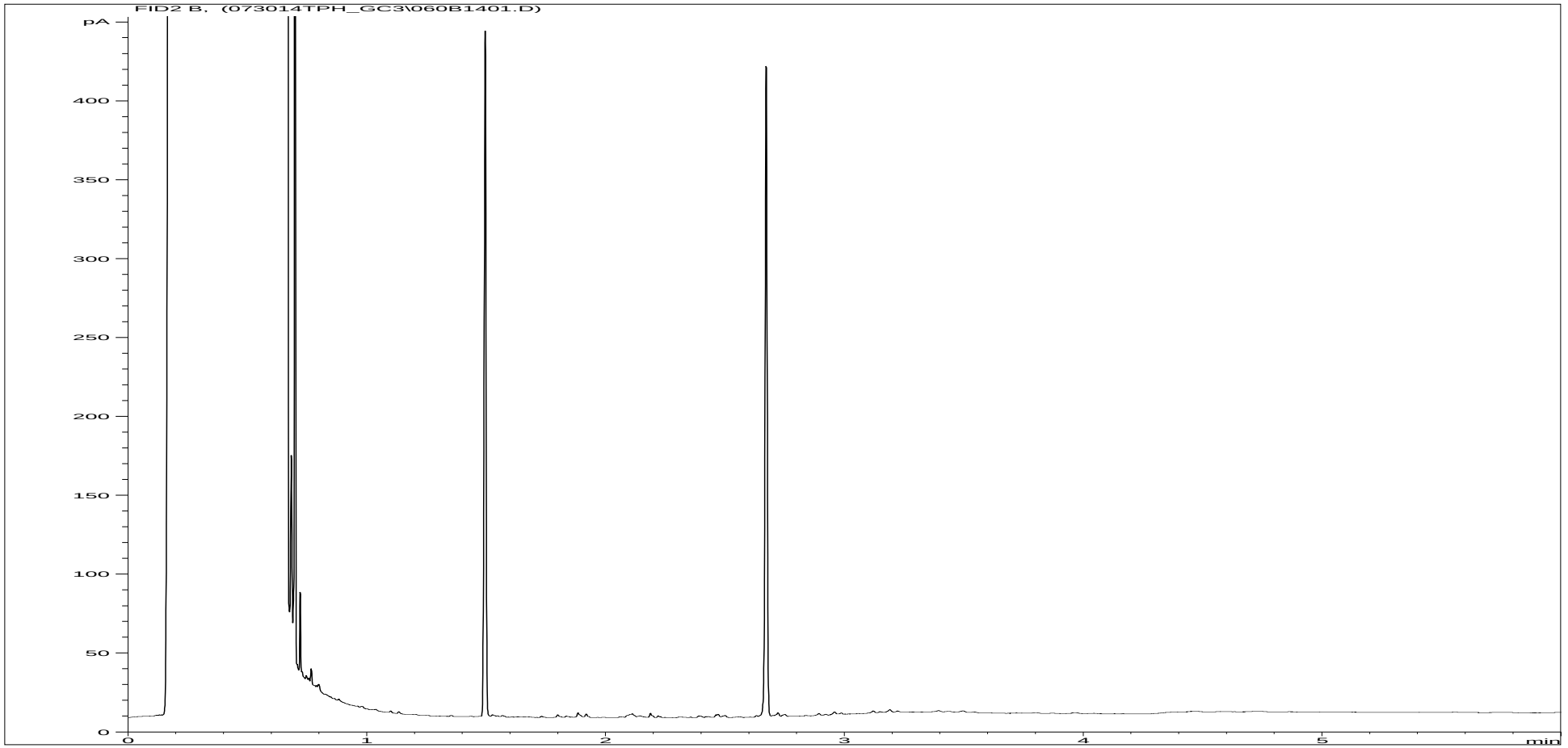
Matrix: Soil
Date Booked in: 28-Jul-14
Date Extracted: 29-Jul-14
Date Analysed: 30-Jul-14

This sample data is not MCERTS accredited.
Ba * This sample data is not ISO17025 accredited.

		Concentration, (mg/kg) - as dry weight.												
		>C8 - C10	>C8 - C10	>C10 - C12	>C10 - C12	>C12 - C16	>C12 - C16	>C16 - C35	>C16 - C21	>C35 - C44*	>C21 - C35	>C35 - C44*	>C8 - C44*	>C8 - C44*
Sample ID	**Client ID**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aromatics**	**Aliphatics**	**Aromatics**
CL1420003	ES 0.50 BH5	<5	<5	<5	<5	<5	<5	<14.4	<5	<6.82	<10.63	<6.82	<24	<24
* CL1420004	ES 0.20 BH6 (NVM)	<4	<4	<4	<4	<4	<4	<13.3	<4	<6.29	<9.80	<6.29	<22	<22
CL1420005	ES 0.20 BH1	<4	<4	<4	<4	<4	11.2	47	44.4	32.1	166	96.2	80	319
CL1420006	ES 1.00 BH1	<5	<5	<5	<5	<5	<5	<15.6	<5	<7.39	<11.51	<7.39	<26	<26
CL1420007	ES 0.50 BH4	<5	<5	<5	<5	<5	<5	<14.7	<5	<6.94	<10.81	<6.94	<25	<25
CL1420008	ES 0.50 BH3	<5	<5	<5	<5	<5	<5	17.2	<5	7.9	<10.83	8.76	26.5	<25
CL1420009	ES 0.20 BH2	<4	<4	<4	<4	<4	<4	15	<4	12.5	9.6	7.96	28.8	<21
CL1420010	ES 0.80 BH2	<5	<5	<5	<5	<5	<5	<14.0	<5	<6.59	<10.27	<6.59	<23	<23

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appropriate, in accordance with the MCERTS standard.

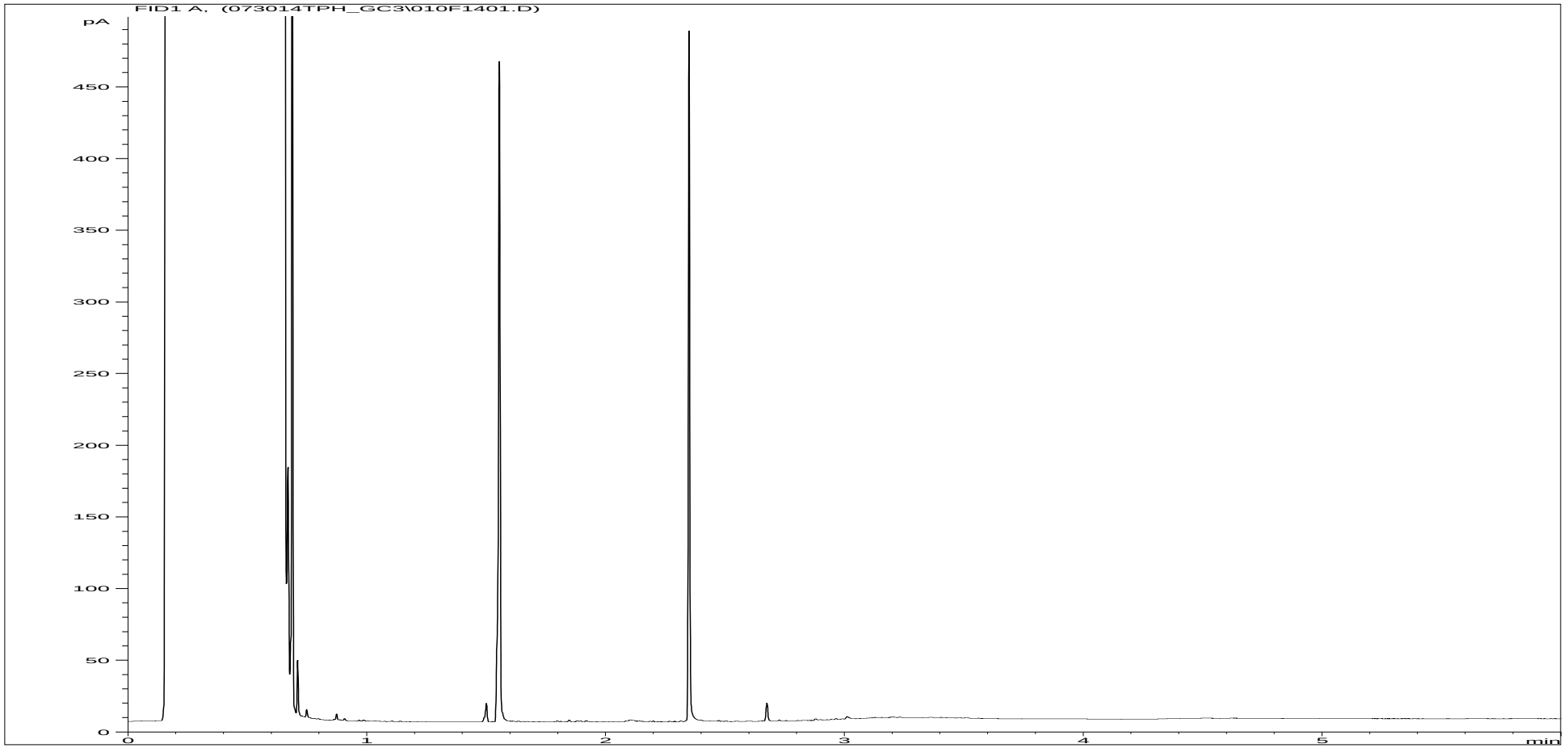
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420003ALI	**Job Number:**	S14_4561M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.50 BH5
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\060B1401.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

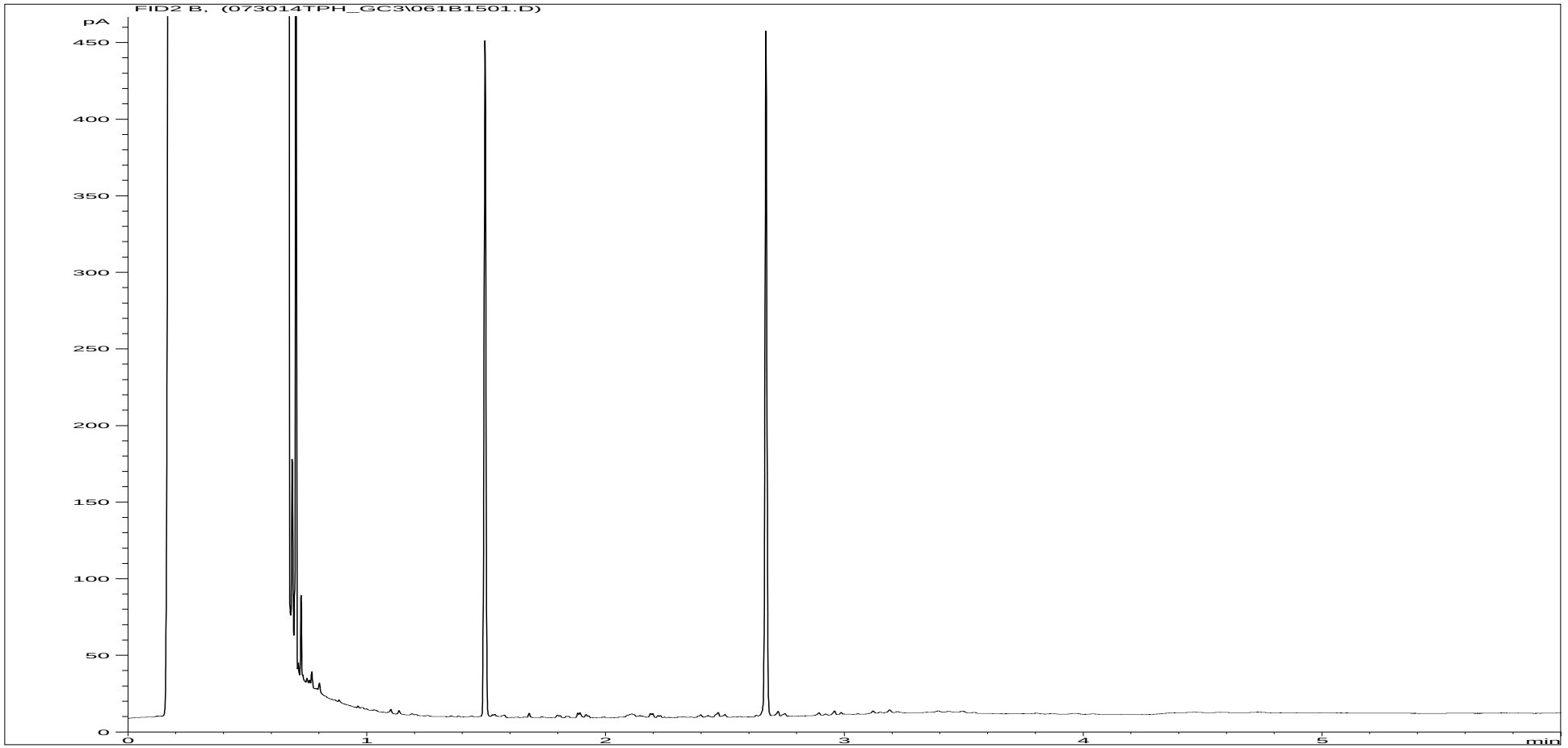
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420003ARO	**Job Number:**	S14_4561M
Multiplier:	11.84	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.50 BH5
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\010F1401.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

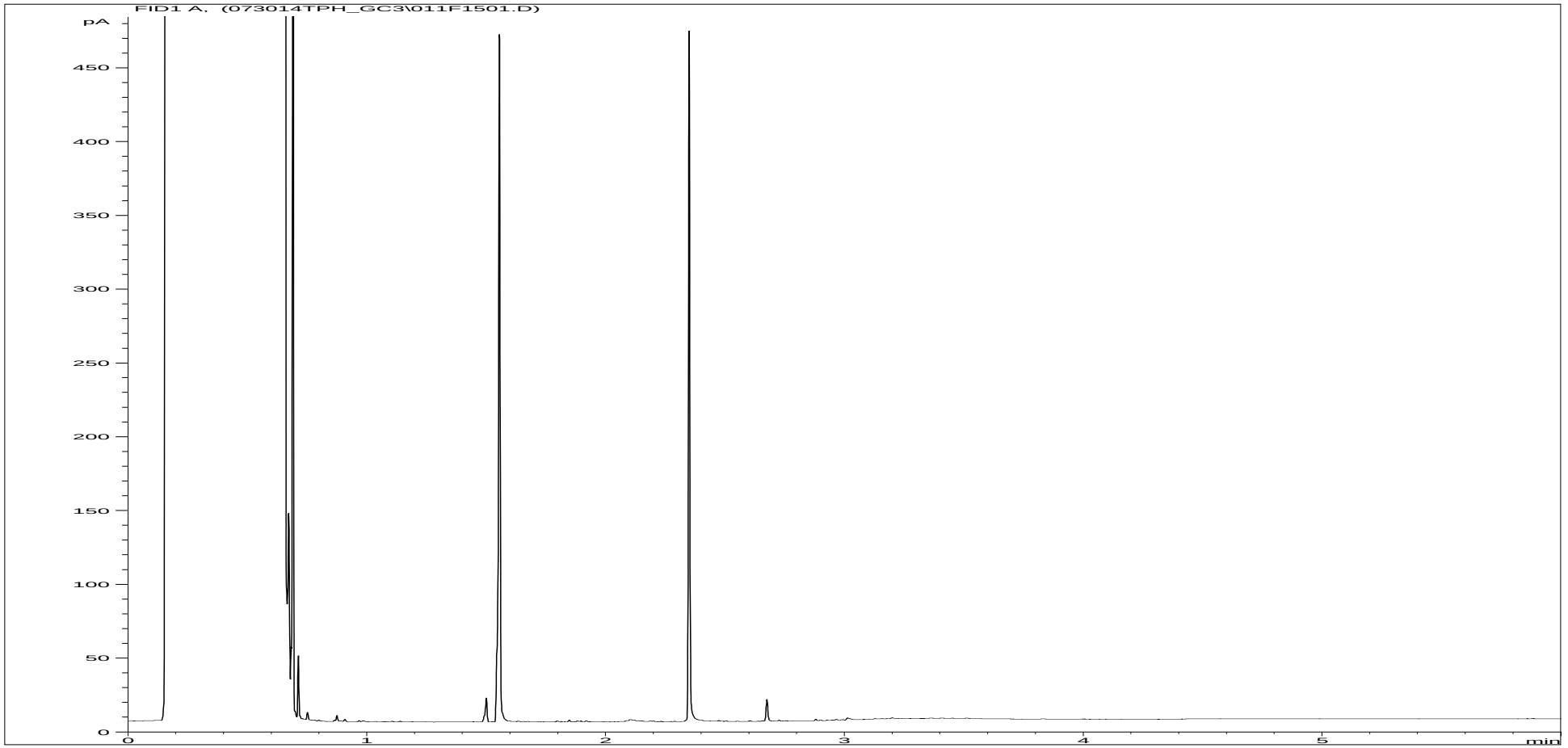
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420004ALI	**Job Number:**	S14_4561M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.20 BH6 (NVM)
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\061B1501.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

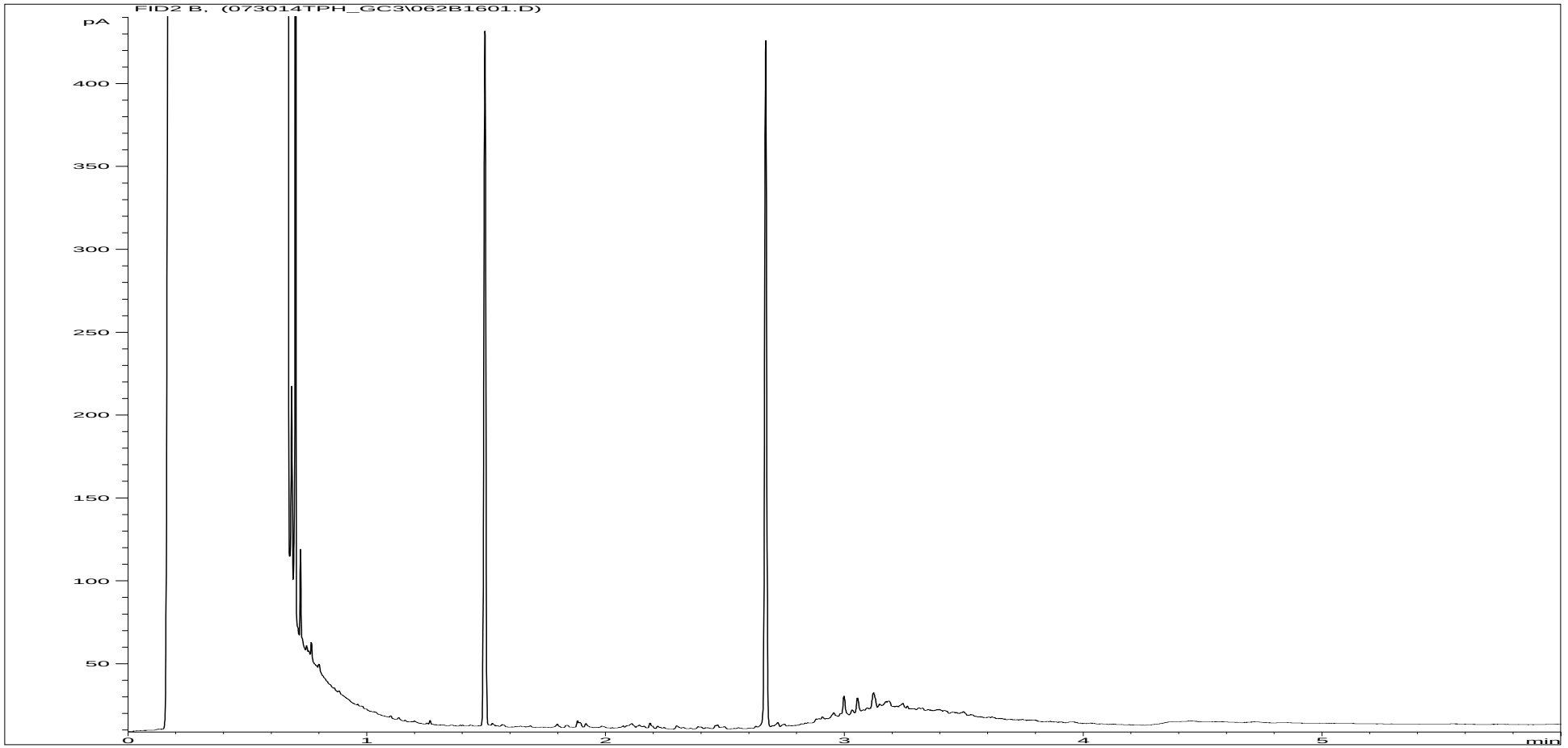
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420004ARO	**Job Number:**	S14_4561M
Multiplier:	11.52	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.20 BH6 (NVM)
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\011F1501.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

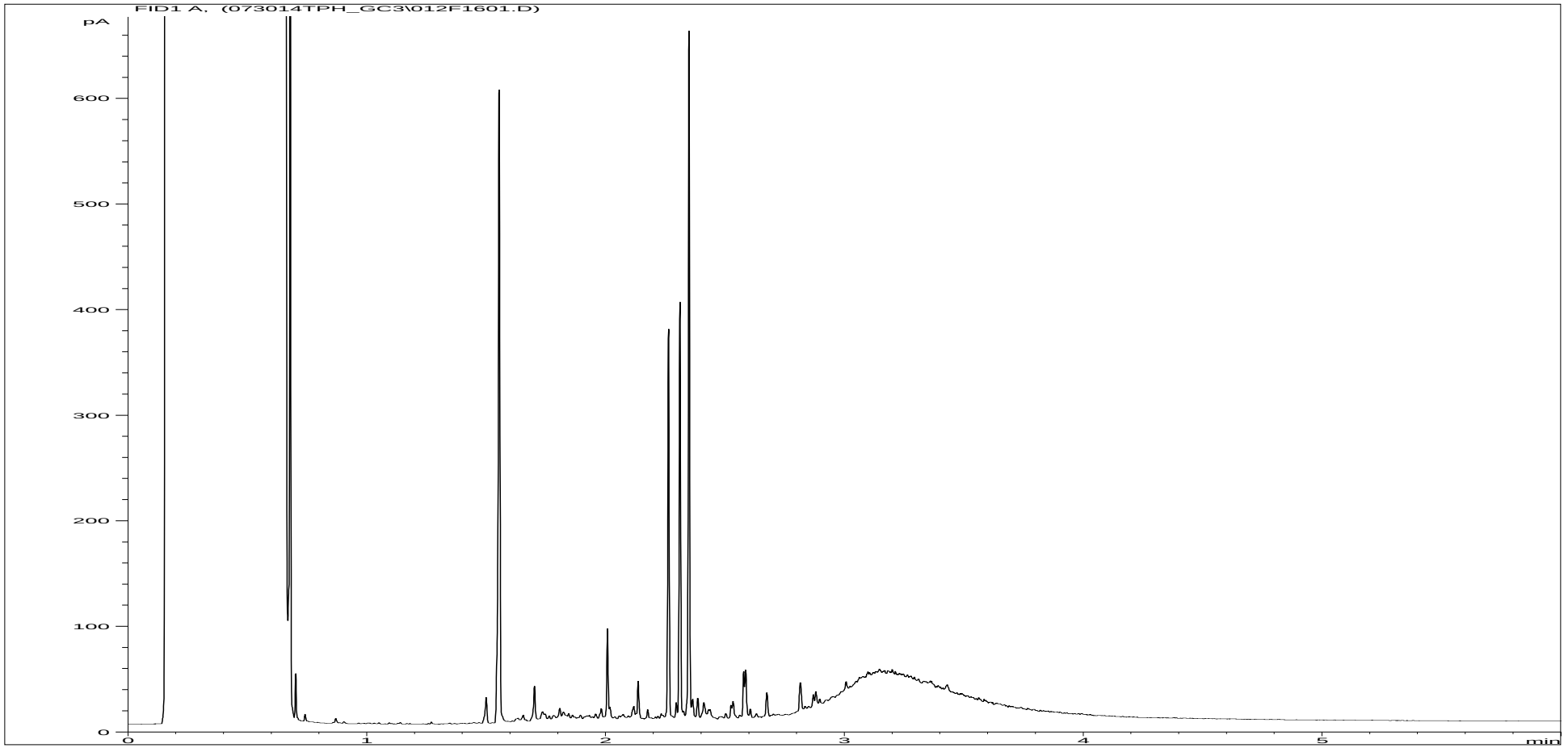
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420005ALI	**Job Number:**	S14_4561M
Multiplier:	15.2	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.20 BH1
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\062B1601.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

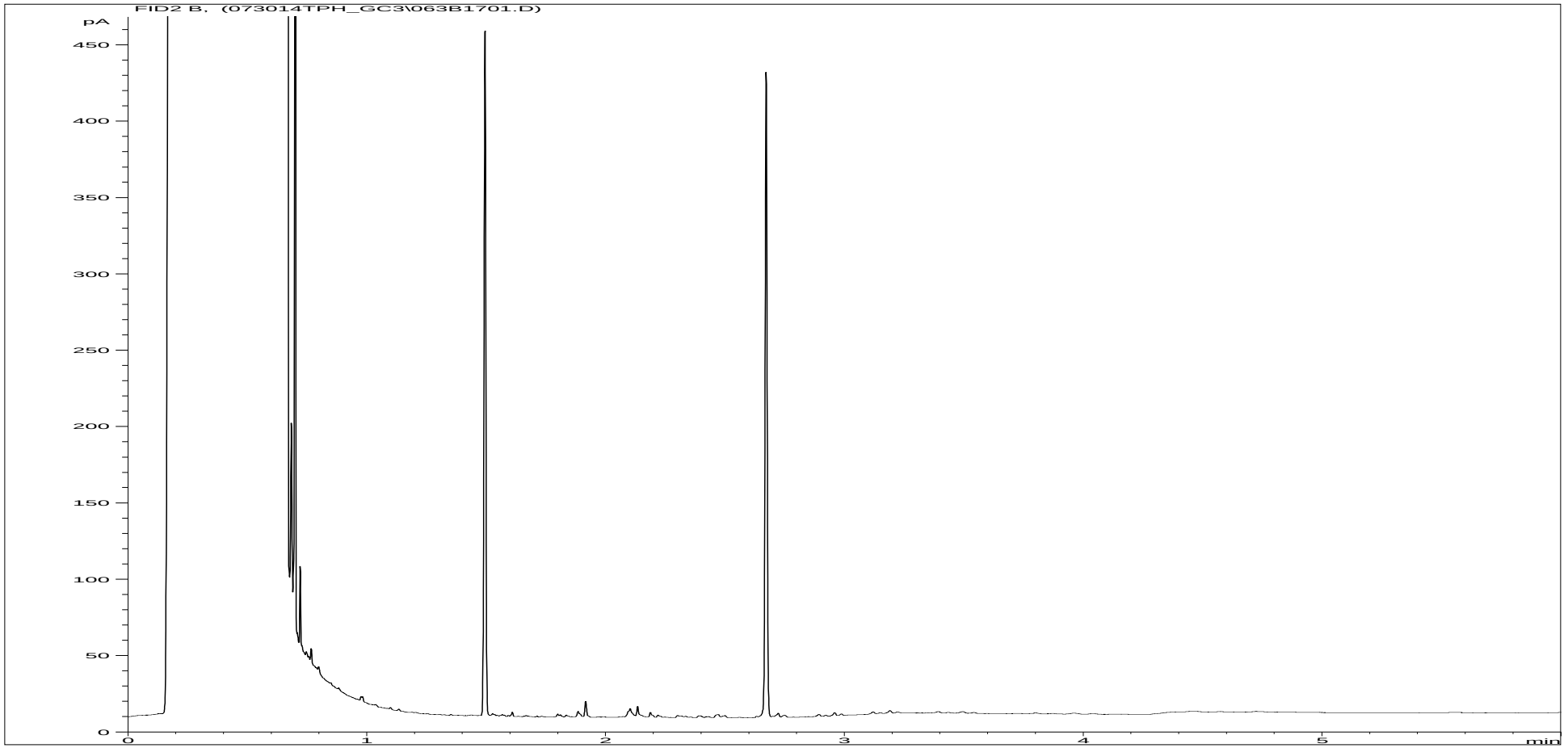
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420005ARO	**Job Number:**	S14_4561M
Multiplier:	12	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.20 BH1
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\012F1601.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

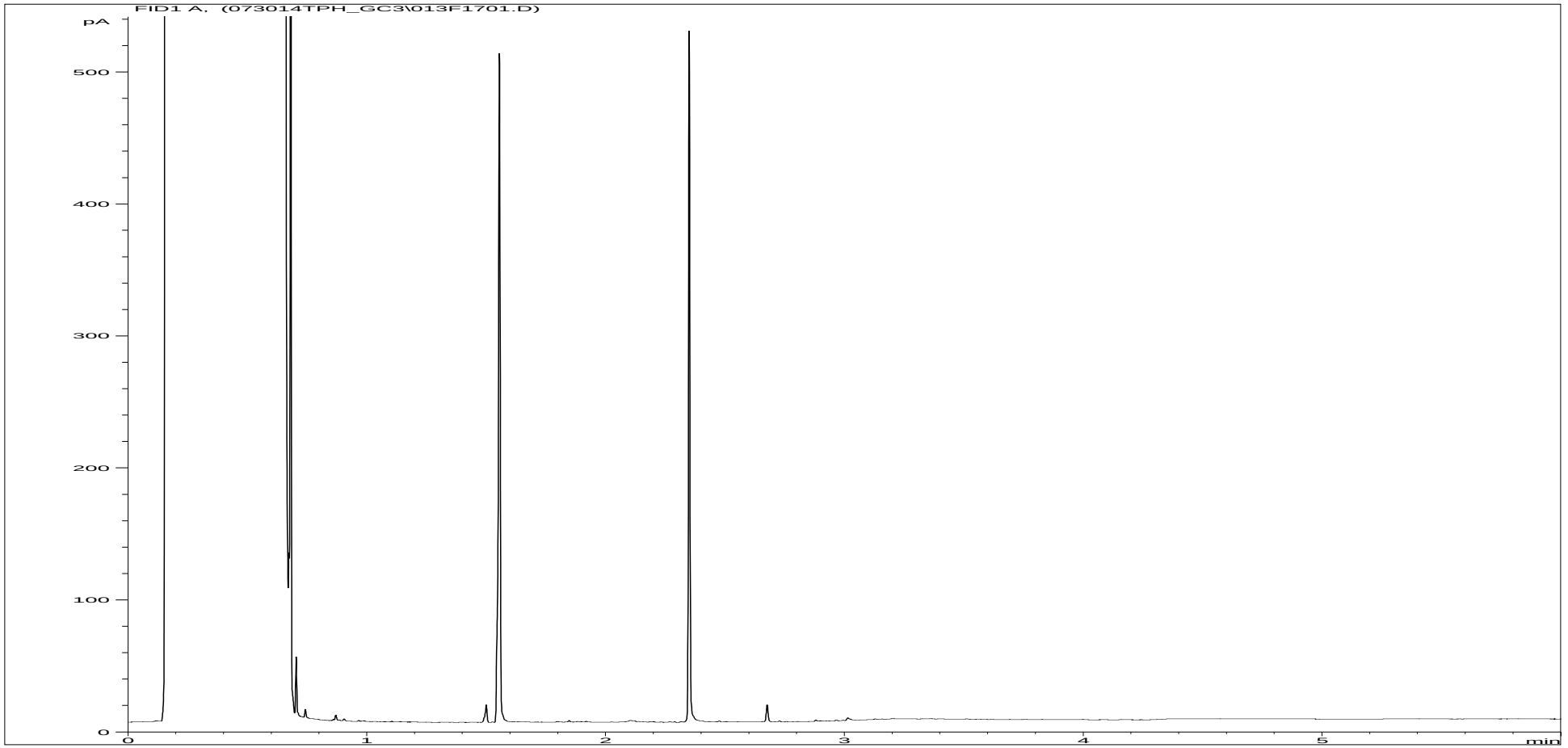
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420006ALI	**Job Number:**	S14_4561M
Multiplier:	15.2	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 1.00 BH1
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\063B1701.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

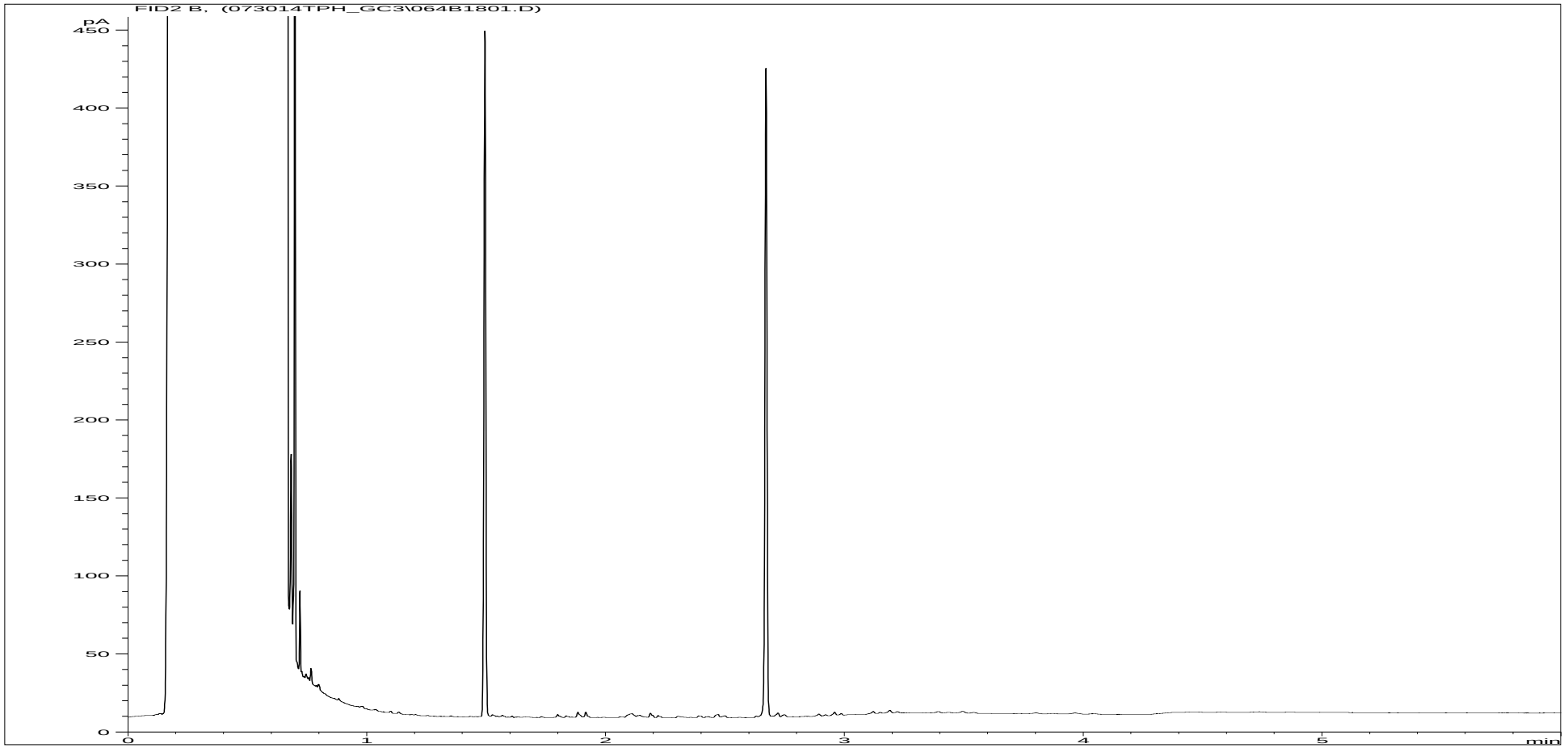
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420006ARO	**Job Number:**	S14_4561M
Multiplier:	12	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 1.00 BH1
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\013F1701.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

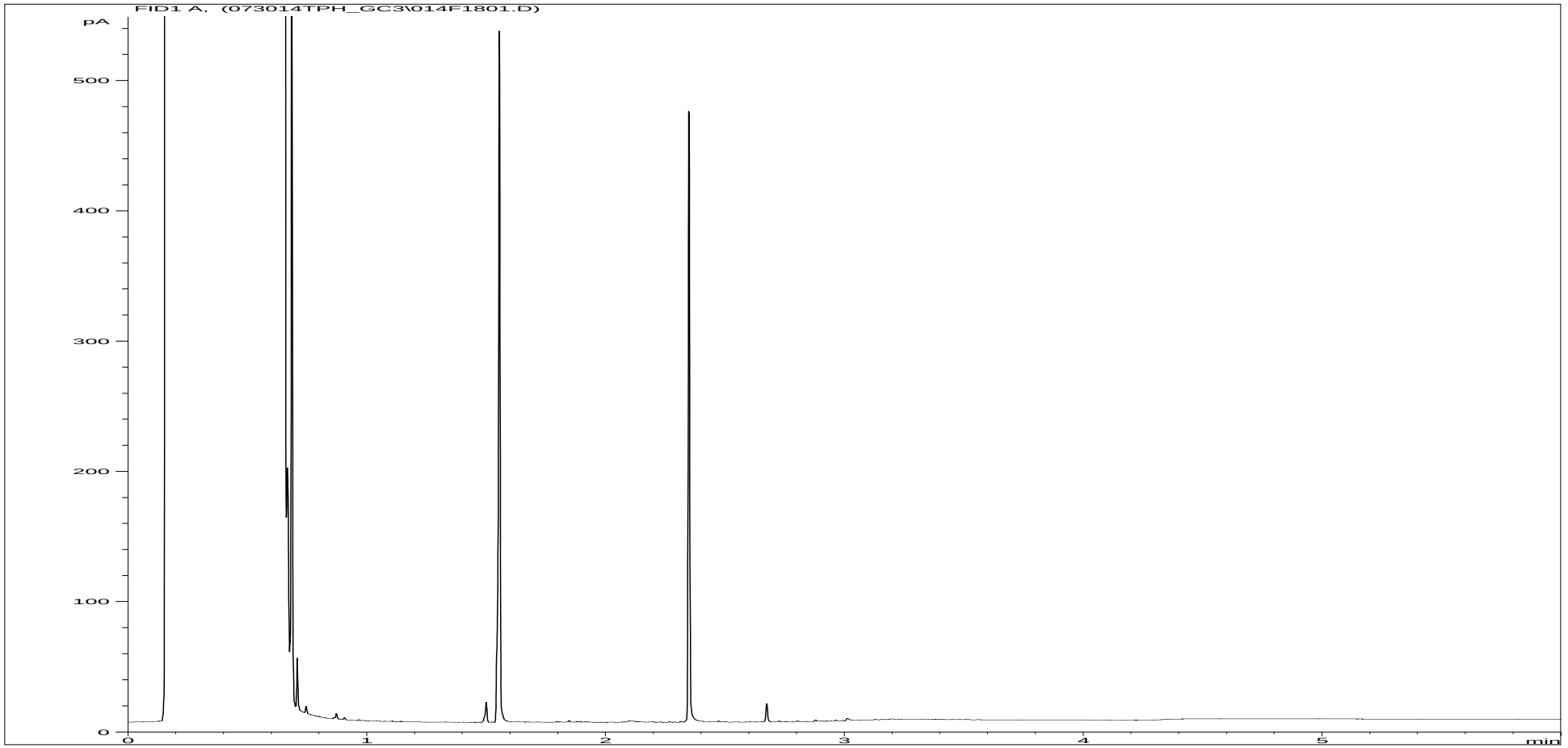
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420007ALI	**Job Number:**	S14_4561M
Multiplier:	15.2	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.50 BH4
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\064B1801.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

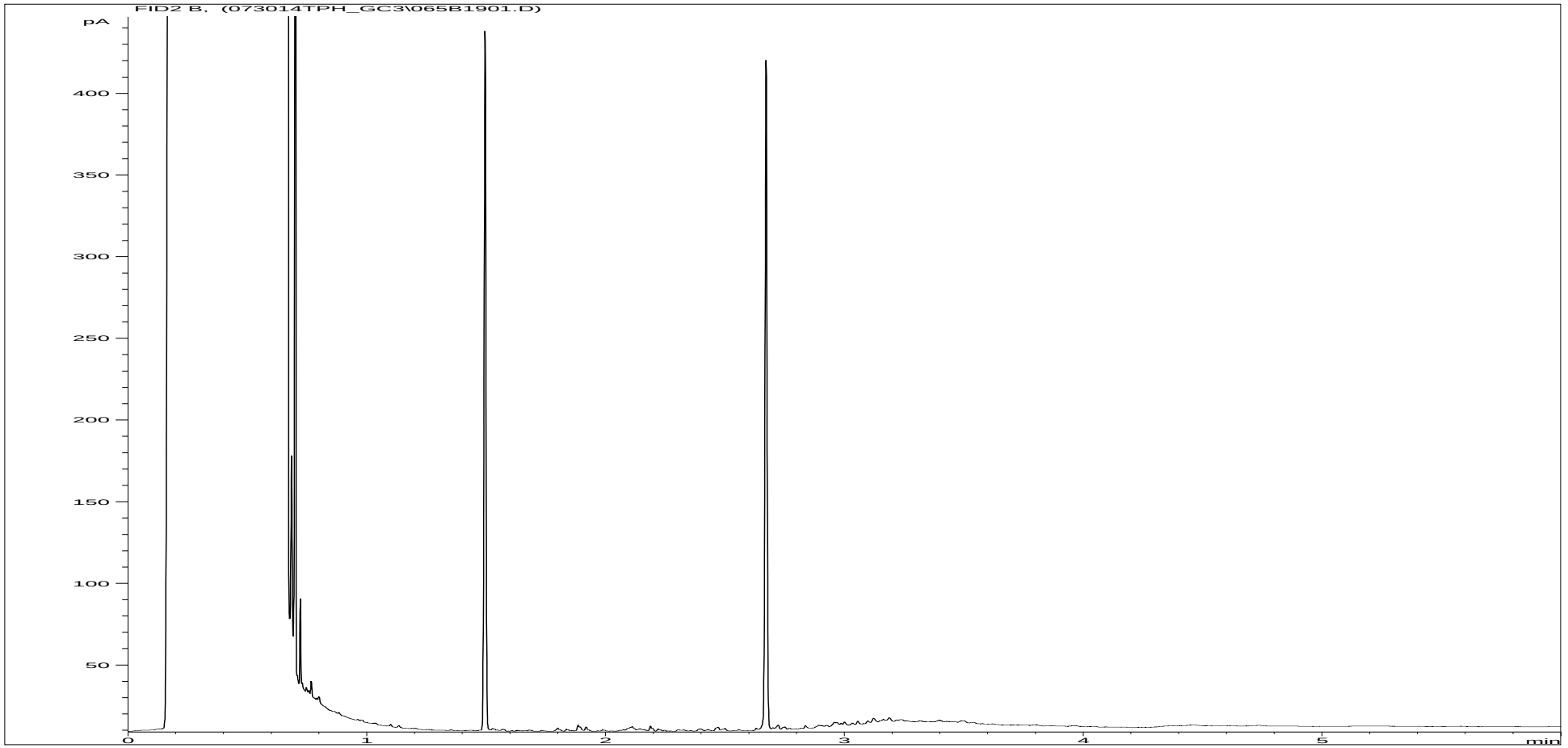
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420007ARO	**Job Number:**	S14_4561M
Multiplier:	11.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.50 BH4
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\014F1801.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

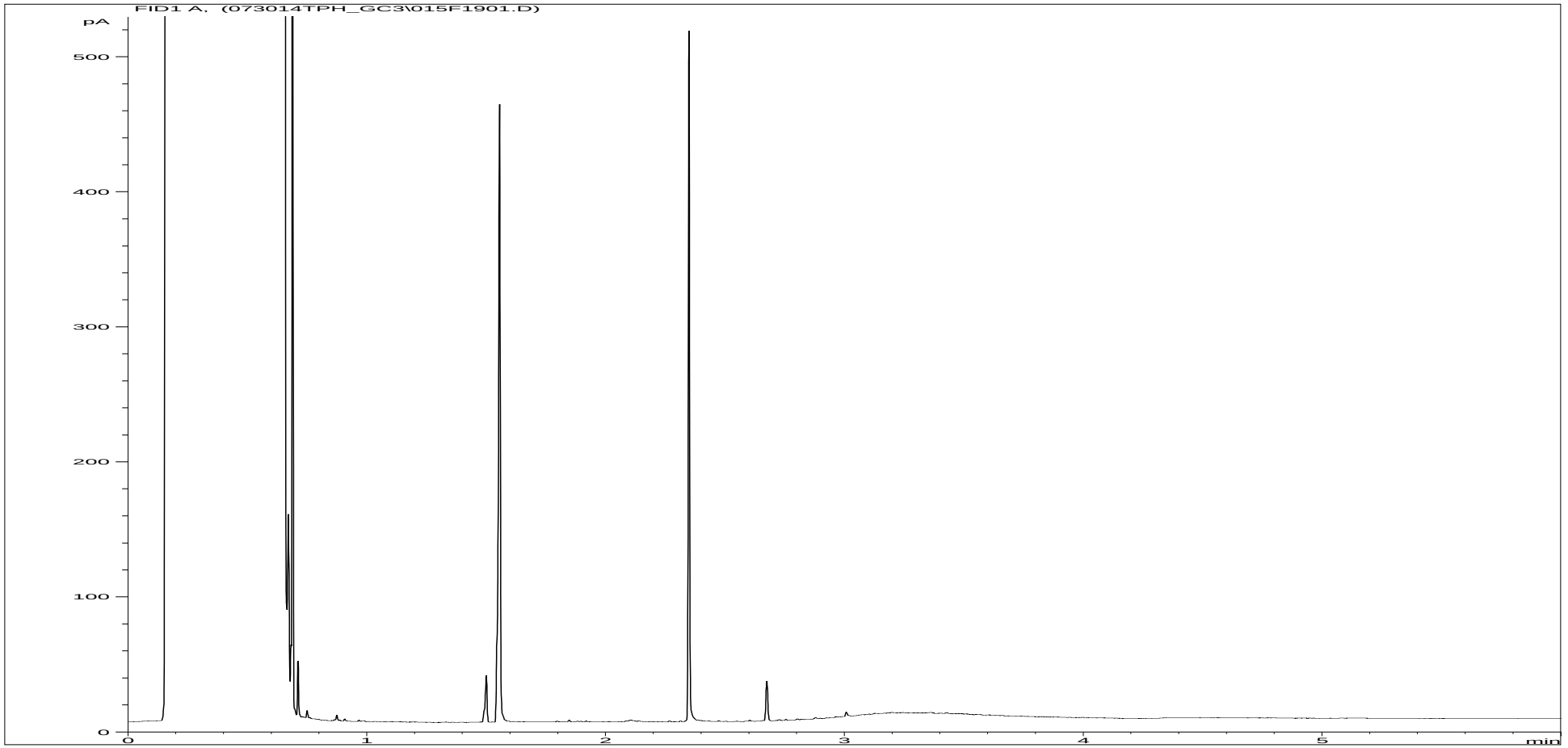
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420008ALI	**Job Number:**	S14_4561M
Multiplier:	15.04	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.50 BH3
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\065B1901.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

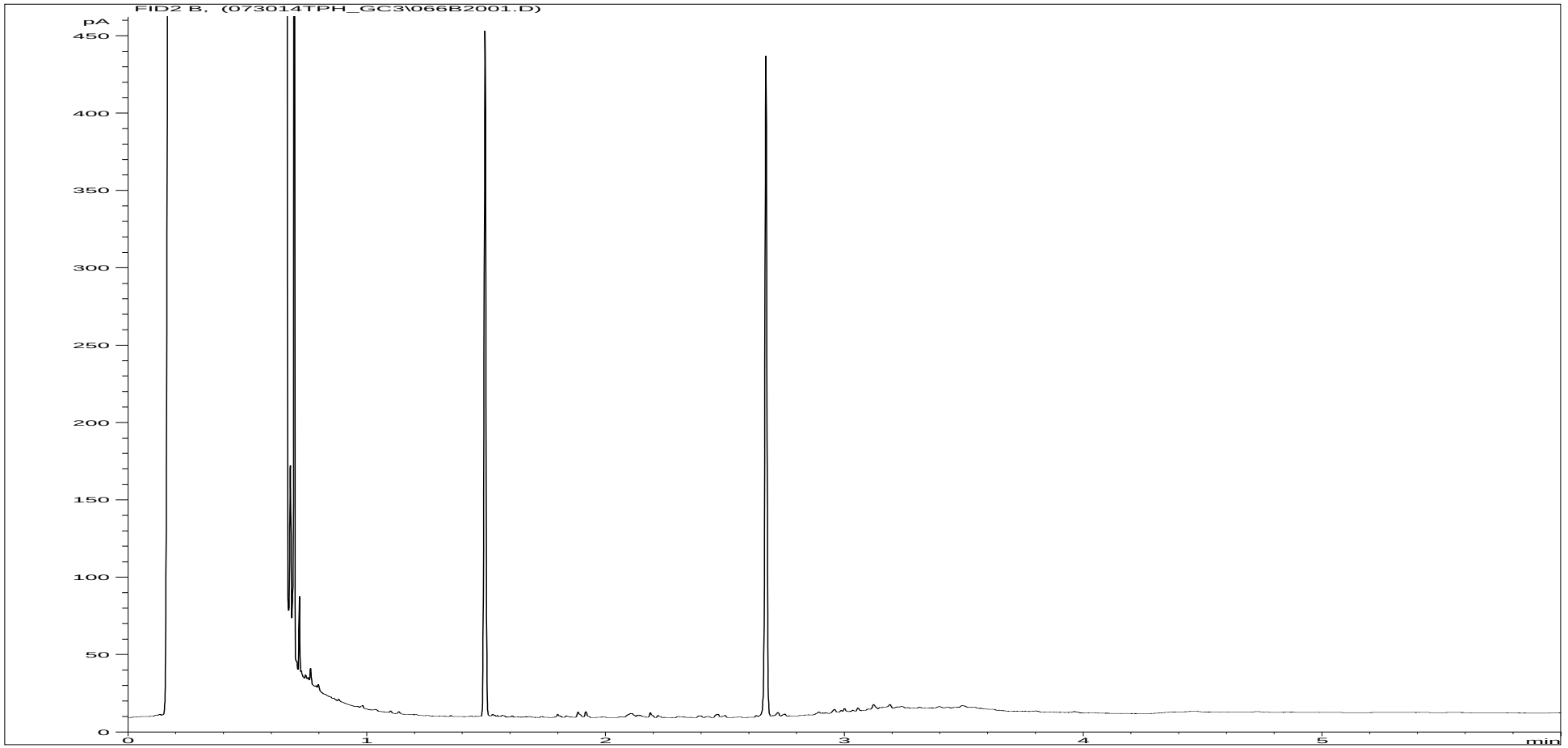
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420008ARO	**Job Number:**	S14_4561M
Multiplier:	11.84	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.50 BH3
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\015F1901.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

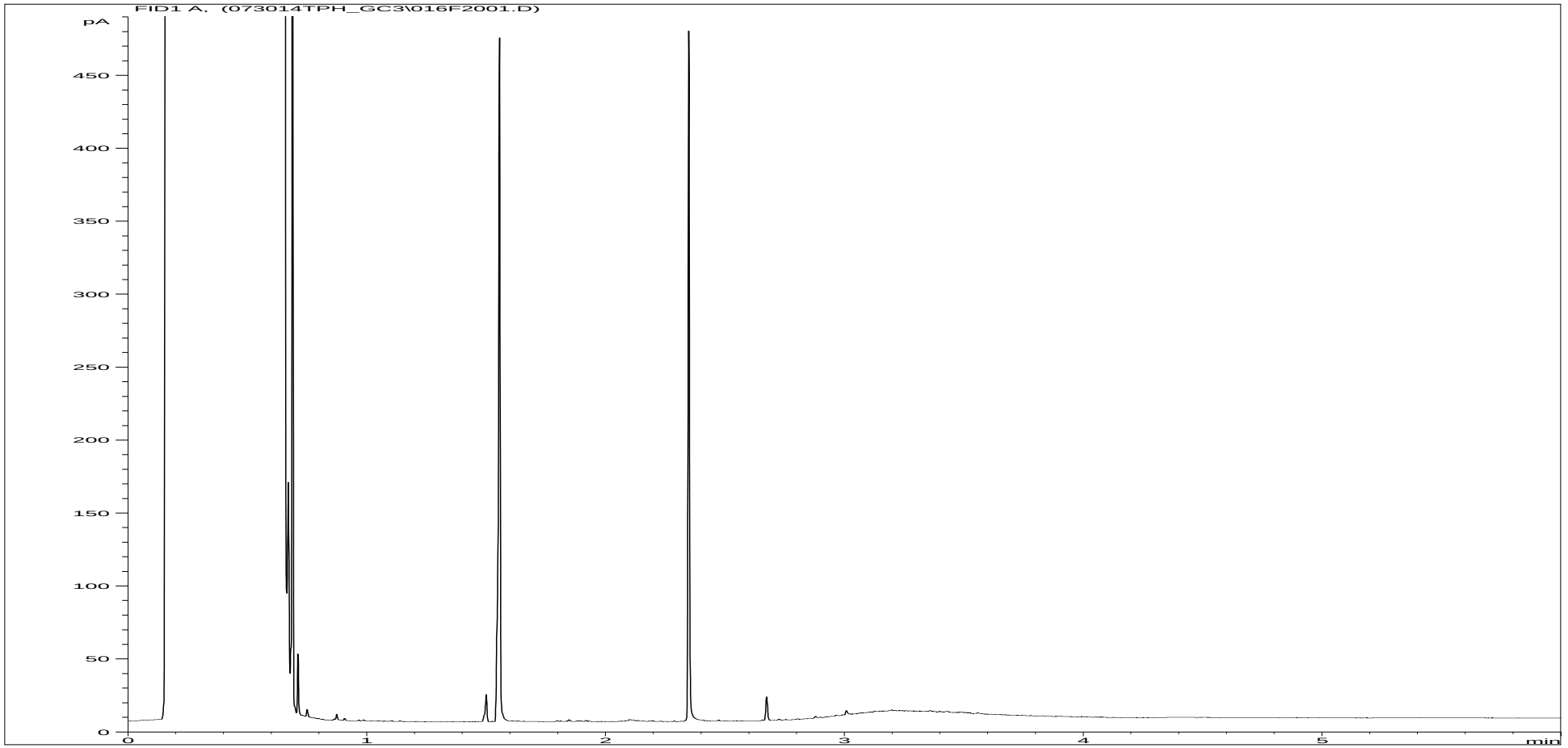
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420009ALI	**Job Number:**	S14_4561M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.20 BH2
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\066B2001.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

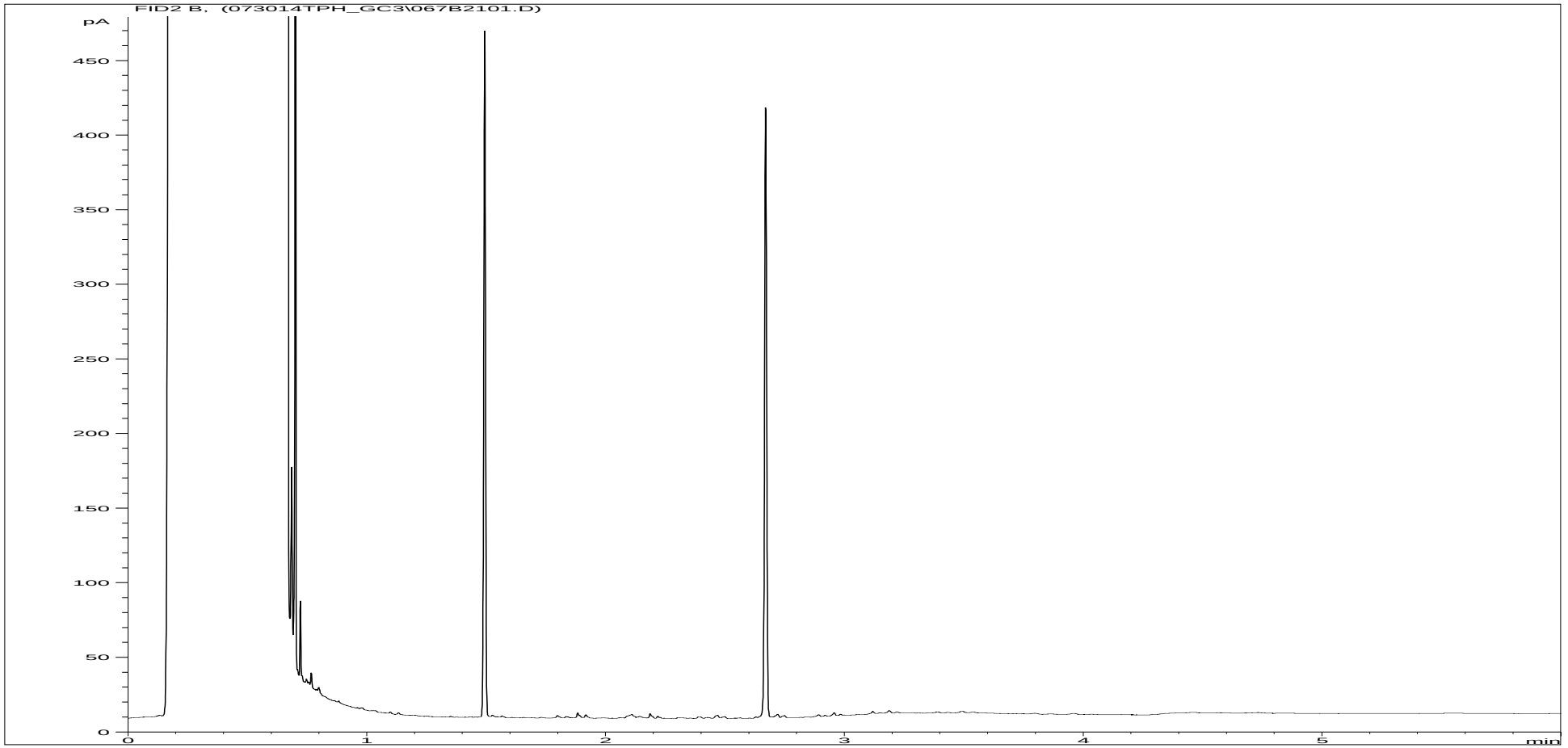
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420009ARO	**Job Number:**	S14_4561M
Multiplier:	11.52	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.20 BH2
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\016F2001.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

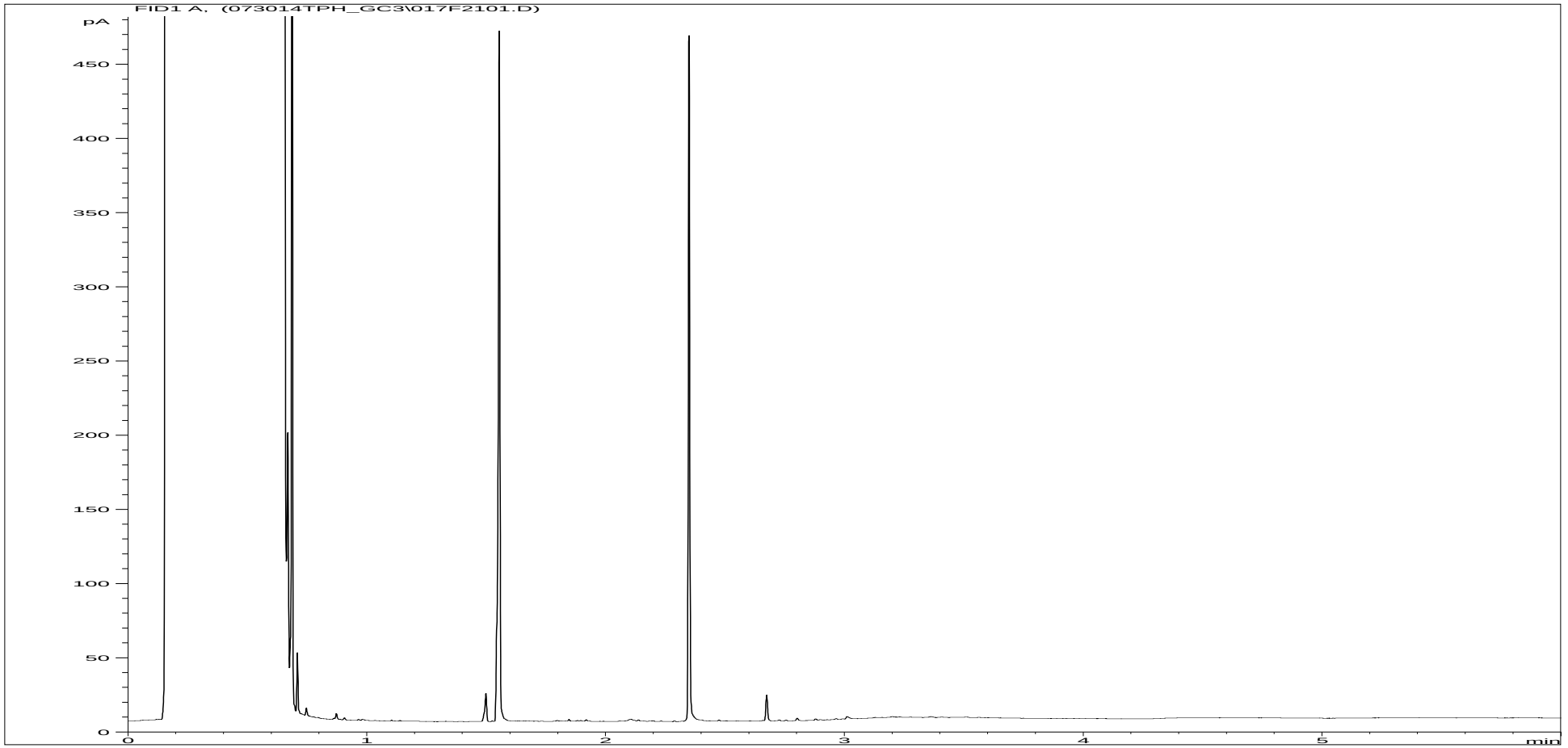
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420010ALI	**Job Number:**	S14_4561M
Multiplier:	15.2	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.80 BH2
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\067B2101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420010ARO	**Job Number:**	S14_4561M
Multiplier:	11.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	ES 0.80 BH2
Acquisition Date/Time:	30-Jul-14		
Datafile:	D:\TES\DATA\Y2013\02\073014TPH_GC3\017F2101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

ALcontrol Laboratories

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Environmental Scientifics Group
Bretby Business Park
Ashby Road
Burton on Trent
Staffordshire
DE15 0YZ
Attention: Customer Services

Post Certification Report

Date:	12 August 2014	**Location:**	Not Specified
Customer:	H_SCIENT_BOT	**No. Of Samples Received:**	8
Your Reference:	Not Specified	**Samples Scheduled:**	8
[SDG] and Samples	9730485,9730487,9730488,9730489,9730490,9730491,9730492,9730493		

Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Alcontrol Laboratories is a trading division of ALcontrol UK Limited
Registered Office: Units 7 & 8 Hawarden Business Park, Manor Road, Hawarden, Deeside, CH5 3US. Registered in England and Wales No. 4057291.

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
9730485	S1420003			
9730487	S1420004			
9730488	S1420005			
9730489	S1420006			
9730490	S1420007			
9730491	S1420008			
9730492	S1420009			
9730493	S1420010			

Only received samples which have had analysis scheduled will be shown on the following pages.

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Results Legend

X Test

N No Determination Possible

			Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container
			9730485	S1420003			60g VOC (ALE215)
			9730487	S1420004			60g VOC (ALE215)
			9730488	S1420005			60g VOC (ALE215)
			9730489	S1420006			60g VOC (ALE215)
			9730490	S1420007			60g VOC (ALE215)
			9730491	S1420008			60g VOC (ALE215)
			9730492	S1420009			60g VOC (ALE215)
			9730493	S1420010			60g VOC (ALE215)
Phenols by HPLC (S)	All	NDPs: 0 Tests: 8	X	X	X	X	X X X X
Sample description	All	NDPs: 0 Tests: 8	X	X	X	X	X X X X

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified

Case :

Results Legend		Customer Sample Ref.	S1420003	S1420004	S1420005	S1420006	S1420007	S1420008
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.	Depth (m)	-	-	-	-	-	-
diss.filt	Dissolved / filtered sample.	Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
tot.unfilt	Total / unfiltered sample.	Date Sampled	-	-	-	-	-	-
*	subcontracted test.	Date Received	01/08/2014	01/08/2014	01/08/2014	01/08/2014	01/08/2014	01/08/2014
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.	SDG Ref	140801-133	140801-133	140801-133	140801-133	140801-133	140801-133
		Lab Sample No.(s)	9730485	9730487	9730488	9730489	9730490	9730491
1-5&+§@	Sample deviation (see appendix)	AGS Reference						

Component	LOD/Units	Method						
Moisture Content Ratio (% of as received sample)	%	PM024	- §		- §	- §	- §	- §
Phenol	<0.01 mg/kg	TM062 (S)	<0.01 § M	<0.01 § #	<0.01 § M	<0.01 § M	<0.01 § M	0.0119 § M
Cresols	<0.01 mg/kg	TM062 (S)	<0.01 § M	<0.01 § #	<0.01 § M	<0.01 § M	0.0119 § M	0.0238 § M
Xylenols	<0.015 mg/kg	TM062 (S)	<0.015 § M	<0.015 § #	<0.015 § M	<0.015 § M	<0.015 § M	<0.015 § M
1-Naphthol	<0.01 mg/kg	TM062 (S)	<0.01 §	<0.01 §	<0.01 §	<0.01 §	<0.01 §	<0.01 §
2,3,5-Trimethylphenol	<0.01 mg/kg	TM062 (S)	<0.01 § M	<0.01 § #	<0.01 § M	<0.01 § M	<0.01 § M	<0.01 § M
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)	<0.035 § M	<0.035 § #	<0.035 § M	<0.035 § M	<0.035 § M	<0.035 § M

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified

Case :

Results Legend		Customer Sample Ref.	S1420009	S1420010				
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.	Depth (m)						
diss.filt	Dissolved / filtered sample.	Sample Type	Soil/Solid	Soil/Solid				
tot.unfilt	Total / unfiltered sample.	Date Sampled	-	-				
*	subcontracted test.	Date Received	01/08/2014	01/08/2014				
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.	SDG Ref	140801-133	140801-133				
		Lab Sample No.(s)	9730492	9730493				
1-5&+§@	Sample deviation (see appendix)	AGS Reference						
Component	**LOD/Units**	**Method**						
Moisture Content Ratio (% of as received sample)	%	PM024	- §	- §				
Phenol	<0.01 mg/kg	TM062 (S)	<0.01 § #	<0.01 § M				
Cresols	<0.01 mg/kg	TM062 (S)	<0.01 § #	<0.01 § M				
Xylenols	<0.015 mg/kg	TM062 (S)	<0.015 § #	<0.015 § M				
1-Naphthol	<0.01 mg/kg	TM062 (S)	<0.01 §	<0.01 §				
2,3,5-Trimethylphenol	<0.01 mg/kg	TM062 (S)	<0.01 § #	<0.01 § M				
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)	<0.035 § #	<0.035 § M				

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10-7

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample [1]	Surrogate Corrected
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC		

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified

Case :

Test Completion Dates

Lab Sample No(s)	9730485	9730487	9730488	9730489	9730490	9730491	9730492	9730493
Customer Sample Ref.	S1420003	S1420004	S1420005	S1420006	S1420007	S1420008	S1420009	S1420010
AGS Ref.								
Depth								
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Phenols by HPLC (S)	12-Aug-2014	12-Aug-2014	12-Aug-2014	12-Aug-2014	12-Aug-2014	12-Aug-2014	12-Aug-2014	12-Aug-2014
Sample description	02-Aug-2014	02-Aug-2014	02-Aug-2014	02-Aug-2014	02-Aug-2014	02-Aug-2014	02-Aug-2014	02-Aug-2014

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5 -C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before presevation was performed
§	Sampled on date not provided
•	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -
Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

ASBESTOS ANALYSIS RESULTS - SOIL ANALYSIS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils

1089

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

Client:	ESG Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0488-08367**
For the attention of:	Waterman EED	**Report Date:**	**01/08/2014**
Site Address:	Imperial Way	**Project Number:**	**S144561**

Sample Number	Sample Date	Sample Location	Test Date	Total Sample Dry Weight (g)	Weight of <2mm Fraction (g)	Asbestos(g) in >8mm+>2mm	Asbestos(g) in <2mm	% Asbestos by weight of Total Dried Sample	Asbestos Fibre Types Identified
CL/1420003	18/07/14	ES 0.50 BH5	01/08/2014					Screen & ID	Amosite(Lagging)
CL/1420004	18/07/14	ES 0.20 BH6	01/08/2014					Screen Only	NAIIS
CL/1420005	18/07/14	ES 0.20 BH1	01/08/2014					Screen Only	NAIIS
CL/1420006	18/07/14	ES 1.00 BH1	01/08/2014					Screen Only	NAIIS
CL/1420007	18/07/14	ES 0.50 BH4	01/08/2014					Screen Only	NAIIS
CL/1420008	18/07/14	ES 0.50 BH3	01/08/2014					Screen Only	NAIIS
CL/1420009	18/07/14	ES 0.20 BH2	01/08/2014					Screen Only	NAIIS
CL/1420010	18/07/14	ES 0.80 BH2	01/08/2014					Screen Only	NAIIS

Keys

NAACR = Not Analysed at Clients Request

NAIIS = No Asbestos Identified in Sample (Screens Only)

NADIS = No Asbestos Detected in Sample (ID & Quant Only)

Name:	Louise James	Authorised Signatory:
Position:	Lab Project Manager	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on HSE document MDHS 90 - Asbestos Contaminated Land - Draft 5 - November 1997 (withdrawn). Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of fine fraction for asbestos content only includes fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0XD, UKAS Laboratory Number 1089.

Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer Waterman EED
Site Imperial Way
Report No S144561M

Consignment No S42515
Date Logged 28-Jul-2014

Report Due 31-Jul-2014

ID Number	Description	MethodID	AMMAR	CustServ	ELESULP	FOCS	GROHSA	ICPBOR	ICPMSS									ICPSOIL		ICPWSS	KoneNO3	MCertS	PAHMSUS	PHSOIL	SFAPI	
		Sampled	Exchange.Ammonium AR	REPORT A	Elemental Sulphur	S.O.M. % (Calc)	GRO (AA-UK) HSA-GCFID	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Vanadium (MS)	Zinc (MS)	Barium.	Beryllium.	SO4-- (H2O sol) mg/l	Nitrate 2:1 mg/kg	MCertS Analysis	PAH (16) by GCMS inc. Sum 8	pH units (AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
			✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓
CL/1420003	ES 0.50 BH5	18/07/14	E																								
CL/1420004	ES 0.20 BH6	18/07/14	E																								
CL/1420005	ES 0.20 BH1	18/07/14	E																								
CL/1420006	ES 1.00 BH1	18/07/14	E																								
CL/1420007	ES 0.50 BH4	18/07/14	E																								
CL/1420008	ES 0.50 BH3	18/07/14	E																								
CL/1420009	ES 0.20 BH2	18/07/14	E																								
CL/1420010	ES 0.80 BH2	18/07/14	E																								

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S144561M

Customer Waterman EED
Site Imperial Way
Report No S144561M

Consignment No S42515
Date Logged 28-Jul-2014

Report Due 31-Jul-2014

ID Number	Description	MethodID	SFAS	Sub002a	Sub036					TMSS	TPHUSSI	WSLM59
		Sampled	Sulphide as S (AR)	^Asbestos Screen	^Phenol	^Trimethylphenols	^Cresols	^Naphthols	^Xylenols	^Total Phenols	Tot.Moisture @ 105C	TPH by GCFID (Si-UKCWG)>44	Total Organic Carbon
				✓							✓	✓	
CL/1420003	ES 0.50 BH5	18/07/14											
CL/1420004	ES 0.20 BH6	18/07/14											
CL/1420005	ES 0.20 BH1	18/07/14											
CL/1420006	ES 1.00 BH1	18/07/14											
CL/1420007	ES 0.50 BH4	18/07/14											
CL/1420008	ES 0.50 BH3	18/07/14											
CL/1420009	ES 0.20 BH2	18/07/14											
CL/1420010	ES 0.80 BH2	18/07/14											

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	AMMAR	As Received	Determination of Exchangeable Ammonium in Soil using potassium chloride extraction, discrete colorimetric detection
Soil	ELESULP	Oven Dried @ < 35℃	Determination of Elemental Sulphur using Solvent Extraction followed by HPLC detection.
Soil	FOCS	Oven Dried @ < 35℃	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35℃	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35℃	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	ICPSOIL	Oven Dried @ < 35℃	Determination of Metals in soil samples by aqua regia digestion followed by ICPOES detection
Soil	ICPWSS	Oven Dried @ < 35℃	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	KoneNO3	Oven Dried @ < 35℃	Determination of Nitrate in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SFAS	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHUSSI	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection including quantitation of Aromatic and Aliphatic fractions.
Soil	WSLM59	Oven Dried @ < 35℃	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Waterman EED

Site : Imperial Way

Report Number : S14_4561

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1420003	ES 0.50 BH5	Brown Stone CLAY
CL/1420004	ES 0.20 BH6 (NVM)	Brown Silt STONE
CL/1420005	ES 0.20 BH1	Brown Stone SILT
CL/1420006	ES 1.00 BH1	Brown Stone CLAY
CL/1420007	ES 0.50 BH4	Brown Stone SILT
CL/1420008	ES 0.50 BH3	Brown Stone CLAY
CL/1420009	ES 0.20 BH2	Brown Stone SILT
CL/1420010	ES 0.80 BH2	Brown Stone CLAY

Our Ref: EFS/144614M (Ver. 2)
Your Ref: C2611

August 13, 2014

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Mr M Amos
Waterman EED
Merchants House
Wapping Road
Bristol
BS1 4RW

For the attention of Mr M Amos

Dear Mr Amos

Sample Analysis - Imperial Way

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 09/09/14 when they will be discarded. Please call 01283 554463 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

S Stone
Project Co-ordinator
01283 554463

Environmental Chemistry, ESG, P.O. Box 100, Burton-upon-trent, DE15 0XD Tel: 01283 554400 Fax: 01283 554422
Environmental Scientifics Group Limited.
Registered No: 2880501

TEST REPORT

1252

Report No. EFS/144614M (Ver. 2)

Waterman EED
Merchants House
Wapping Road
Bristol
BS1 4RW

Site: Imperial Way

The 13 samples described in this report were registered for analysis by ESG on 29-Jul-2014. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 13-Aug-2014

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Pages 5 to 15)
Table of PCB Congener Results (Page 16)
Table of GRO Results (Page 17)
Table of TPH (Si) banding (UK-CWG) (Page 18)
GC-FID Chromatograms (Pages 19 to 37)
Table of VOC (HSA) Results (Pages 38 to 41)
Table of WAC Analysis Results (Pages 42 to 44)
Sub Contracted Analysis Results (Pages 45 to 51)
Table of Asbestos Results (Page 52)
Analytical and Deviating Sample Overview (Pages 53 to 54)
Table of Method Descriptions (Pages 55 to 56)
Table of Report Notes (Page 57)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns

Operations Director
Laboratory and Analytical Business

Date of Issue: 13-Aug-2014

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Method Codes :			AMMAR	ELESULP	GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPSOIL	ICPSOIL	ICPWSS
Method Reporting Limits :			0.5	20	0.2	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16	1	0.1	10
Accreditation Code:			UM	UM		UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Exchange.Ammonium AR**	**Elemental Sulphur**	**GRO (AA-UK) HSA-GCFID**	**Boron (H20 Soluble)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**Barium.**	**Beryllium.**	**SO4-- (H2O sol) mg/l**
1420186	WS5 0.40 (NVM)	**23-Jul-14**	0.71§	39.44§	Req §	0.60§	36.43§	0.552§	9.13§	5.42§	26.89§	<0.50§	9.13§	<0.50§	106.87§	3090§	0.2519§	249§
1420187	WS9 0.35	**23-Jul-14**																
1420188	WS4 0.40	**23-Jul-14**	<0.5	<21	Req *	<0.5	19.4	0.35	8.6	3	14.3	<0.5	8.1	<0.5	68.3	876	<0.1	103
1420189	TP11 1.50	**23-Jul-14**	15.4	285.3	Req *	1.1	11.7	0.22	26.8	15.4	18.1	<0.5	23.5	<0.5	54.0	93.2	0.681	559
1420190	TP11 1.30	**23-Jul-14**	<0.5	<20	Req *	<0.5	14.3	0.31	9.3	2.9	12.3	<0.5	8.7	<0.5	52	774	0.108	99
1420191	TP11 0.80	**23-Jul-14**	<0.5	<20	Req *	<0.5	70.6	0.78	6.7	3.6	31.0	<0.5	8.9	<0.5	185.5	2680	<0.1	127
1420192	TP11 0.35	**23-Jul-14**	<0.5	<21	Req *	<0.5	36.9	0.6	6.3	2.7	28.7	<0.5	7.1	<0.5	118.9	2250	<0.1	120
1420193	CBR5 0.60	**23-Jul-14**																
1420194	CBR2 0.40	**23-Jul-14**	1.7	53.9	Req *	1	11.5	0.30	33	16.6	22	<0.6	25.9	<0.6	66.6	180	0.904	324
1420195	TP12 0.40 (NVM)	**23-Jul-14**																
1420196	SP1 CRUSHED	**23-Jul-14**																
1420197	SOIL BUND 1	**23-Jul-14**																
1420198	TP10 0.40	**23-Jul-14**	<0.6	<20	Req *	<0.5	29.7	0.47	13.2	6.0	18.3	<0.5	12.8	<0.5	85.0	1510	0.21	531

Environmental Scientifics Group

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Client Name **Waterman EED**

Contact Mr M Amos

Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144614M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appr opriate, in accordance with the MCERTS standard.

Units :			%	pH Units	mg/kg	mg/kg		mg/kg	mg/kg	mg/kg	µg/kg	Mol/kg	% M/M	mg/kg	mg/kg	%	µg/kg	mg/kg
Method Codes :			MICROTMSS	PHSOIL	SFAPI	SFAPI	Sub002a	TPHFIDUS	TPHFIDUS	TPHUSSI	VOCHSAS	ANC	FOCS	ICPMSS	KoneNO3	LOI(%MM)	PCBUSECDAR	SFAS
Method Reporting Limits :			0.2		0.5	0.5		10	10	10		0.04	0.04	0.6		0.2		0.5
Accreditation Code:			U	UM	UM	UM	U	N	UM			N	N	N	N	N		N
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Tot.Moisture @ 105C**	**pH units (AR)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**^Asbestos Screen**	**TPH Band (>C10-C40)**	**TPH by GCFID (AR)**	**TPH by GCFID (Si-UKCWG)>44**	**VOC HSA-GCMS**	**Acid Neut. Capacity**	**S.O.M. % (Calc)**	**Vanadium (MS)**	**Nitrate 2:1 mg/kg**	**L.O.I. % @ 450C**	**PCB-7 Congeners Analysis**	**Sulphide as S (AR)**
1420186	WS5 0.40 (NVM)	23-Jul-14	1.14 §	10.0 §	<0.51§	<0.51§	NAIIS			Req §			0.91	11.3	1.9			<0.5
1420187	WS9 0.35	23-Jul-14	4.52															
1420188	WS4 0.40	23-Jul-14	3.57	9.6	<0.5	<0.5	NAIIS			Req			0.80	6.5	<0.2			<0.5
1420189	TP11 1.50	23-Jul-14	14.26	8.3	<0.6	<0.6	NAIIS			Req	Req		1.61	36.5	<0.2			19.8
1420190	TP11 1.30	23-Jul-14	4.73	9.5	<0.5	<0.5	NAIIS			Req	Req		0.86	7.4	<0.2			0.8
1420191	TP11 0.80	23-Jul-14	15.59	9.8	<0.5	<0.5	NAIIS			Req	Req		1.10	6.5	0.2			0.6
1420192	TP11 0.35	23-Jul-14	5.98	10.8	<0.5	<0.5	NAIIS			Req	Req		1.01	4.9	<0.2			<0.5
1420193	CBR5 0.60	23-Jul-14	16.25															
1420194	CBR2 0.40	23-Jul-14	21.49	9.0	<0.6	<0.6	NAIIS			Req			0.84	51.0	<0.2			<0.6
1420195	TP12 0.40 (NVM)	23-Jul-14	3.54 §	11.4 §				60§	61§			16.12				1.2	Req	
1420196	SP1 CRUSHED	23-Jul-14	8.78	8.5				58	59			6.07				7.1	Req	
1420197	SOIL BUND 1	23-Jul-14	15.60	8.6				18	18			0.80				5.3	Req	
1420198	TP10 0.40	23-Jul-14	15.20	11.5	<0.6	<0.6	NAIIS			Req			0.85	14.2	0.4			<0.6

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Client Name Waterman EED

Contact Mr M Amos

Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144614M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appr opriate, in accordance with the MCERTS standard.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg	mg/kg
Method Codes :			Sub036	Sub036	Sub036	Sub036	Sub036	Sub036	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	PAHMSUS	PAHMSUS
Method Reporting Limits :									0.02	10	10	10	20	30	20	10		
Accreditation Code:			N		N		N	N	N	UM	UM	UM	U	UM	UM	UM		
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**^Phenol**	**^Trimethylphenols**	**^Cresols**	**^Naphthols**	**^Xylenols**	**^Total Phenols**	**Total Organic Carbon**	**Benzene**	**Toluene**	**Ethyl Benzene**	**MTBE**	**Xylenes**	**m/p Xylenes**	**o Xylene**	**PAH (16) by GCMS inc. Sum 8**	**PAH (17) by GCMS**
1420186	WS5 0.40 (NVM)	23-Jul-14	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055	0.53								Req §	
1420187	WS9 0.35	23-Jul-14																
1420188	WS4 0.40	23-Jul-14	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055	0.46								Req	
1420189	TP11 1.50	23-Jul-14	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055	0.94								Req	
1420190	TP11 1.30	23-Jul-14	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055	0.49								Req	
1420191	TP11 0.80	23-Jul-14	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055	0.63								Req	
1420192	TP11 0.35	23-Jul-14	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055	0.59								Req	
1420193	CBR5 0.60	23-Jul-14																
1420194	CBR2 0.40	23-Jul-14	<0.01	<0.01	<0.01	<0.01	<0.015	<0.055	0.48								Req	
1420195	TP12 0.40 (NVM)	23-Jul-14							0.43	<10§	<10§	<10§	<21§	<31§	<21§	<10§		Req §
1420196	SP1 CRUSHED	23-Jul-14							0.81	<11*	<11*	<11*	<22*	<33*	<22*	<11*		Req
1420197	SOIL BUND 1	23-Jul-14							1.06	<12*	<12*	<12*	<24*	<36*	<24*	<12*		Req
1420198	TP10 0.40	23-Jul-14	<0.01	<0.01	0.0103	<0.01	0.0309	<0.0712	0.49								Req	

ESG Environmental Scientifics Group

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Client Name **Waterman EED**

Contact Mr M Amos

Imperial Way

Sample Analysis

Date Printed	**13-Aug-2014**
Report Number	**EFS/144614M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105ºC where appr opriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	WS5 0.40 (NVM)	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420186	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**N**
Acenaphthylene	208-96-8	-	< 0.08	-	N
Acenaphthene	83-32-9	-	< 0.08	-	N
Fluorene	86-73-7	-	< 0.08	-	N
Phenanthrene	85-01-8	-	< 0.08	-	N
Anthracene	120-12-7	-	< 0.08	-	N
Fluoranthene	206-44-0	-	< 0.08	-	N
Pyrene	129-00-0	-	< 0.08	-	N
Benzo[a]anthracene	56-55-3	-	< 0.08	-	N
Chrysene	218-01-9	-	< 0.08	-	N
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	N
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	N
Benzo[a]pyrene	50-32-8	-	< 0.08	-	N
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	N
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	N
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-	N
Total (USEPA16) PAHs	-	-	< 1.29	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.57	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	88
Acenaphthene-d10	93
Phenanthrene-d10	93
Chrysene-d12	95
Perylene-d12	96

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	101
Terphenyl-d14	72

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	WS4 0.40	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420188	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**UM**
Acenaphthylene	208-96-8	-	< 0.08	-	U
Acenaphthene	83-32-9	-	< 0.08	-	UM
Fluorene	86-73-7	-	< 0.08	-	UM
Phenanthrene	85-01-8	-	< 0.08	-	UM
Anthracene	120-12-7	-	< 0.08	-	U
Fluoranthene	206-44-0	-	< 0.08	-	UM
Pyrene	129-00-0	-	< 0.08	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.08	-	UM
Chrysene	218-01-9	-	< 0.08	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.08	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-	UM
Total (USEPA16) PAHs	-	-	< 1.34	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.59	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	102
Acenaphthene-d10	100
Phenanthrene-d10	102
Chrysene-d12	97
Perylene-d12	89

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	100
Terphenyl-d14	74

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP11 1.50	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420189	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	4.38	0.31	93	U
Acenaphthene	83-32-9	4.49	0.20	98	UM
Fluorene	86-73-7	4.89	0.19	95	UM
Phenanthrene	85-01-8	5.75	1.06	99	UM
Anthracene	120-12-7	5.80	0.49	88	U
Fluoranthene	206-44-0	7.11	2.73	96	UM
Pyrene	129-00-0	7.40	2.51	99	UM
Benzo[a]anthracene	56-55-3	9.11	1.42	91	UM
Chrysene	218-01-9	9.16	1.20	94	UM
Benzo[b]fluoranthene	205-99-2	10.65	2.40	99	UM
Benzo[k]fluoranthene	207-08-9	10.69	0.83	99	UM
Benzo[a]pyrene	50-32-8	11.09	1.71	99	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.48	1.50	97	UM
Dibenzo[a,h]anthracene	53-70-3	12.51	0.24	55	UM
Benzo[g,h,i]perylene	191-24-2	12.79	1.61	96	UM
Total (USEPA16) PAHs	-	-	< 18.50	-	N
Total (Oil Guide 8) PAHs	-	-	9.32	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	83
Acenaphthene-d10	91
Phenanthrene-d10	93
Chrysene-d12	97
Perylene-d12	100

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	101
Terphenyl-d14	72

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP11 1.30	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420190	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**UM**
Acenaphthylene	208-96-8	-	< 0.08	-	U
Acenaphthene	83-32-9	-	< 0.08	-	UM
Fluorene	86-73-7	-	< 0.08	-	UM
Phenanthrene	85-01-8	-	< 0.08	-	UM
Anthracene	120-12-7	-	< 0.08	-	U
Fluoranthene	206-44-0	-	< 0.08	-	UM
Pyrene	129-00-0	-	< 0.08	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.08	-	UM
Chrysene	218-01-9	-	< 0.08	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.08	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-	UM
Total (USEPA16) PAHs	-	-	< 1.34	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.59	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	99
Acenaphthene-d10	96
Phenanthrene-d10	98
Chrysene-d12	94
Perylene-d12	88

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	100
Terphenyl-d14	73

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP11 0.80	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420191	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Total (USEPA16) PAHs	-	-	< 1.36	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.60	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	84
Acenaphthene-d10	88
Phenanthrene-d10	87
Chrysene-d12	86
Perylene-d12	88

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	103
Terphenyl-d14	74

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP11 0.35	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420192	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Total (USEPA16) PAHs	-	-	< 1.36	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.60	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	94
Acenaphthene-d10	94
Phenanthrene-d10	97
Chrysene-d12	98
Perylene-d12	101

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	100
Terphenyl-d14	72

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	CBR2 0.40	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420194	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 1.63	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.71	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	81
Acenaphthene-d10	92
Phenanthrene-d10	91
Chrysene-d12	94
Perylene-d12	98

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	101
Terphenyl-d14	74

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP12 0.40 (NVM)	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420195	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.08	-	**N**
Acenaphthylene	208-96-8	-	< 0.08	-	N
Acenaphthene	83-32-9	-	< 0.08	-	N
Fluorene	86-73-7	-	< 0.08	-	N
Phenanthrene	85-01-8	-	< 0.08	-	N
Anthracene	120-12-7	-	< 0.08	-	N
Fluoranthene	206-44-0	-	< 0.08	-	N
Pyrene	129-00-0	-	< 0.08	-	N
Benzo[a]anthracene	56-55-3	-	< 0.08	-	N
Chrysene	218-01-9	-	< 0.08	-	N
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-	N
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-	N
Benzo[a]pyrene	50-32-8	-	< 0.08	-	N
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-	N
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-	N
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-	N
Coronene	191-07-1	-	< 0.08	-	N
Total (USEPA16) PAHs	-	-	< 1.33	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	87
Acenaphthene-d10	91
Phenanthrene-d10	91
Chrysene-d12	86
Perylene-d12	82

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	101
Terphenyl-d14	72

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	SP1 CRUSHED	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420196	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	7.11	0.10	79	UM
Pyrene	129-00-0	7.40	0.10	98	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Coronene	191-07-1 *	-	< 0.09	-	N
Total (USEPA16) PAHs	-	-	< 1.40	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	101
Acenaphthene-d10	108
Phenanthrene-d10	115
Chrysene-d12	119
Perylene-d12	117

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	94
Terphenyl-d14	71

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	SOIL BUND 1	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420197	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	7.11	0.11	90	UM
Pyrene	129-00-0	7.40	0.11	81	UM
Benzo[a]anthracene	56-55-3	9.11	0.10	90	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Coronene	191-07-1 *	-	< 0.09	-	N
Total (USEPA16) PAHs	-	-	< 1.56	-	N

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	97
Acenaphthene-d10	93
Phenanthrene-d10	94
Chrysene-d12	91
Perylene-d12	85

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	98
Terphenyl-d14	70

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	TP10 0.40	**Job Number:**	S14_4614M
LIMS ID Number:	CL1420198	**Date Booked in:**	29-Jul-14
QC Batch Number:	140636	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	0114PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Total (USEPA16) PAHs	-	-	< 1.49	-	N
Total (Oil Guide 8) PAHs	-	-	< 0.65	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	85
Acenaphthene-d10	94
Phenanthrene-d10	95
Chrysene-d12	93
Perylene-d12	84

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	100
Terphenyl-d14	73

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

The Oil Guide 8 PAHs comprise of Benzo[a]anthracene, Chrysene, Benzo[b/k/j]fluoranthene's Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene and Dibenzo[a,h]anthracene.
Benzo[j]fluoranthene co-elutes with Benzo[b/k]fluoranthene's and therefore is included in the sum of the Oil Guide 8 but is not individually listed.

Polychlorinated Biphenyls (congeners)

Customer and Site Details:	Waterman EED: Imperial Way	**Matrix:**	SOIL
Job Number:	S14_4614M	**Date Booked in:**	29-Jul-14
QC Batch Number:	140223	**Date Extracted:**	01-Aug-14
Directory:	0803PCB.GC8	**Date Analysed:**	04-Aug-14
Method:	Ultrasonic		
Accreditation code:	N		

			Concentration, (µg/kg)						
	Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
*	CL1420195	TP12 0.40 (NVM)	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
*	CL1420196	SP1 CRUSHED	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5
*	CL1420197	SOIL BUND 1	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where approp riate, in accordance with the MCERTS standard.

Gasoline Range Organics
(BTEX and Aromatic/Aliphatic Carbon Ranges)

Customer and Site Details: Waterman EED : Imperial Way
Job Number: S14_4614M
Directory: E:\TES\DATA\2014\073114HSA_GC9\140731 2014-07-31 17-43-16\038F3801.D
Method: HEADSPACE GCFID
Accreditation Code: N

Matrix: Soil
Date Booked in: 29-Jul-14
Date extracted: 31-Jul-14
Date Analysed: 01-Aug-14, 05:26:
Units: mg/kg

*** Sample data with an asterisk are not UKAS accredited.**

			BTEX				Aromatics		Aliphatics		Total GRO
	Sample ID	Client ID	Benzene	Toluene	Ethyl benzene	Xylenes	C5 - C7	>C7 - C8	C5 - C6	>C6 - C8	C5 - C10
*	CL1420186	WS5 0.40 (NVM)	<0.010	<0.010	<0.010	<0.020	<0.01	<0.01	<0.2	<0.2	<0.2
*	CL1420188	WS4 0.40	<0.010	<0.010	<0.010	<0.021	<0.01	<0.01	<0.2	<0.2	<0.2
*	CL1420189	TP11 1.50	<0.012	<0.012	<0.012	<0.023	<0.01	<0.01	<0.2	<0.2	<0.2
*	CL1420190	TP11 1.30	<0.010	<0.010	<0.010	<0.021	<0.01	<0.01	<0.2	<0.2	<0.2
*	CL1420191	TP11 0.80	<0.011	<0.011	<0.011	<0.021	<0.01	<0.01	<0.2	<0.2	<0.2
*	CL1420192	TP11 0.35	<0.011	<0.011	<0.011	<0.021	<0.01	<0.01	<0.2	<0.2	<0.2
*	CL1420194	CBR2 0.40	<0.013	<0.013	<0.013	<0.025	<0.01	<0.01	<0.3	<0.3	<0.3
*	CL1420198	TP10 0.40	<0.012	<0.012	<0.012	<0.023	<0.01	<0.01	<0.2	<0.2	<0.2

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

ALIPHATIC / AROMATIC FRACTION BY GC/FID

Customer and Site Details: Waterman EED : Imperial Way
Job Number: S14_4614M
QC Batch Number: 140636
Directory: D:\TES\DATA\Y2013\02\080414TPH_GC3\013F1501.D
Method: Ultra Sonic

Separation: Silica gel
Eluents: Hexane, DCM

Matrix: Soil
Date Booked in: 29-Jul-14
Date Extracted: 01-Aug-14
Date Analysed: 04-Aug-14

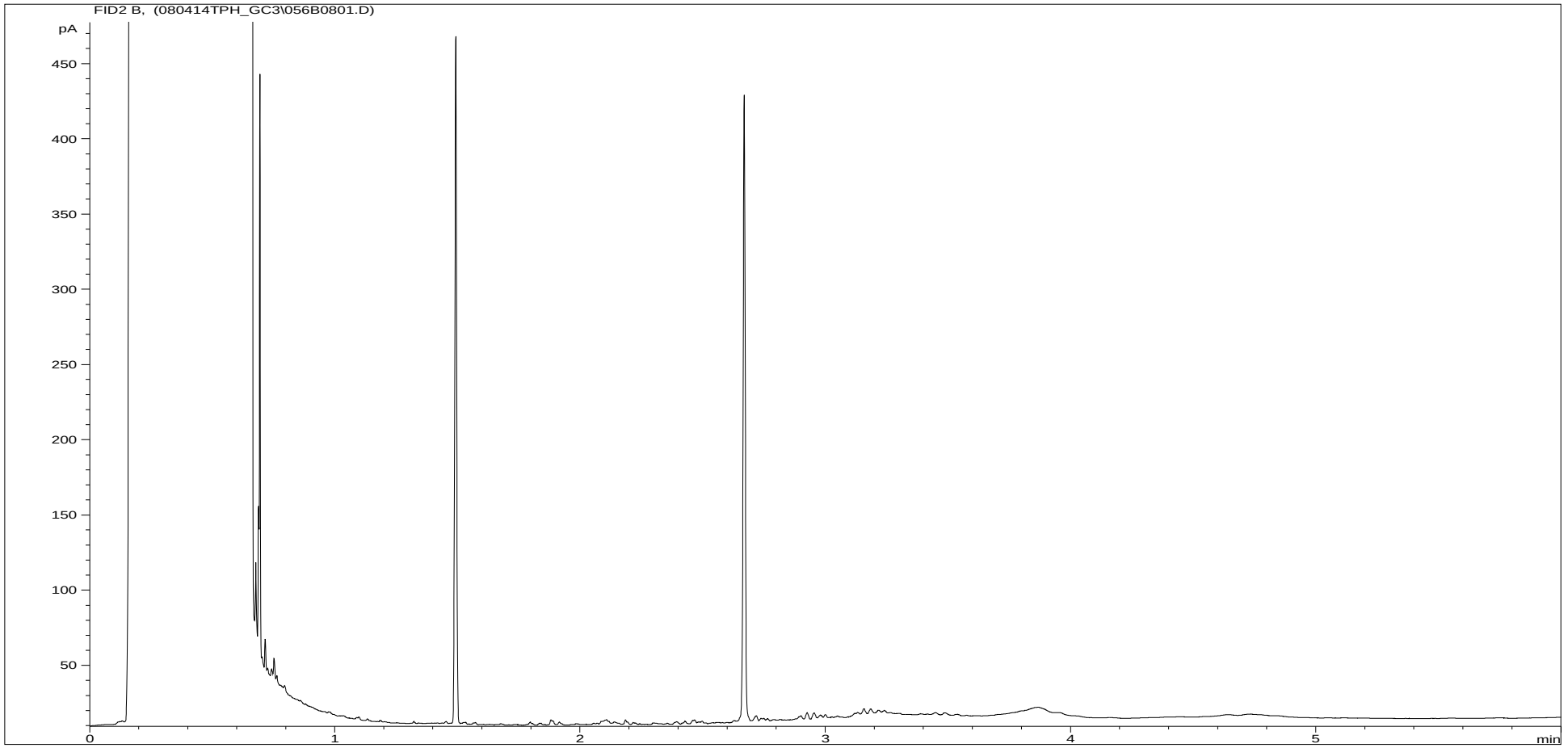
This sample data is not MCERTS accredited.

Ba * This sample data is not ISO17025 accredited.

		Concentration, (mg/kg) - as dry weight.												
		>C8 - C10	>C8 - C10	>C10 - C12	>C10 - C12	>C12 - C16	>C12 - C16	>C16 - C35	>C16 - C21	>C35 - C44*	>C21 - C35	>C35 - C44*	>C8 - C44*	>C8 - C44*
Sample ID	**Client ID**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aromatics**	**Aliphatics**	**Aromatics**
* CL1420186	WS5 0.40 (NVM)	<4	<4	<4	<4	<4	<4	<12.0	<4	<5.68	<8.86	<5.68	<20	<20
CL1420188	WS4 0.40	<4	<4	<4	<4	<4	<4	<12.5	4.5	<5.90	<9.20	<5.90	<21	<21
CL1420189	TP11 1.50	<5	<5	<5	<5	<5	<5	<13.9	6.78	<6.55	27.4	<6.55	<23	36.6
CL1420190	TP11 1.30	<4	<4	<4	<4	<4	<4	<12.5	<4	<5.88	<9.17	<5.88	<21	<21
CL1420191	TP11 0.80	<4	<4	<4	<4	<4	<4	83	<4	12.3	33	<5.98	96.1	38.4
CL1420192	TP11 0.35	<4	<4	<4	<4	<4	<4	20	5.17	7.43	23.8	<5.98	28.5	36.5
CL1420194	CBR2 0.40	<5	<5	<5	<5	<5	<5	<15.2	<5	<7.16	<11.16	<7.16	<25	<25
CL1420198	TP10 0.40	<5	<5	<5	<5	<5	<5	<13.8	6.51	<6.52	34.5	<6.52	<23	48

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appropriate, in accordance with the MCERTS standard.

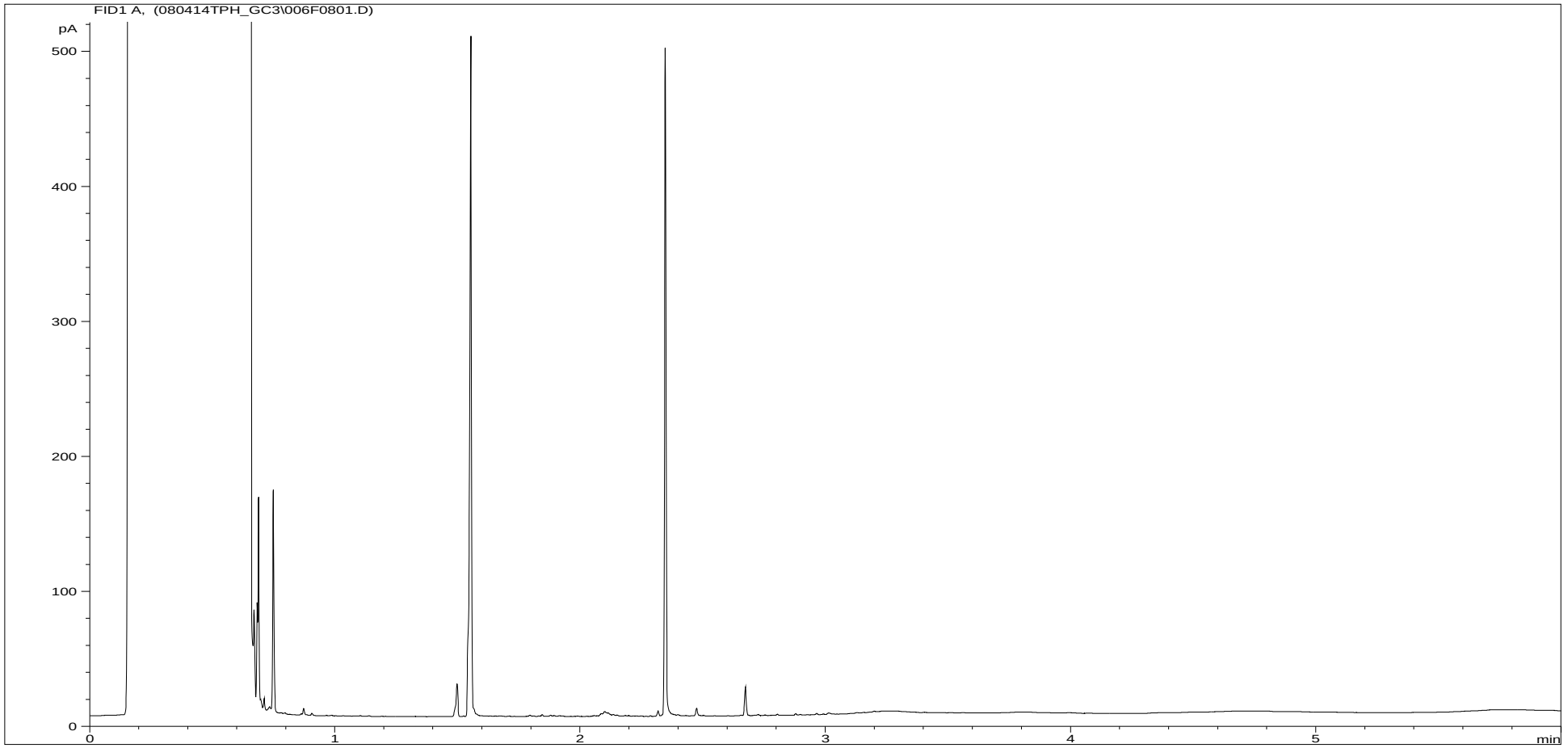
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420186ALI	**Job Number:**	S14_4614M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS5 0.40 (NVM)
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\056B0801.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

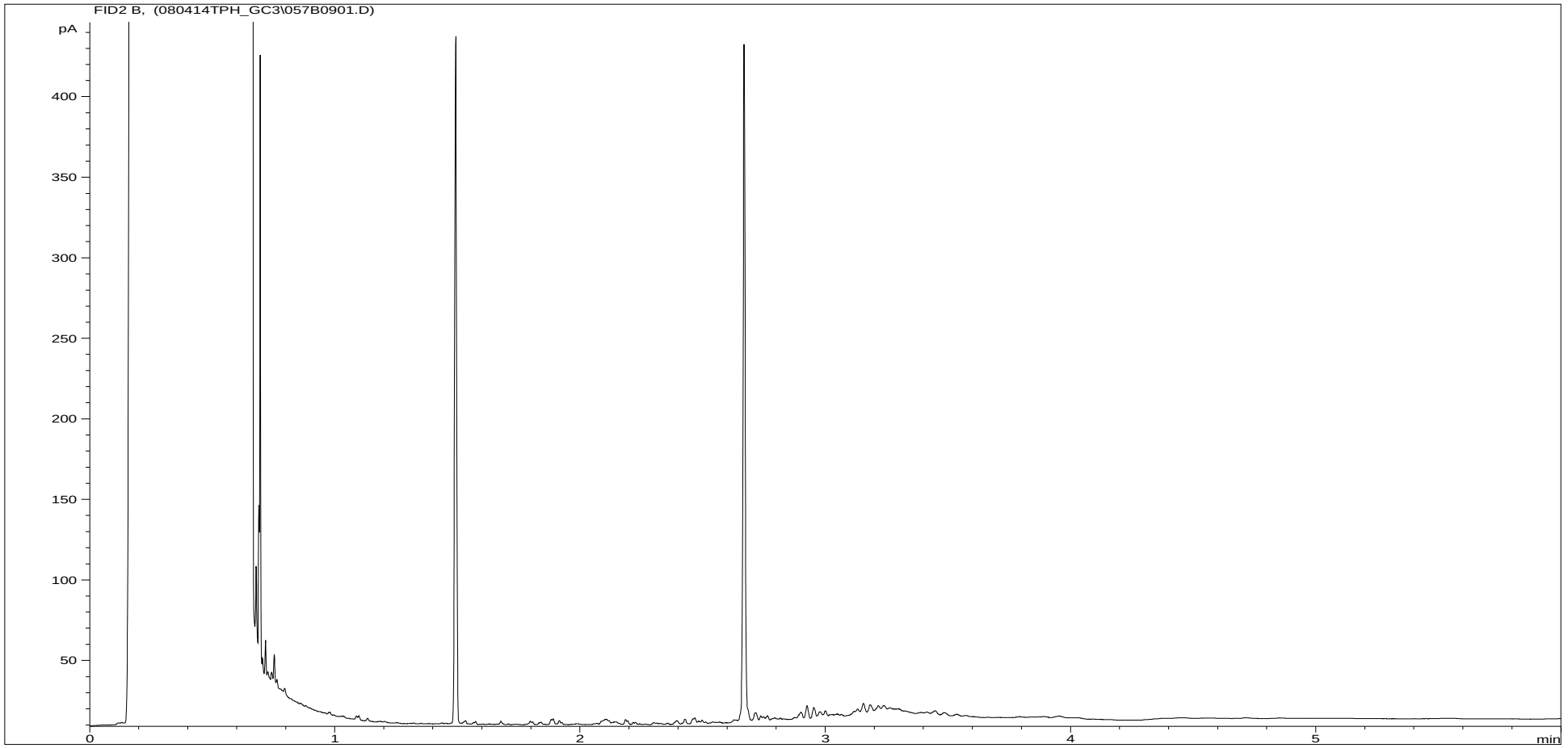
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420186ARO	**Job Number:**	S14_4614M
Multiplier:	11.84	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS5 0.40 (NVM)
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\006F0801.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

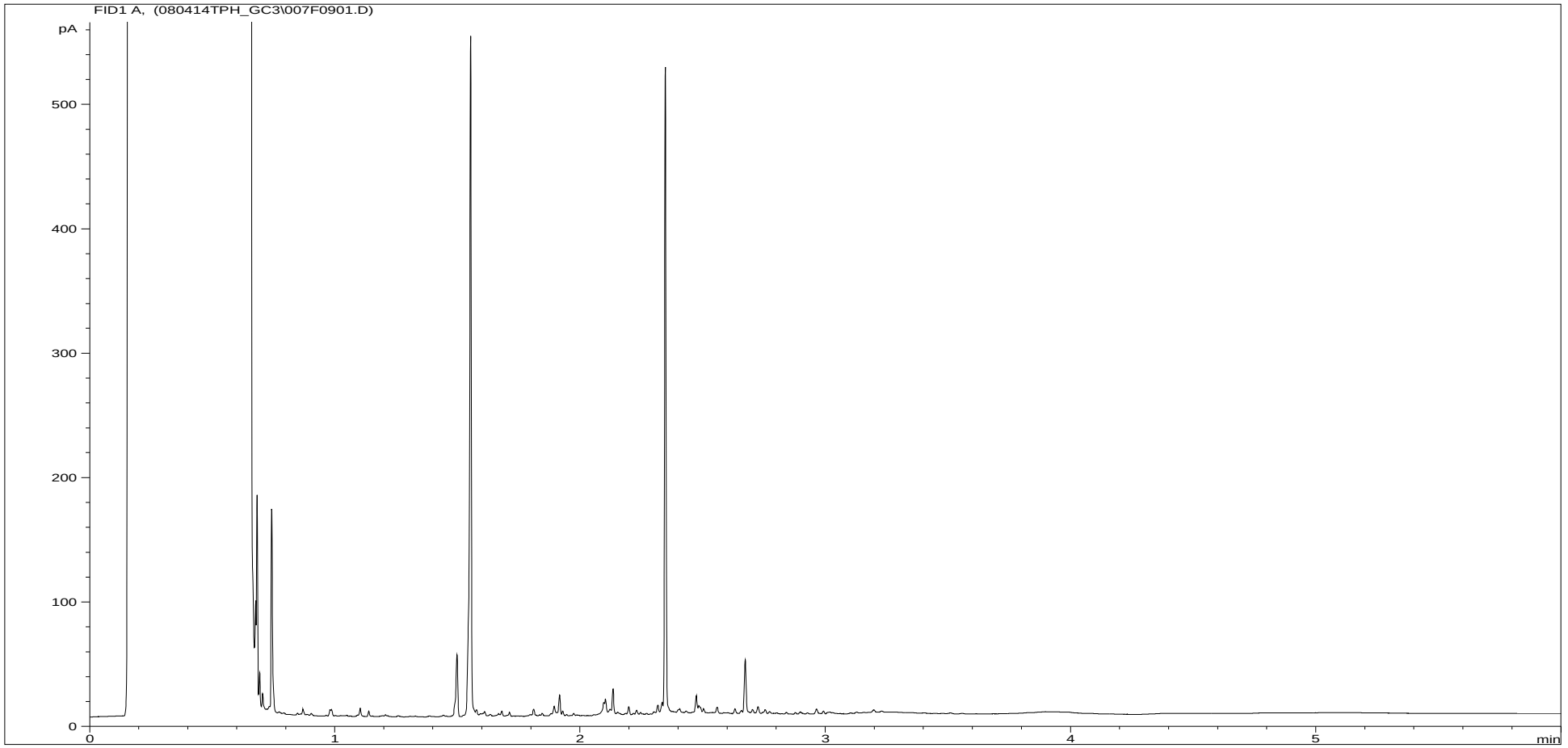
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420188ALI	**Job Number:**	S14_4614M
Multiplier:	15.2	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS4 0.40
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\057B0901.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

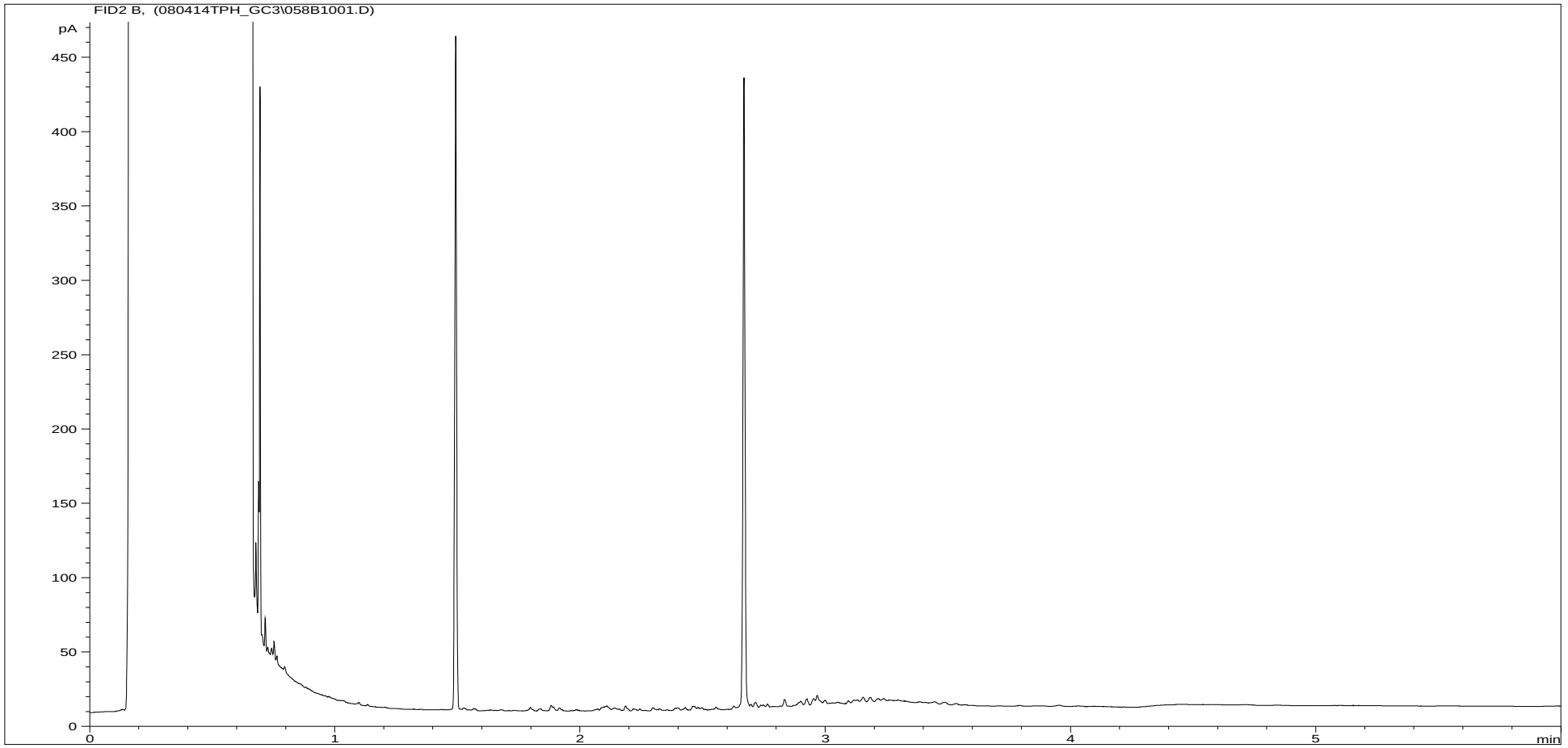
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420188ARO	**Job Number:**	S14_4614M
Multiplier:	11.68	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS4 0.40
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\007F0901.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

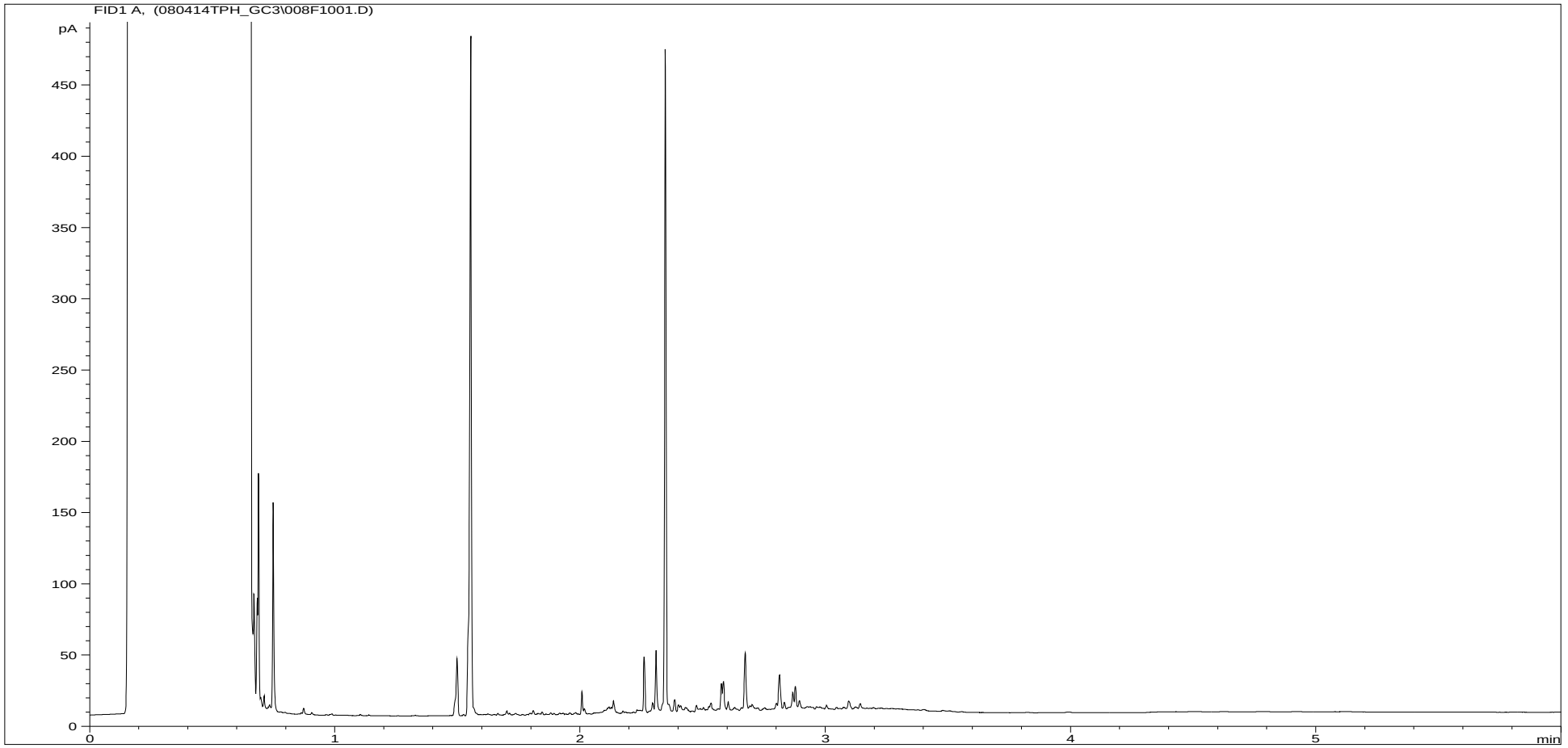
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420189ALI	**Job Number:**	S14_4614M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP11 1.50
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\058B1001.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

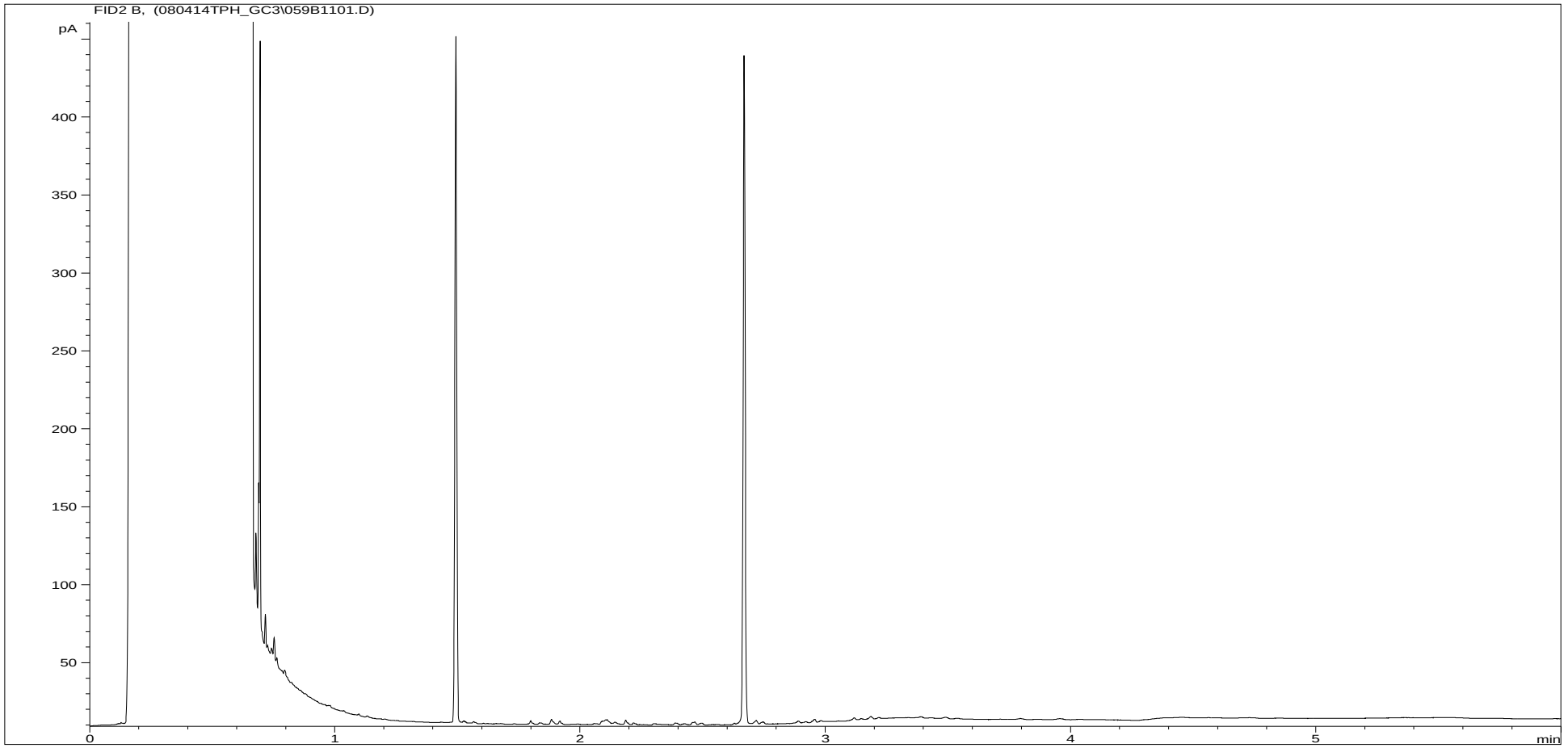
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420189ARO	**Job Number:**	S14_4614M
Multiplier:	11.68	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP11 1.50
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\008F1001.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

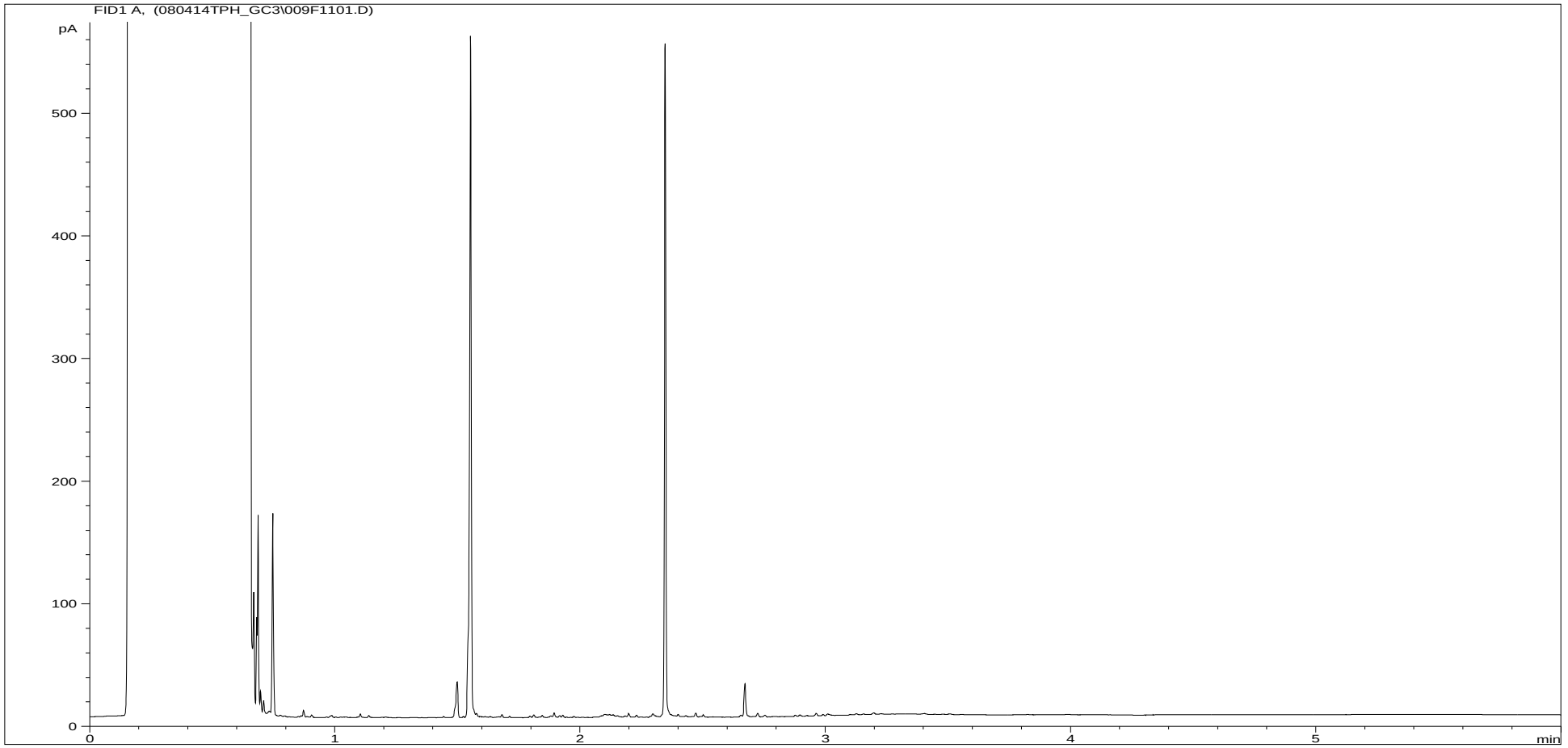
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420190ALI	**Job Number:**	S14_4614M
Multiplier:	15.2	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP11 1.30
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\059B1101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

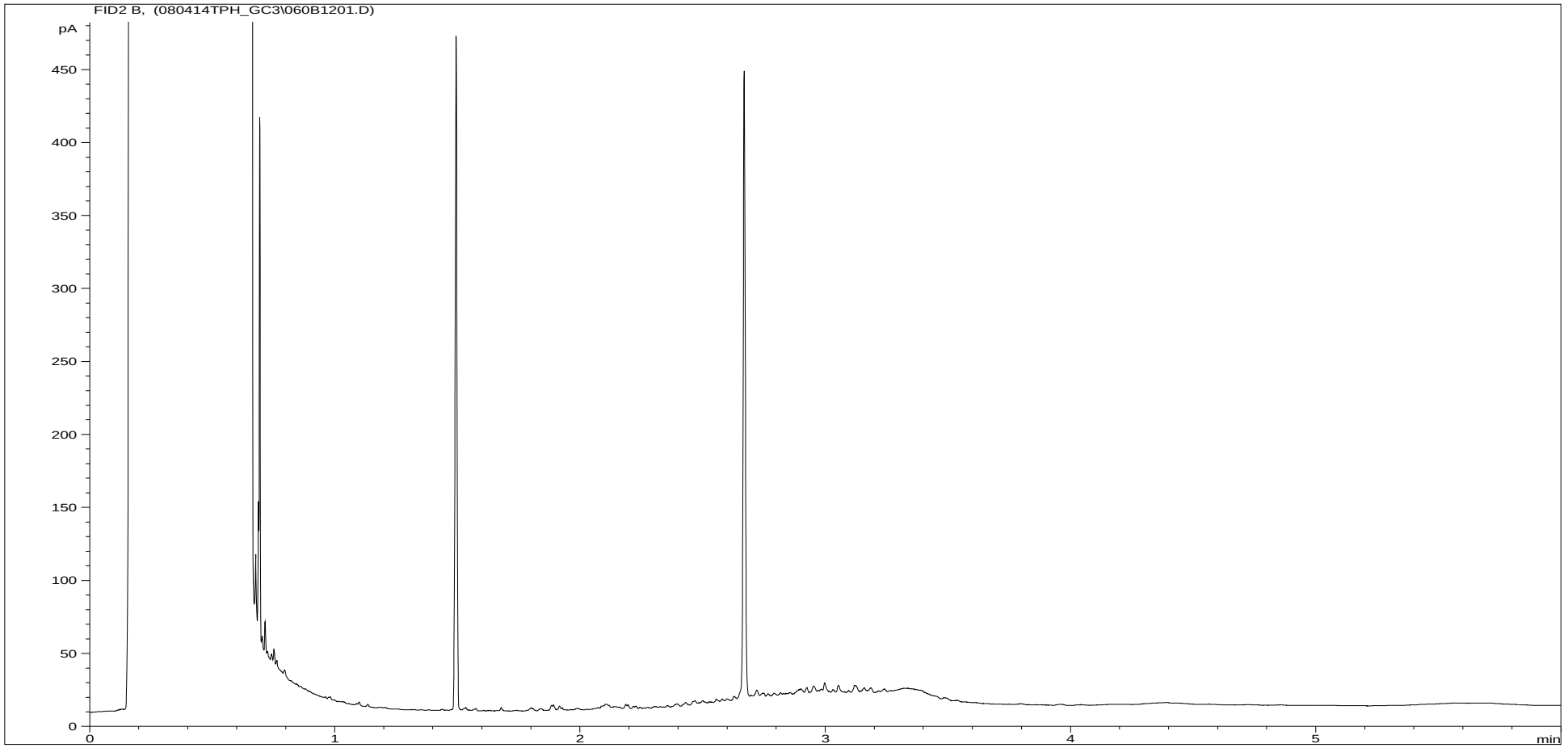
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420190ARO	**Job Number:**	S14_4614M
Multiplier:	11.84	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP11 1.30
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\009F1101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

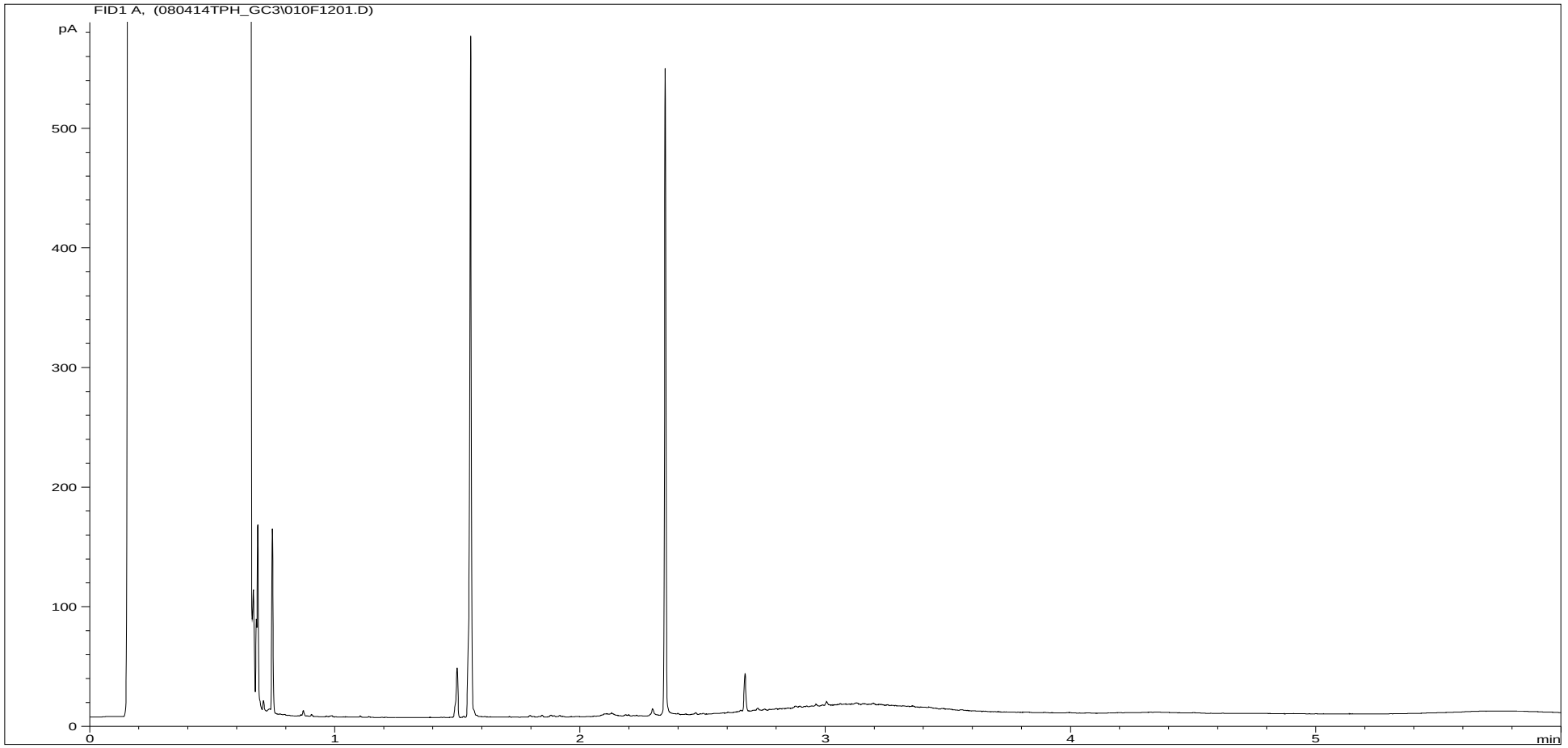
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420191ALI	**Job Number:**	S14_4614M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP11 0.80
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\060B1201.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

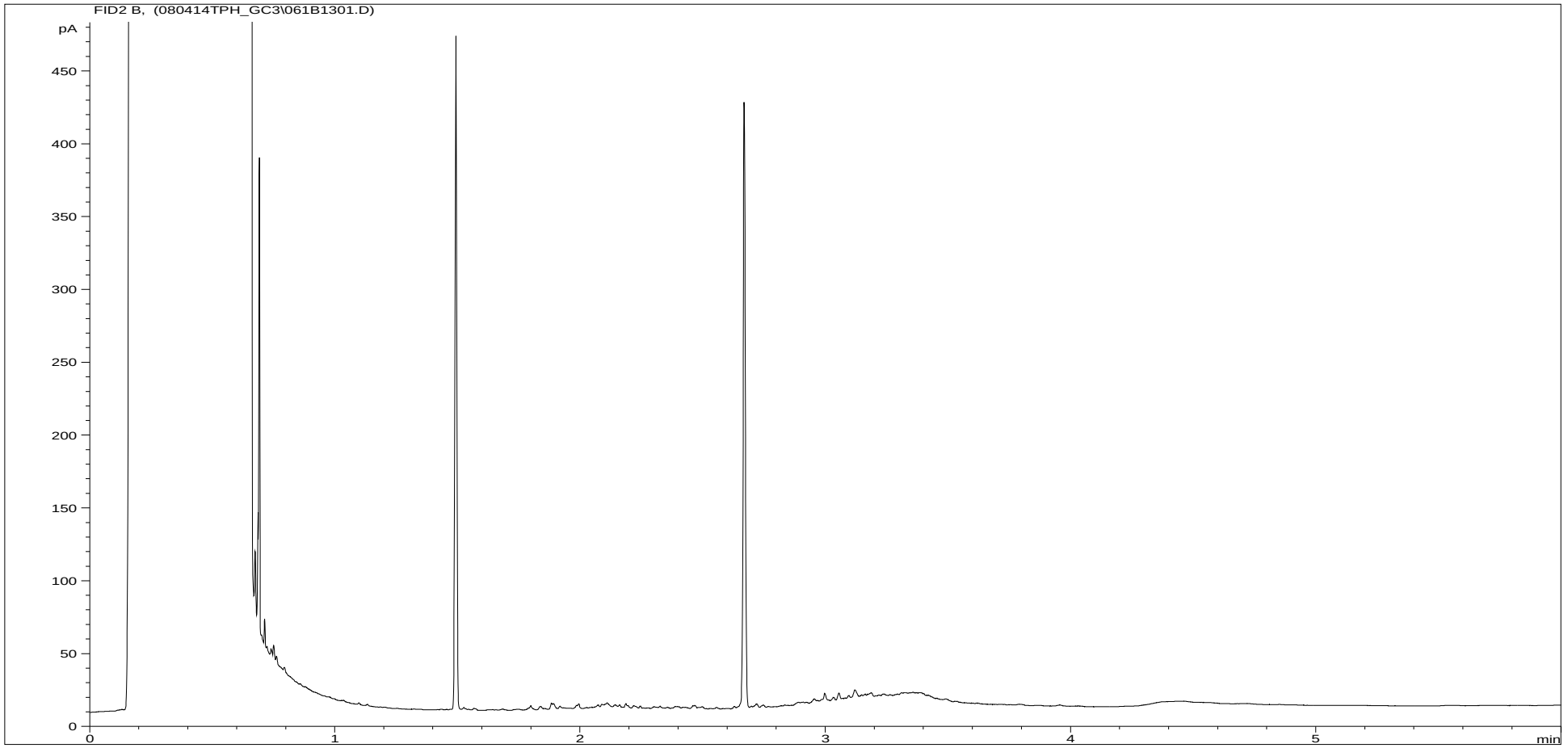
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420191ARO	**Job Number:**	S14_4614M
Multiplier:	11.52	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP11 0.80
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\010F1201.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

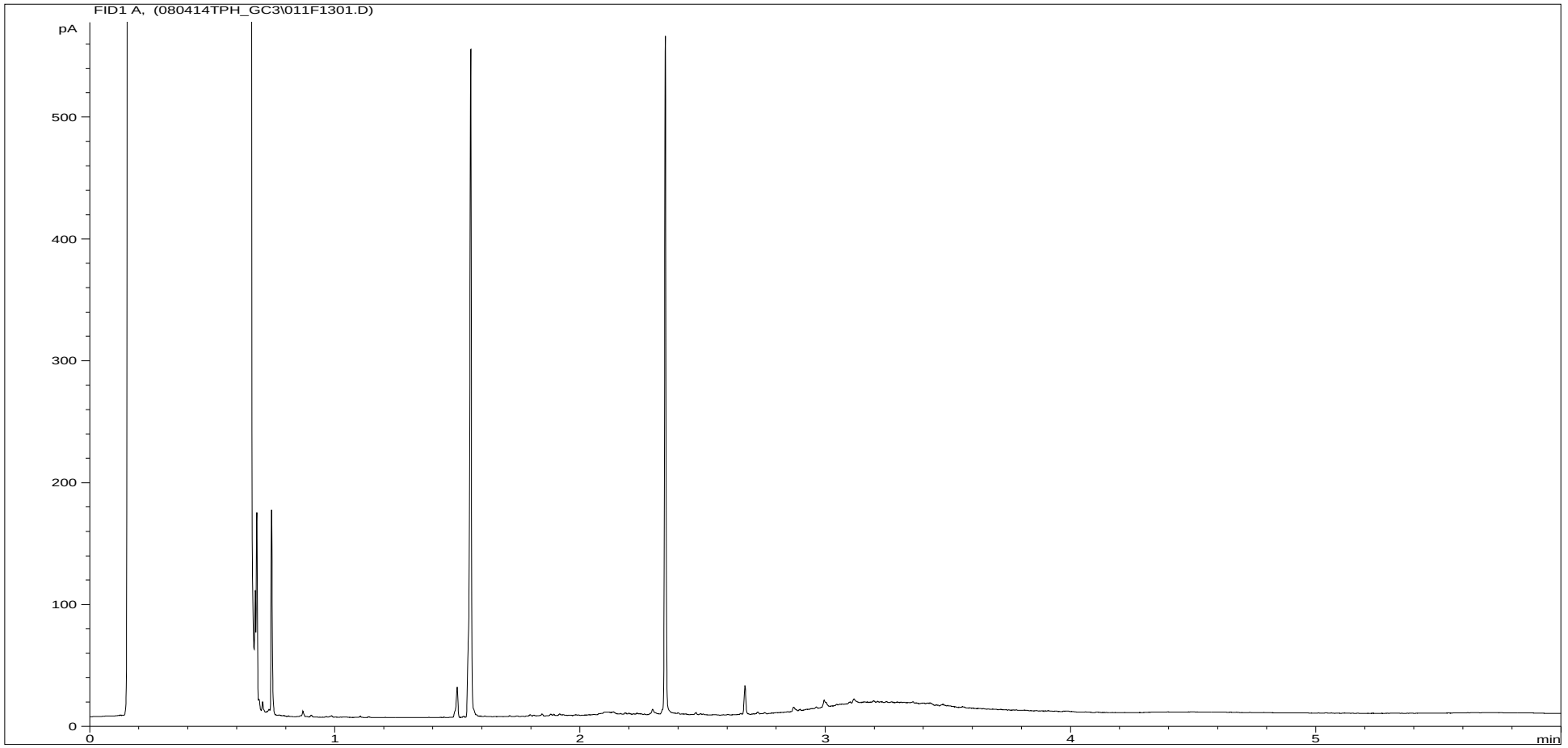
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420192ALI	**Job Number:**	S14_4614M
Multiplier:	15.36	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP11 0.35
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\061B1301.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

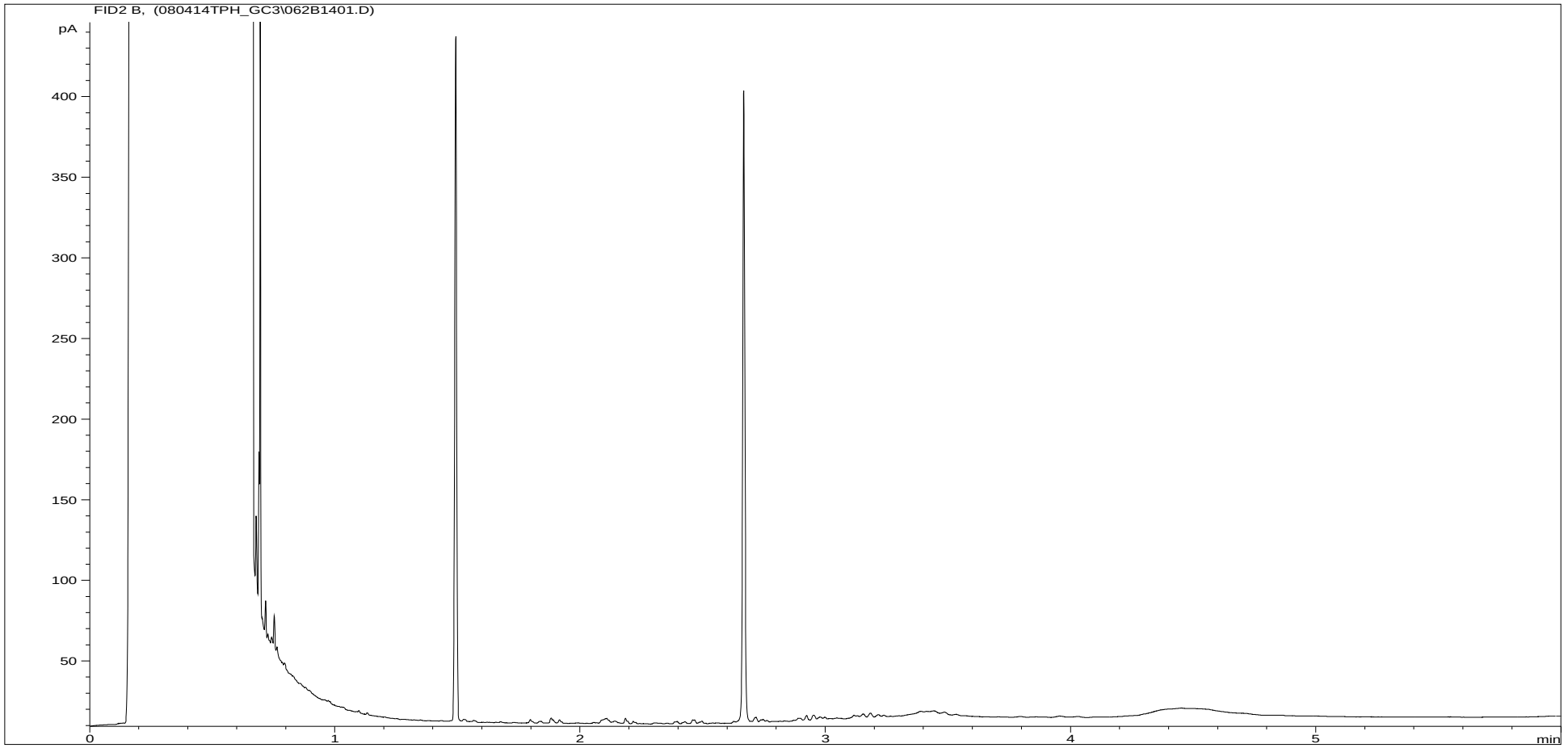
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420192ARO	**Job Number:**	S14_4614M
Multiplier:	12	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP11 0.35
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\011F1301.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

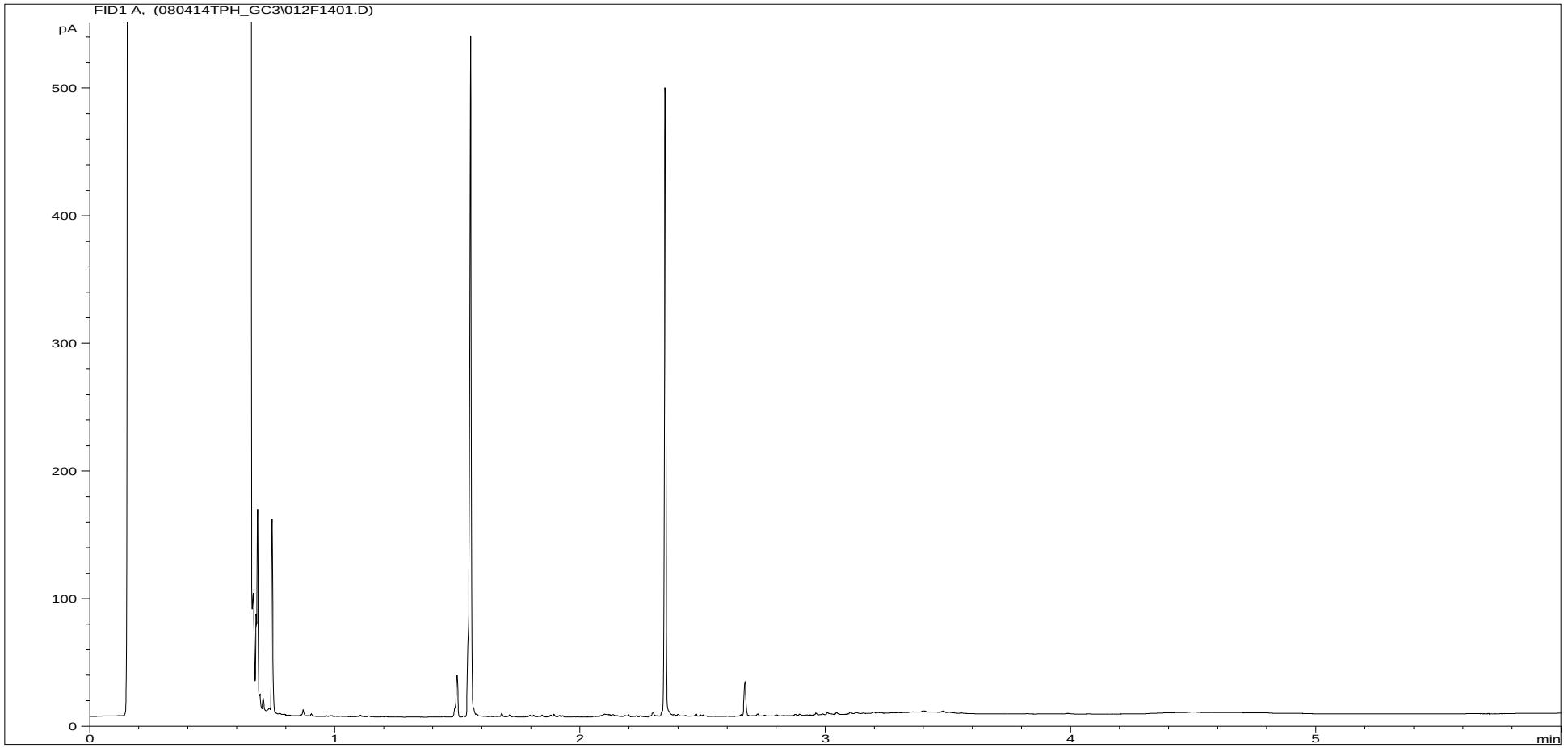
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420194ALI	**Job Number:**	S14_4614M
Multiplier:	15.2	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	CBR2 0.40
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\062B1401.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

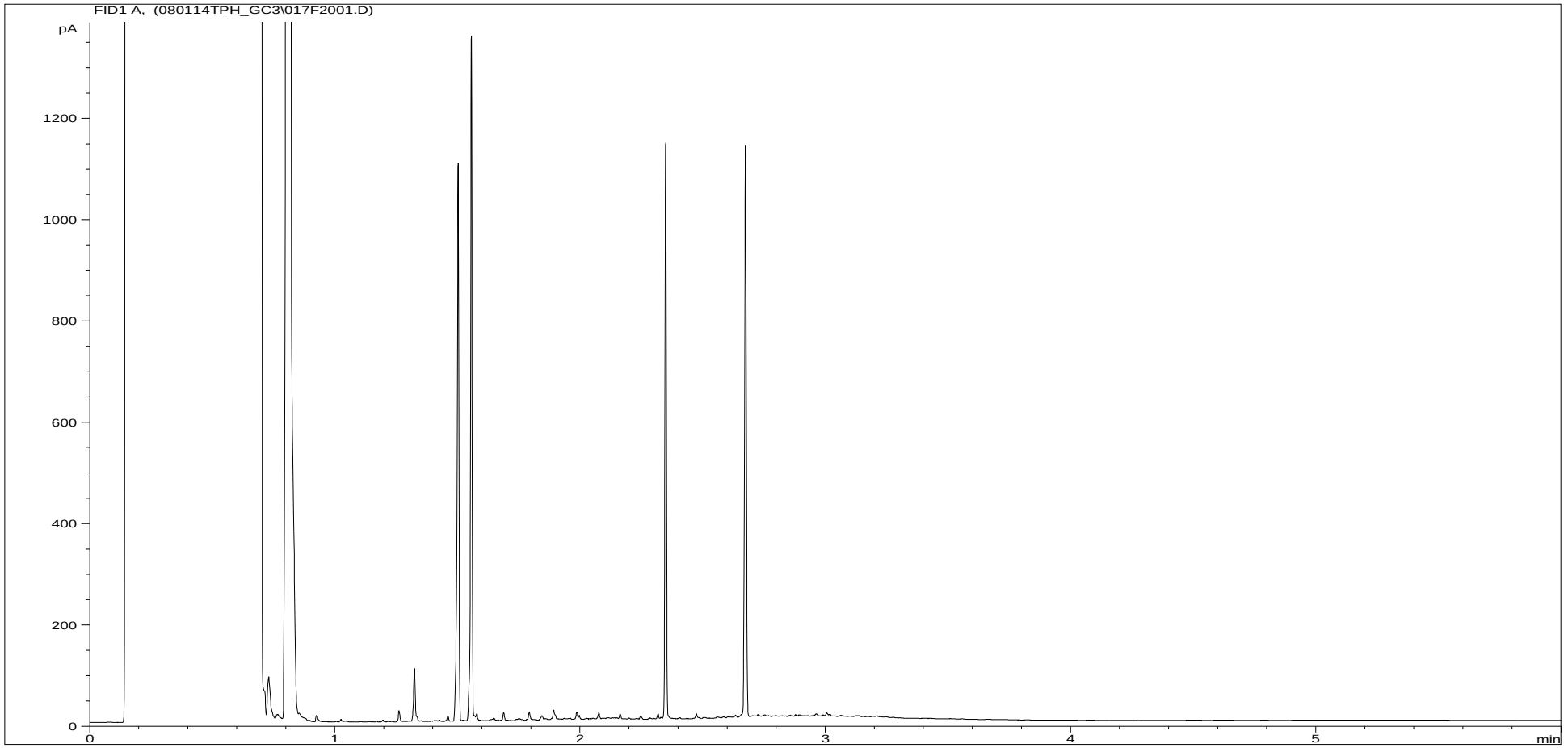
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420194ARO	**Job Number:**	S14_4614M
Multiplier:	11.68	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	CBR2 0.40
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\012F1401.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

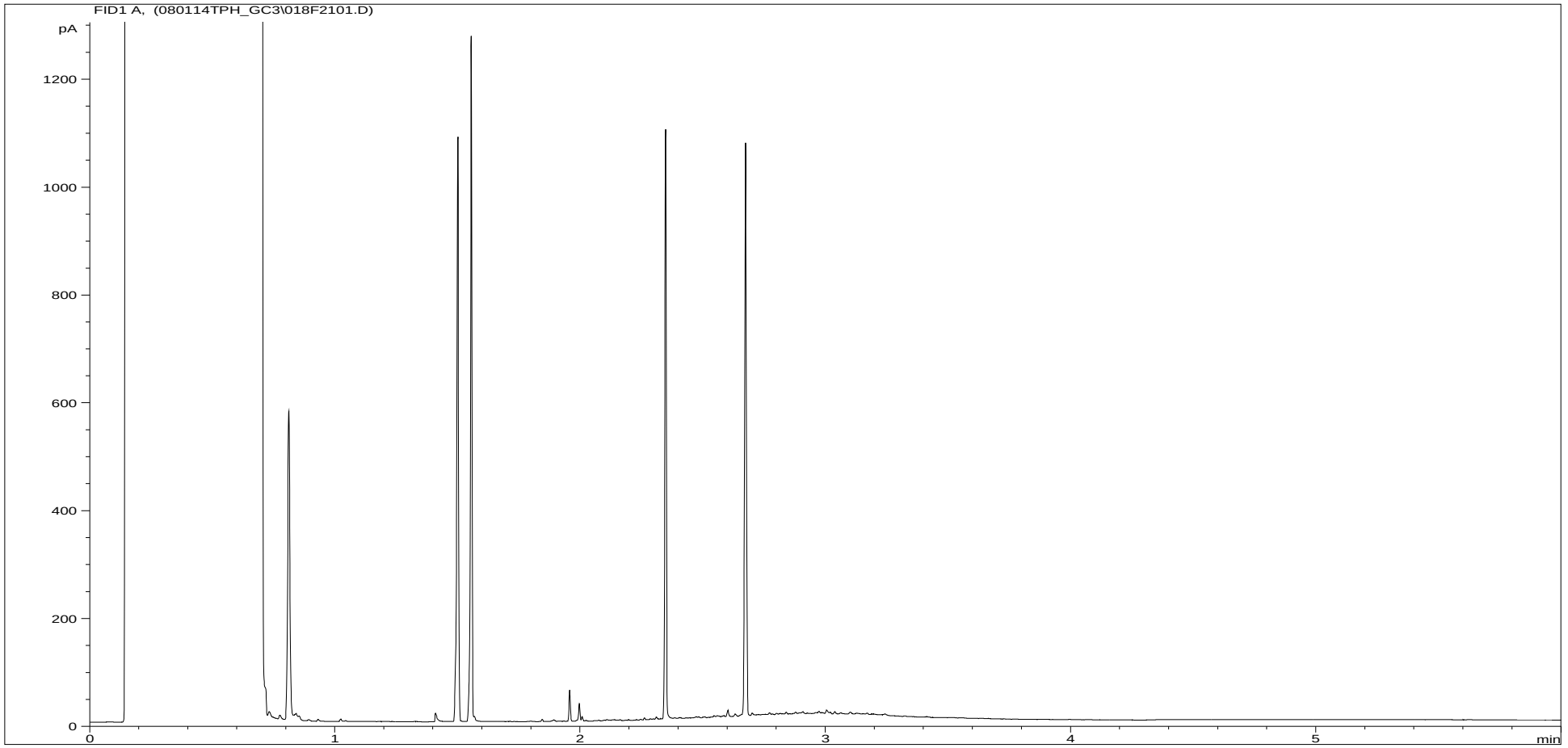
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1420195	**Job Number:**	S14_4614M
Multiplier:	8	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP12 0.40 (NVM)
Acquisition Date/Time:	01-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080114TPH_GC3\017F2001.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

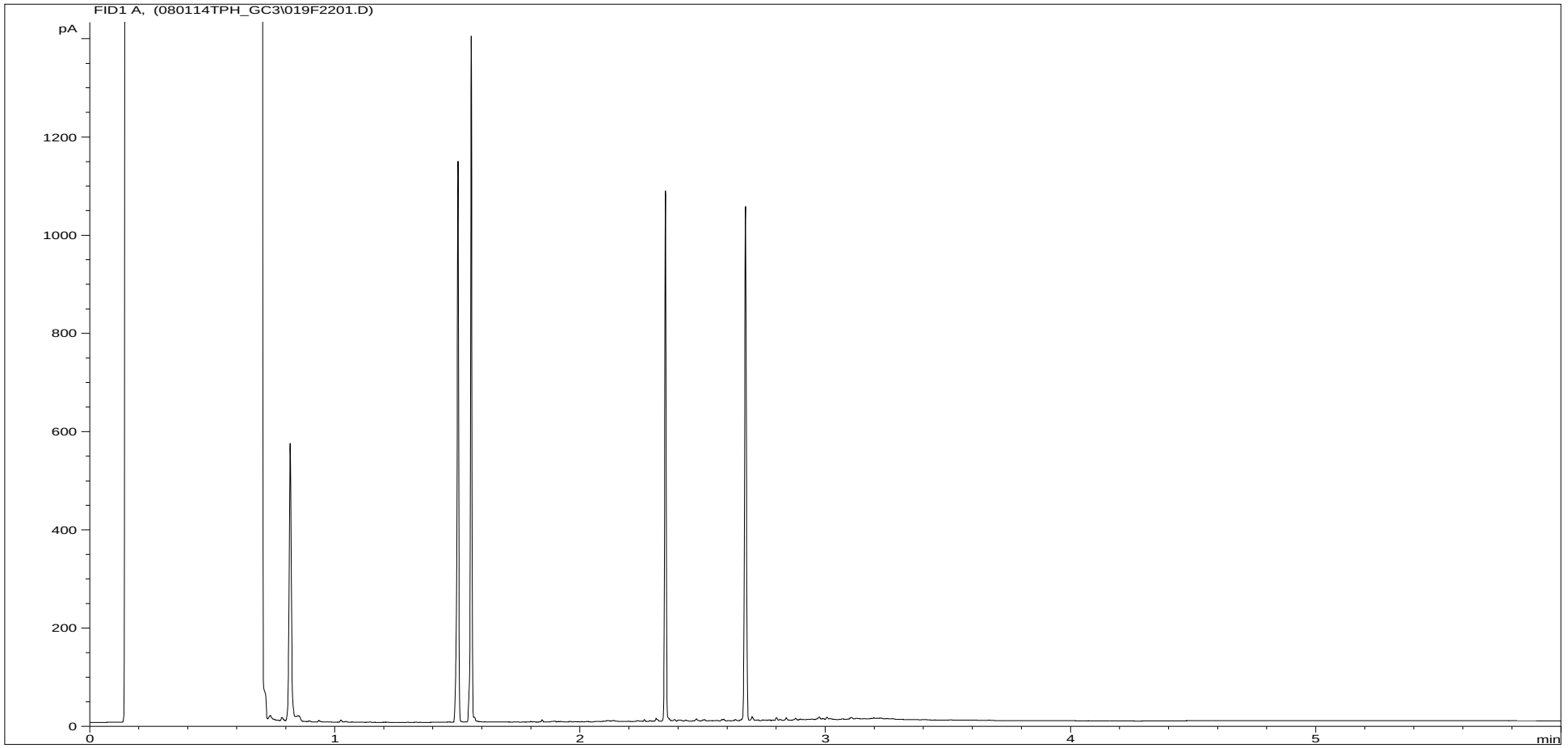
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1420196	**Job Number:**	S14_4614M
Multiplier:	8	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	SP1 CRUSHED
Acquisition Date/Time:	01-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080114TPH_GC3\018F2101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

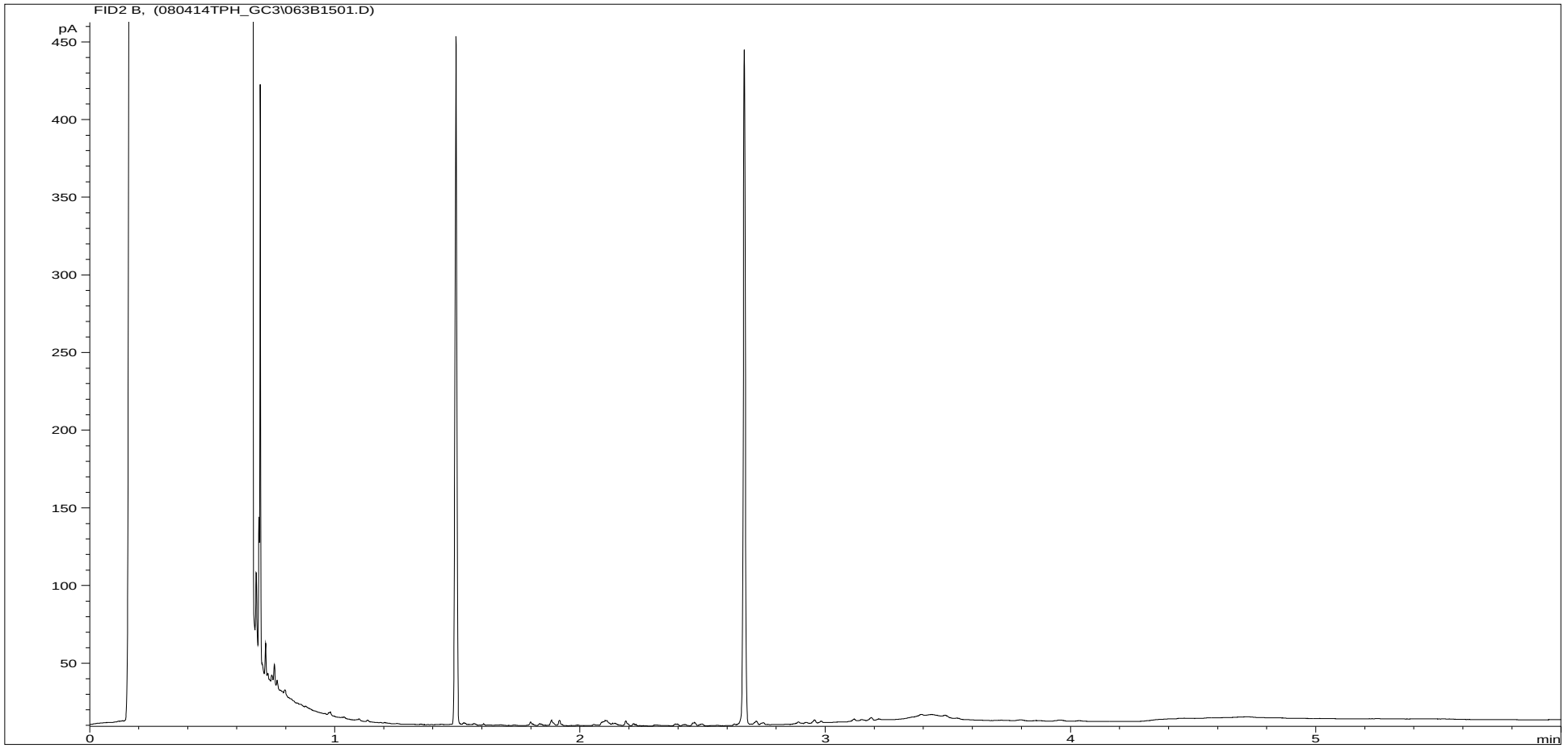
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1420197	**Job Number:**	S14_4614M
Multiplier:	8	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	SOIL BUND 1
Acquisition Date/Time:	01-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080114TPH_GC3\019F2201.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

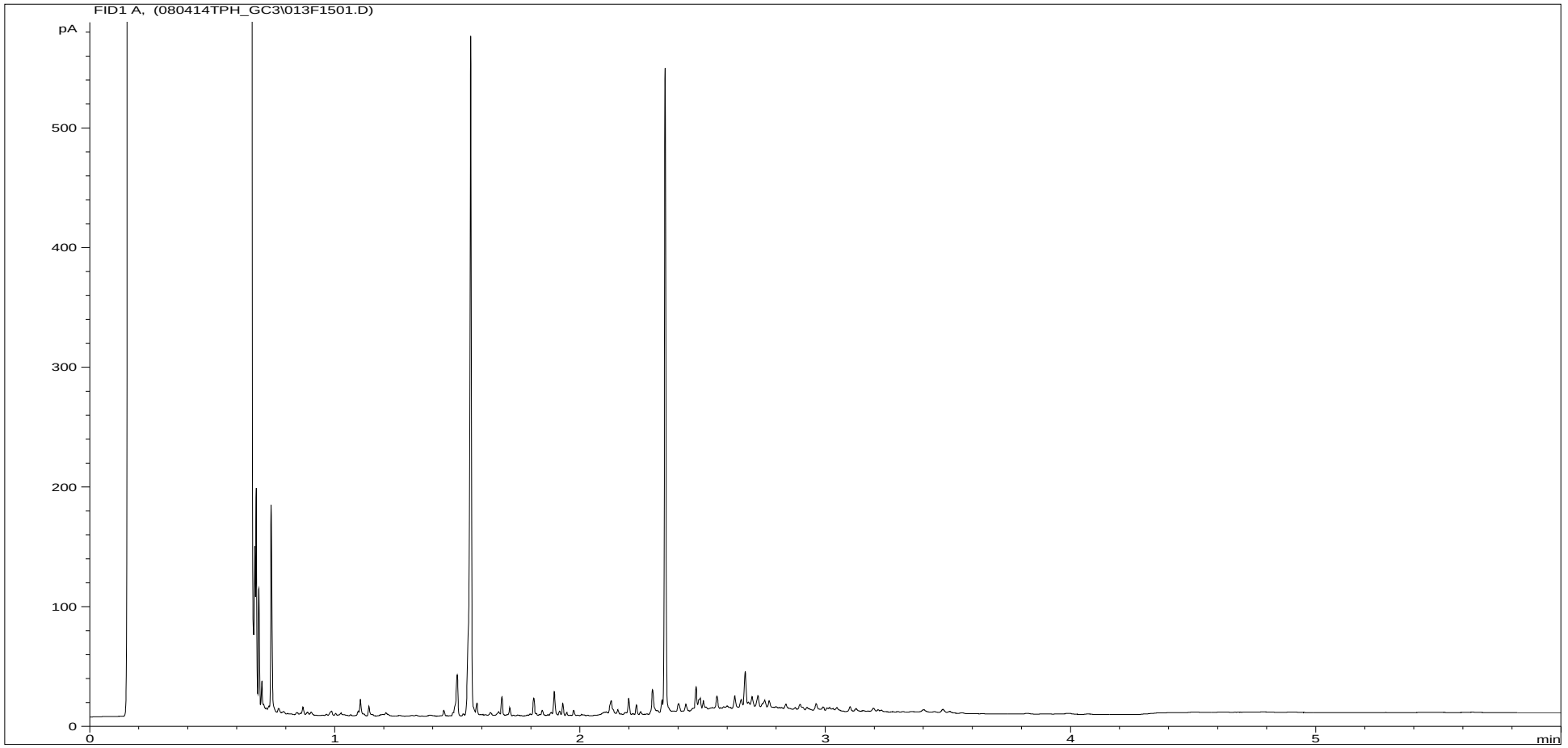
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1420198ALI	**Job Number:**	S14_4614M
Multiplier:	15.2	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP10 0.40
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\063B1501.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1420198ARO	**Job Number:**	S14_4614M
Multiplier:	11.84	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP10 0.40
Acquisition Date/Time:	04-Aug-14		
Datafile:	D:\TES\DATA\Y2013\02\080414TPH_GC3\013F1501.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

Volatile Organic Compounds by HSA-GCMS

Accredited?: Yes

Customer and Site Details:	Waterman EED: Imperial Way	**Directory/Quant file:**	801VOC_MS19\ Initial Calibration	**Matrix:**	Soil
Sample Details:	TP11 1.50	**Date Booked in:**	29-Jul-14	**Method:**	Headspace
LIMS ID Number:	CL1420189	**Date Analysed:**	01-Aug-14	**Multiplier:**	1
Job Number:	S14_4614M	**Operator:**	PR	**Position:**	12

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit	Accr. code
Dichlorodifluoromethane	75-71-8 **	-	< 1	-	N
Chloromethane	74-87-3 *	-	< 3	-	N
Vinyl Chloride	75-01-4	-	< 1	-	UM
Bromomethane	74-83-9	-	< 1	-	UM
Chloroethane	75-00-3	-	< 2	-	UM
Trichlorofluoromethane	75-69-4	-	< 1	-	UM
1,1-Dichloroethene	75-35-48 *	-	< 1	-	N
trans 1,2-Dichloroethene	156-60-5	-	< 1	-	UM
1,1-Dichloroethane	75-34-3	-	< 1	-	UM
MTBE	1634-04-4	-	< 1	-	UM
2,2-Dichloropropane	594-20-7	-	< 1	-	UM
cis 1,2-Dichloroethene	156-59-2	-	< 6	-	UM
Bromochloromethane	74-97-5	-	< 1	-	UM
Chloroform	67-66-3	-	< 1	-	UM
1,1,1-Trichloroethane	71-55-6	-	< 1	-	UM
Carbon Tetrachloride	56-23-5	-	< 1	-	UM
1,1-Dichloropropene	563-58-6	-	< 1	-	UM
Benzene	71-43-2	-	< 1	-	UM
1,2-Dichloroethane	107-06-2	-	< 1	-	UM
Trichloroethene	79-01-6	-	< 1	-	UM
1,2-Dichloropropane	78-87-5	-	< 1	-	UM
Dibromomethane	74-95-3	-	< 1	-	UM
Bromodichloromethane	75-27-4	-	< 1	-	UM
cis 1,3-Dichloropropene	10061-01-5	-	< 1	-	UM
Toluene	108-88-3	-	< 6	-	UM
trans 1,3-Dichloropropene	10061-02-6	-	< 1	-	UM
1,1,2-Trichloroethane	79-00-5	-	< 1	-	UM
Tetrachloroethene	127-18-4	-	< 3	-	UM
1,3-Dichloropropane	142-28-9	-	< 1	-	UM
Dibromochloromethane	124-48-1	-	< 1	-	UM
1,2-Dibromoethane	106-93-4	-	< 1	-	UM
Chlorobenzene	108-90-7	-	< 1	-	UM
Ethylbenzene	100-41-4	-	< 2	-	UM
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-	UM
m and p-Xylene	108-38-3/106-42-3	-	< 5	-	UM

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit	Accr. code
o-Xylene	95-47-6	-	< 2	-	UM
Styrene	100-42-5	-	< 1	-	UM
Bromoform	75-25-2	-	< 1	-	UM
iso-Propylbenzene	98-82-8	-	< 1	-	UM
1,1,2,2-Tetrachloroethane	79-34-5 **	-	< 1	-	N
Propylbenzene	103-65-1	-	< 1	-	UM
Bromobenzene	108-86-1	-	< 1	-	UM
1,2,3-Trichloropropane	96-18-4	-	< 1	-	UM
2-Chlorotoluene	95-49-8	-	< 1	-	UM
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-	UM
4-Chlorotoluene	106-43-4	-	< 1	-	UM
tert-Butylbenzene	98-06-6	-	< 1	-	UM
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-	UM
sec-Butylbenzene	135-98-8	-	< 1	-	UM
p-Isopropyltoluene	99-87-6	-	< 1	-	UM
1,3-Dichlorobenzene	541-73-1	-	< 1	-	UM
1,4-Dichlorobenzene	106-46-7	-	< 1	-	UM
n-Butylbenzene	104-51-8 *	-	< 1	-	N
1,2-Dichlorobenzene	95-50-1	-	< 1	-	UM
1,2-Dibromo-3-chloropropane	96-12-8	-	< 1	-	UM
1,2,4-Trichlorobenzene	120-82-1 *	-	< 3	-	N
Hexachlorobutadiene	87-68-3 **	-	< 2	-	N
Naphthalene	91-20-3	-	< 6	-	UM
1,2,3-Trichlorobenzene	87-61-6	-	< 3	-	UM

Concentrations are reported on a dry weight basis
Compounds marked ** are not UKAS or Mcerts accredited
"M" denotes that % fit has been manually interpreted
This analysis was conducted on an 'As Recieved' basis.

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	4.11	96	Dibromofluoromethane	107
1,4-Difluorobenzene	4.45	99	Toluene-d8	100
Chlorobenzene-d5	5.56	96		
Bromofluorobenzene	5.96	95		
1,4-Dichlorobenzene-d4	6.35	93		
Naphthalene-d8	7.22	74		

Note: Volatile compounds degrade with time, and this may affect the integrity of the data depending on the timescale between sampling and analysis. It is recommended that analysis takes place within 7 days of sampling.

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appropriate, in accordance with the MCERTS standard.

Volatile Organic Compounds by HSA-GCMS

Accredited?: Yes

Customer and Site Details:	Waterman EED: Imperial Way	**Directory/Quant file:**	801VOC_MS19\ Initial Calibration	**Matrix:**	Soil
Sample Details:	TP11 1.30	**Date Booked in:**	29-Jul-14	**Method:**	Headspace
LIMS ID Number:	CL1420190	**Date Analysed:**	01-Aug-14	**Multiplier:**	1
Job Number:	S14_4614M	**Operator:**	PR	**Position:**	13

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit	Accr. code
Dichlorodifluoromethane	75-71-8 **	-	< 1	-	N
Chloromethane	74-87-3 *	-	< 3	-	N
Vinyl Chloride	75-01-4	-	< 1	-	UM
Bromomethane	74-83-9	-	< 1	-	UM
Chloroethane	75-00-3	-	< 2	-	UM
Trichlorofluoromethane	75-69-4	-	< 1	-	UM
1,1-Dichloroethene	75-35-48 *	-	< 1	-	N
trans 1,2-Dichloroethene	156-60-5	-	< 1	-	UM
1,1-Dichloroethane	75-34-3	-	< 1	-	UM
MTBE	1634-04-4	-	< 1	-	UM
2,2-Dichloropropane	594-20-7	-	< 1	-	UM
cis 1,2-Dichloroethene	156-59-2	-	< 5	-	UM
Bromochloromethane	74-97-5	-	< 1	-	UM
Chloroform	67-66-3	-	< 1	-	UM
1,1,1-Trichloroethane	71-55-6	-	< 1	-	UM
Carbon Tetrachloride	56-23-5	-	< 1	-	UM
1,1-Dichloropropene	563-58-6	-	< 1	-	UM
Benzene	71-43-2	-	< 1	-	UM
1,2-Dichloroethane	107-06-2	-	< 1	-	UM
Trichloroethene	79-01-6	-	< 1	-	UM
1,2-Dichloropropane	78-87-5	-	< 1	-	UM
Dibromomethane	74-95-3	-	< 1	-	UM
Bromodichloromethane	75-27-4	-	< 1	-	UM
cis 1,3-Dichloropropene	10061-01-5	-	< 1	-	UM
Toluene	108-88-3	-	< 5	-	UM
trans 1,3-Dichloropropene	10061-02-6	-	< 1	-	UM
1,1,2-Trichloroethane	79-00-5	-	< 1	-	UM
Tetrachloroethene	127-18-4	-	< 3	-	UM
1,3-Dichloropropane	142-28-9	-	< 1	-	UM
Dibromochloromethane	124-48-1	-	< 1	-	UM
1,2-Dibromoethane	106-93-4	-	< 1	-	UM
Chlorobenzene	108-90-7	-	< 1	-	UM
Ethylbenzene	100-41-4	-	< 2	-	UM
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-	UM
m and p-Xylene	108-38-3/106-42-3	-	< 4	-	UM

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit	Accr. code
o-Xylene	95-47-6	-	< 2	-	UM
Styrene	100-42-5	-	< 1	-	UM
Bromoform	75-25-2	-	< 1	-	UM
iso-Propylbenzene	98-82-8	-	< 1	-	UM
1,1,2,2-Tetrachloroethane	79-34-5 **	-	< 1	-	N
Propylbenzene	103-65-1	-	< 1	-	UM
Bromobenzene	108-86-1	-	< 1	-	UM
1,2,3-Trichloropropane	96-18-4	-	< 1	-	UM
2-Chlorotoluene	95-49-8	-	< 1	-	UM
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-	UM
4-Chlorotoluene	106-43-4	-	< 1	-	UM
tert-Butylbenzene	98-06-6	-	< 1	-	UM
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-	UM
sec-Butylbenzene	135-98-8	-	< 1	-	UM
p-Isopropyltoluene	99-87-6	-	< 1	-	UM
1,3-Dichlorobenzene	541-73-1	-	< 1	-	UM
1,4-Dichlorobenzene	106-46-7	-	< 1	-	UM
n-Butylbenzene	104-51-8 *	-	< 1	-	N
1,2-Dichlorobenzene	95-50-1	-	< 1	-	UM
1,2-Dibromo-3-chloropropane	96-12-8	-	< 1	-	UM
1,2,4-Trichlorobenzene	120-82-1 *	-	< 3	-	N
Hexachlorobutadiene	87-68-3 **	-	< 2	-	N
Naphthalene	91-20-3	-	< 5	-	UM
1,2,3-Trichlorobenzene	87-61-6	-	< 3	-	UM

Concentrations are reported on a dry weight basis
Compounds marked ** are not UKAS or Mcerts accredited
"M" denotes that % fit has been manually interpreted
This analysis was conducted on an 'As Recieved' basis.

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	4.11	103	Dibromofluoromethane	83
1,4-Difluorobenzene	4.45	103	Toluene-d8	99
Chlorobenzene-d5	5.56	102		
Bromofluorobenzene	5.96	100		
1,4-Dichlorobenzene-d4	6.36	100		
Naphthalene-d8	7.22	97		

Note: Volatile compounds degrade with time, and this may affect the integrity of the data depending on the timescale between sampling and analysis. It is recommended that analysis takes place within 7 days of sampling.

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appropriate, in accordance with the MCERTS standard.

Volatile Organic Compounds by HSA-GCMS

Accredited?: Yes

Customer and Site Details: Waterman EED: Imperial Way
Sample Details: TP11 0.80
LIMS ID Number: CL1420191
Job Number: S14_4614M

Directory/Quant file: 801VOC_MS19\ Initial Calibration
Date Booked in: 29-Jul-14
Date Analysed: 01-Aug-14
Operator: PR

Matrix: Soil
Method: Headspace
Multiplier: 1
Position: 14

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit	Accr. code
Dichlorodifluoromethane	75-71-8 **	-	< 1	-	N
Chloromethane	74-87-3 *	-	< 3	-	N
Vinyl Chloride	75-01-4	-	< 1	-	UM
Bromomethane	74-83-9	-	< 1	-	UM
Chloroethane	75-00-3	-	< 2	-	UM
Trichlorofluoromethane	75-69-4	-	< 1	-	UM
1,1-Dichloroethene	75-35-48 *	-	< 1	-	N
trans 1,2-Dichloroethene	156-60-5	-	< 1	-	UM
1,1-Dichloroethane	75-34-3	-	< 1	-	UM
MTBE	1634-04-4	-	< 1	-	UM
2,2-Dichloropropane	594-20-7	-	< 1	-	UM
cis 1,2-Dichloroethene	156-59-2	-	< 5	-	UM
Bromochloromethane	74-97-5	-	< 1	-	UM
Chloroform	67-66-3	-	< 1	-	UM
1,1,1-Trichloroethane	71-55-6	-	< 1	-	UM
Carbon Tetrachloride	56-23-5	-	< 1	-	UM
1,1-Dichloropropene	563-58-6	-	< 1	-	UM
Benzene	71-43-2	-	< 1	-	UM
1,2-Dichloroethane	107-06-2	-	< 1	-	UM
Trichloroethene	79-01-6	-	< 1	-	UM
1,2-Dichloropropane	78-87-5	-	< 1	-	UM
Dibromomethane	74-95-3	-	< 1	-	UM
Bromodichloromethane	75-27-4	-	< 1	-	UM
cis 1,3-Dichloropropene	10061-01-5	-	< 1	-	UM
Toluene	108-88-3	-	< 5	-	UM
trans 1,3-Dichloropropene	10061-02-6	-	< 1	-	UM
1,1,2-Trichloroethane	79-00-5	-	< 1	-	UM
Tetrachloroethene	127-18-4	-	< 3	-	UM
1,3-Dichloropropane	142-28-9	-	< 1	-	UM
Dibromochloromethane	124-48-1	-	< 1	-	UM
1,2-Dibromoethane	106-93-4	-	< 1	-	UM
Chlorobenzene	108-90-7	-	< 1	-	UM
Ethylbenzene	100-41-4	-	< 2	-	UM
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-	UM
m and p-Xylene	108-38-3/106-42-3	-	< 4	-	UM

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit	Accr. code
o-Xylene	95-47-6	-	< 2	-	UM
Styrene	100-42-5	-	< 1	-	UM
Bromoform	75-25-2	-	< 1	-	UM
iso-Propylbenzene	98-82-8	-	< 1	-	UM
1,1,2,2-Tetrachloroethane	79-34-5 **	-	< 1	-	N
Propylbenzene	103-65-1	-	< 1	-	UM
Bromobenzene	108-86-1	-	< 1	-	UM
1,2,3-Trichloropropane	96-18-4	-	< 1	-	UM
2-Chlorotoluene	95-49-8	-	< 1	-	UM
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-	UM
4-Chlorotoluene	106-43-4	-	< 1	-	UM
tert-Butylbenzene	98-06-6	-	< 1	-	UM
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-	UM
sec-Butylbenzene	135-98-8	-	< 1	-	UM
p-Isopropyltoluene	99-87-6	-	< 1	-	UM
1,3-Dichlorobenzene	541-73-1	-	< 1	-	UM
1,4-Dichlorobenzene	106-46-7	-	< 1	-	UM
n-Butylbenzene	104-51-8 *	-	< 1	-	N
1,2-Dichlorobenzene	95-50-1	-	< 1	-	UM
1,2-Dibromo-3-chloropropane	96-12-8	-	< 1	-	UM
1,2,4-Trichlorobenzene	120-82-1 *	-	< 3	-	N
Hexachlorobutadiene	87-68-3 **	-	< 2	-	N
Naphthalene	91-20-3	-	< 5	-	UM
1,2,3-Trichlorobenzene	87-61-6	-	< 3	-	UM

Concentrations are reported on a dry weight basis
Compounds marked ** are not UKAS or Mcerts accredited
"M" denotes that % fit has been manually interpreted
This analysis was conducted on an 'As Recieved' basis.

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	4.11	101	Dibromofluoromethane	88
1,4-Difluorobenzene	4.45	102	Toluene-d8	100
Chlorobenzene-d5	5.56	100		
Bromofluorobenzene	5.96	102		
1,4-Dichlorobenzene-d4	6.36	96		
Naphthalene-d8	7.22	90		

Note: Volatile compounds degrade with time, and this may affect the integrity of the data depending on the timescale between sampling and analysis. It is recommended that analysis takes place within 7 days of sampling.

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appropriate, in accordance with the MCERTS standard.

Volatile Organic Compounds by HSA-GCMS

Accredited?: Yes

Customer and Site Details:	Waterman EED: Imperial Way	**Directory/Quant file:**	801VOC_MS19\ Initial Calibration	**Matrix:**	Soil
Sample Details:	TP11 0.35	**Date Booked in:**	29-Jul-14	**Method:**	Headspace
LIMS ID Number:	CL1420192	**Date Analysed:**	01-Aug-14	**Multiplier:**	1
Job Number:	S14_4614M	**Operator:**	PR	**Position:**	15

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit	Accr. code
Dichlorodifluoromethane	75-71-8 **	-	< 1	-	N
Chloromethane	74-87-3 *	-	< 3	-	N
Vinyl Chloride	75-01-4	-	< 1	-	UM
Bromomethane	74-83-9	-	< 1	-	UM
Chloroethane	75-00-3	-	< 2	-	UM
Trichlorofluoromethane	75-69-4	-	< 1	-	UM
1,1-Dichloroethene	75-35-48 *	-	< 1	-	N
trans 1,2-Dichloroethene	156-60-5	-	< 1	-	UM
1,1-Dichloroethane	75-34-3	-	< 1	-	UM
MTBE	1634-04-4	-	< 1	-	UM
2,2-Dichloropropane	594-20-7	-	< 1	-	UM
cis 1,2-Dichloroethene	156-59-2	-	< 5	-	UM
Bromochloromethane	74-97-5	-	< 1	-	UM
Chloroform	67-66-3	-	< 1	-	UM
1,1,1-Trichloroethane	71-55-6	-	< 1	-	UM
Carbon Tetrachloride	56-23-5	-	< 1	-	UM
1,1-Dichloropropene	563-58-6	-	< 1	-	UM
Benzene	71-43-2	-	< 1	-	UM
1,2-Dichloroethane	107-06-2	-	< 1	-	UM
Trichloroethene	79-01-6	-	< 1	-	UM
1,2-Dichloropropane	78-87-5	-	< 1	-	UM
Dibromomethane	74-95-3	-	< 1	-	UM
Bromodichloromethane	75-27-4	-	< 1	-	UM
cis 1,3-Dichloropropene	10061-01-5	-	< 1	-	UM
Toluene	108-88-3	-	< 5	-	UM
trans 1,3-Dichloropropene	10061-02-6	-	< 1	-	UM
1,1,2-Trichloroethane	79-00-5	-	< 1	-	UM
Tetrachloroethene	127-18-4	-	< 3	-	UM
1,3-Dichloropropane	142-28-9	-	< 1	-	UM
Dibromochloromethane	124-48-1	-	< 1	-	UM
1,2-Dibromoethane	106-93-4	-	< 1	-	UM
Chlorobenzene	108-90-7	-	< 1	-	UM
Ethylbenzene	100-41-4	-	< 2	-	UM
1,1,1,2-Tetrachloroethane	630-20-6	-	< 1	-	UM
m and p-Xylene	108-38-3/106-42-3	-	< 4	-	UM

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit	Accr. code
o-Xylene	95-47-6	-	< 2	-	UM
Styrene	100-42-5	-	< 1	-	UM
Bromoform	75-25-2	-	< 1	-	UM
iso-Propylbenzene	98-82-8	-	< 1	-	UM
1,1,2,2-Tetrachloroethane	79-34-5 **	-	< 1	-	N
Propylbenzene	103-65-1	-	< 1	-	UM
Bromobenzene	108-86-1	-	< 1	-	UM
1,2,3-Trichloropropane	96-18-4	-	< 1	-	UM
2-Chlorotoluene	95-49-8	-	< 1	-	UM
1,3,5-Trimethylbenzene	108-67-8	-	< 1	-	UM
4-Chlorotoluene	106-43-4	-	< 1	-	UM
tert-Butylbenzene	98-06-6	-	< 1	-	UM
1,2,4-Trimethylbenzene	95-63-6	-	< 1	-	UM
sec-Butylbenzene	135-98-8	-	< 1	-	UM
p-Isopropyltoluene	99-87-6	-	< 1	-	UM
1,3-Dichlorobenzene	541-73-1	-	< 1	-	UM
1,4-Dichlorobenzene	106-46-7	-	< 1	-	UM
n-Butylbenzene	104-51-8 *	-	< 1	-	N
1,2-Dichlorobenzene	95-50-1	-	< 1	-	UM
1,2-Dibromo-3-chloropropane	96-12-8	-	< 1	-	UM
1,2,4-Trichlorobenzene	120-82-1 *	-	< 3	-	N
Hexachlorobutadiene	87-68-3 **	-	< 2	-	N
Naphthalene	91-20-3	-	< 5	-	UM
1,2,3-Trichlorobenzene	87-61-6	-	< 3	-	UM

Concentrations are reported on a dry weight basis
Compounds marked ** are not UKAS or Mcerts accredited
"M" denotes that % fit has been manually interpreted
This analysis was conducted on an 'As Recieved' basis.

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	4.11	96	Dibromofluoromethane	88
1,4-Difluorobenzene	4.45	99	Toluene-d8	97
Chlorobenzene-d5	5.56	94		
Bromofluorobenzene	5.96	91		
1,4-Dichlorobenzene-d4	6.36	86		
Naphthalene-d8	7.22	67		

Note: Volatile compounds degrade with time, and this may affect the integrity of the data depending on the timescale between sampling and analysis. It is recommended that analysis takes place within 7 days of sampling.

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appropriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

					Leaching Data	
Client	Waterman EED				Weight of sample (kg)	0.234
Contact	Mr M Amos				Moisture content @ 105℃ (% of Wet Weight)	3.54
					Equivalent Weight based on drying at 105℃ (kg)	0.225
Site	Imperial Way				Volume of water required to carry out 2:1 stage (litres)	0.441
					Fraction of sample above 4 mm %	61.500
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
TP12 0.40		s14_4614M	CL/1420195	13-Aug-14	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	0.43	3	5	6
N	LOI450	Loss on Ignition (%)	1.2			10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
N	TPHFIDUS	Mineral Oil (mg/kg)	60§	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<1.41	100		
N	PHSOIL	pH (pH units)	11.4 §		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	16.12		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	11.8	11.5	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	2230	1090					
U	ICPMSW	Arsenic	0.001	<0.001	0.002	<0.01	0.5	2	25
U	ICPWATVAR	Barium	0.55	0.32	1.1	3.5	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.059	0.034	0.118	0.37	0.5	10	70
U	ICPMSW	Copper	0.008	0.003	0.016	0.04	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.003	0.002	0.006	0.02	0.5	10	30
U	ICPMSW	Nickel	0.002	0.001	0.004	0.01	0.4	10	40
U	ICPMSW	Lead	0.007	0.001	0.014	0.02	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.054	0.036	0.108	0.38	4	50	200
U	KONENS	Chloride	8	1	16	19	800	15000	25000
U	ISEF	Fluoride	0.3	0.2	0.6	2	10	150	500
U	ICPWATVAR	Sulphate as SO4	23	26	46	256	1000	20000	50000
N	WSLM27	Total Dissolved Solids	1740	846	3480	9652	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	7	3.2	14	37	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

					Leaching Data	
Client	Waterman EED				Weight of sample (kg)	0.247
Contact	Mr M Amos				Moisture content @ 105℃ (% of Wet Weight)	8.78
					Equivalent Weight based on drying at 105℃ (kg)	0.225
Site	Imperial Way				Volume of water required to carry out 2:1 stage (litres)	0.428
					Fraction of sample above 4 mm %	53.000
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
SP1 CRUSHED		s14_4614M	CL/1420196	13-Aug-14	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	0.81	3	5	6
N	LOI450	Loss on Ignition (%)	7.1			10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	58	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<1.51	100		
U	PHSOIL	pH (pH units)	8.5		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	6.07		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	10.5	10	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	2330	2220					
U	ICPMSW	Arsenic	0.002	0.001	0.004	0.01	0.5	2	25
U	ICPWATVAR	Barium	0.19	0.1	0.38	1.1	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.254	0.039	0.508	0.68	0.5	10	70
U	ICPMSW	Copper	0.073	0.018	0.146	0.25	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.022	0.005	0.044	0.07	0.5	10	30
U	ICPMSW	Nickel	0.007	0.004	0.014	0.04	0.4	10	40
U	ICPMSW	Lead	0.073	0.001	0.146	0.11	0.5	10	50
U	ICPMSW	Antimony	0.001	<0.001	0.002	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.002	0.001	0.004	0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.023	2.951	0.046	25.61	4	50	200
U	KONENS	Chloride	12	11	24	111	800	15000	25000
U	ISEF	Fluoride	<0.2	<0.2	<0.4	<2	10	150	500
U	ICPWATVAR	Sulphate as SO4	1470	1350	2940	13660	1000	20000	50000
N	WSLM27	Total Dissolved Solids	1820	1730	3640	17420	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	26	7.4	52	99	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	Waterman EED				**Leaching Data**	
					Weight of sample (kg)	0.268
Contact	Mr M Amos				Moisture content @ 105℃ (% of Wet Weight)	15.60
					Equivalent Weight based on drying at 105℃ (kg)	0.225
Site	Imperial Way				Volume of water required to carry out 2:1 stage (litres)	0.407
					Fraction of sample above 4 mm %	0.000
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
SOIL BUND 1		s14_4614M	CL/1420197	13-Aug-14	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	1.06	3	5	6
N	LOI450	Loss on Ignition (%)	5.3			10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.07	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	18	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<1.7	100		
U	PHSOIL	pH (pH units)	8.6		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	0.8		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	8.7	8.4	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	270	148					
U	ICPMSW	Arsenic	0.003	0.001	0.006	0.01	0.5	2	25
U	ICPWATVAR	Barium	0.17	0.19	0.34	1.9	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.003	0.004	0.006	0.04	0.5	10	70
U	ICPMSW	Copper	0.014	0.017	0.028	0.17	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.001	0.002	0.002	0.02	0.5	10	30
U	ICPMSW	Nickel	0.004	0.003	0.008	0.03	0.4	10	40
U	ICPMSW	Lead	0.008	0.004	0.016	0.05	0.5	10	50
U	ICPMSW	Antimony	<0.001	0.001	<0.002	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.045	0.082	0.09	0.77	4	50	200
U	KONENS	Chloride	5	1	10	15	800	15000	25000
U	ISEF	Fluoride	0.9	0.6	1.8	6	10	150	500
U	ICPWATVAR	Sulphate as SO4	13	<3	26	<43	1000	20000	50000
N	WSLM27	Total Dissolved Solids	211	115	422	1278	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	14	7.1	28	80	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105℃ where appr opriate, in accordance with the MCERTS standard.

ALcontrol Laboratories

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Attention: Customer Services

Post Certification Report

Date:	12 August 2014	**Location:**	Not Specified
Customer:	H_SCIENT_BOT	**No. Of Samples Received:**	8
Your Reference:	Not Specified	**Samples Scheduled:**	8
[SDG] and Samples	9744852,9744855,9744856,9744857,9744858,9744859,9744860,9744864		

Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
9744852	S1420186 - WS5			23/07/2014
9744855	S1420188 - WS4		0.40	23/07/2014
9744856	S1420189 - TP11		1.50	23/07/2014
9744857	S1420190 - TP11		1.30	23/07/2014
9744858	S1420191 - TP11		0.80	23/07/2014
9744859	S1420192 - TP11		0.35	23/07/2014
9744860	S1420194 - CBR2		0.40	23/07/2014
9744864	S1420198 - TP10		0.40	23/07/2014

Only received samples which have had analysis scheduled will be shown on the following pages.

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Results Legend

X Test

N No Determination Possible

			Lab Sample No(s)	9744852	9744855	9744860	9744856	9744857	9744858	9744859	9744864
			Customer Sample Reference	S142186 - WS5	S142188 - WS4	S142194 - CBR2	S142189 - TP11	S142190 - TP11	S142191 - TP11	S142192 - TP11	S142198 - TP10
			AGS Reference								
			Depth (m)		0.40	0.40	1.50	1.30	0.80	0.35	0.40
			Container	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)	60g VOC (ALE215)
Phenols by HPLC (S)	All	NDPs: 0 Tests: 8		X	X	X	X	X	X	X	X
Sample description	All	NDPs: 0 Tests: 8		X	X	X	X	X	X	X	X

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Results Legend			Customer Sample Ref.	S1420194 - CBR2	S1420189 - TP11	S1420190 - TP11	S1420191 - TP11	S1420192 - TP11	S1420198 - TP10
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	subcontracted test.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.								
1-5&+$@	Sample deviation (see appendix)								
			Depth (m)	0.40	1.50	1.30	0.80	0.35	0.40
			Sample Type	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
			Date Sampled	23/07/2014	23/07/2014	23/07/2014	23/07/2014	23/07/2014	23/07/2014
			Date Received	05/08/2014	05/08/2014	05/08/2014	05/08/2014	05/08/2014	05/08/2014
			SDG Ref	140805-19	140805-19	140805-19	140805-19	140805-19	140805-19
			Lab Sample No.(s)	9744860	9744856	9744857	9744858	9744859	9744864
			AGS Reference						
Component	**LOD/Units**	**Method**							
Moisture Content Ratio (% of as received sample)	%	PM024		13	13	1.2	1.7	3.2	2.9
Phenol	<0.01 mg/kg	TM062 (S)		<0.01 M	<0.01 M	<0.01 #	<0.01 #	<0.01 #	<0.01 #
Cresols	<0.01 mg/kg	TM062 (S)		<0.01 M	<0.01 M	<0.01 #	<0.01 #	<0.01 #	0.0103 #
Xylenols	<0.015 mg/kg	TM062 (S)		<0.015 M	<0.015 M	<0.015 #	<0.015 #	<0.015 #	0.0309 #
1-Naphthol	<0.01 mg/kg	TM062 (S)		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2,3,5-Trimethylphenol	<0.01 mg/kg	TM062 (S)		<0.01 M	<0.01 M	<0.01 #	<0.01 #	<0.01 #	<0.01 #
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)		<0.035 M	<0.035 M	<0.035 #	<0.035 #	<0.035 #	0.0412 #

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Results Legend			Customer Sample Ref.	S1420186 - WS5	S1420188 - WS4				
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.		Depth (m)	-	0.40				
diss.filt	Dissolved / filtered sample.		Sample Type	Soil/Solid	Soil/Solid				
tot.unfilt	Total / unfiltered sample.		Date Sampled	23/07/2014	23/07/2014				
*	subcontracted test.		Date Received	05/08/2014	05/08/2014				
**	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.		SDG Ref	140805-19	140805-19				
			Lab Sample No.(s)	9744852	9744855				
1-5&+5@	Sample deviation (see appendix)		AGS Reference						
Component		**LOD/Units**	**Method**						
Moisture Content Ratio (% of as received sample)		%	PM024	0	0.55				
Phenol		<0.01 mg/kg	TM062 (S)	<0.01 #	<0.01 #				
Cresols		<0.01 mg/kg	TM062 (S)	<0.01 #	<0.01 #				
Xylenols		<0.015 mg/kg	TM062 (S)	<0.015 #	<0.015 #				
1-Naphthol		<0.01 mg/kg	TM062 (S)	<0.01	<0.01				
2,3,5-Trimethylphenol		<0.01 mg/kg	TM062 (S)	<0.01 #	<0.01 #				
Phenols, Total Detected monohydric		<0.035 mg/kg	TM062 (S)	<0.035 #	<0.035 #				

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified

Case :

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10-7

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample [1]	Surrogate Corrected
ASB_PREP				
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC		

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Test Completion Dates

Lab Sample No(s)	9744860	9744856	9744857	9744858	9744859	9744864	9744852	9744855
Customer Sample Ref.	S1420194 - CBR2	S1420189 - TP11	S1420190 - TP11	S1420191 - TP11	S1420192 - TP11	S1420198 - TP10	S1420186 - WS5	S1420188 - WS4
AGS Ref.								
Depth	0.40	1.50	1.30	0.80	0.35	0.40		0.40
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Phenols by HPLC (S)	11-Aug-2014	11-Aug-2014	11-Aug-2014	11-Aug-2014	11-Aug-2014	11-Aug-2014	11-Aug-2014	11-Aug-2014
Sample description	06-Aug-2014	06-Aug-2014	06-Aug-2014	06-Aug-2014	06-Aug-2014	06-Aug-2014	06-Aug-2014	06-Aug-2014

Customer : H_SCIENT_BOT **Client Reference :** Not Specified **Location :** Not Specified
Case :

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt . However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill /made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5 -C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before presevation was performed
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -
Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

ASBESTOS ANALYSIS RESULTS - SOIL ANALYSIS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils

1089

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

Client:	ESG Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0488-08366**
For the attention of:	Waterman EED	**Report Date:**	**01/08/2014**
Site Address:	Imperial Way	**Project Number:**	**S144614**

Sample Number	Sample Date	Sample Location	Test Date	Total Sample Dry Weight (g)	Weight of <2mm Fraction (g)	Asbestos(g) in >8mm+>2mm	Asbestos(g) in <2mm	% Asbestos by weight of Total Dried Sample	Asbestos Fibre Types Identified
CL/1420186	23/07/14	WS5 0.40	01/08/2014					Screen Only	NAIIS
CL/1420188	23/07/14	WS4 0.40	01/08/2014					Screen Only	NAIIS
CL/1420189	23/07/14	TP11 1.50	01/08/2014					Screen Only	NAIIS
CL/1420190	23/07/14	TP11 1.30	01/08/2014					Screen Only	NAIIS
CL/1420191	23/07/14	TP11 0.80	01/08/2014					Screen Only	NAIIS
CL/1420192	23/07/14	TP11 0.35	01/08/2014					Screen Only	NAIIS
CL/1420194	23/07/14	CBR2 0.40	01/08/2014					Screen Only	NAIIS
CL/1420198	23/07/14	TP10 0.40	01/08/2014					Screen Only	NAIIS

Keys

NAACR = Not Analysed at Clients Request

NAIIS = No Asbestos Identified in Sample (Screens Only)

NADIS = No Asbestos Detected in Sample (ID & Quant Only)

Name:	Louise James	Authorised Signatory:
Position:	Lab Project Manager	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on HSE document MDHS 90 - Asbestos Contaminated Land - Draft 5 - November 1997 (withdrawn). Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of fine fraction for asbestos content only includes fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0XD, UKAS Laboratory Number 1089.

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S144614M

Customer Waterman EED
Site Imperial Way
Report No S144614M

Consignment No S42683
Date Logged 29-Jul-2014

Report Due 04-Aug-2014

ID Number	Description	MethodID	AMMAR	ANC	BTEXHSA		CEN Leachate			CustServ	ELESULP	FOCS	GROHSA	ICPBOR	ICPMSS										ICPSOIL		ICPWSS
		Sampled	Exchange.Ammonium AR	Acid Neut. Capacity	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	CEN Leac(P)_2:1	CEN Leac(P)1	CEN Leac(P)2	REPORT A	Elemental Sulphur	S.O.M. % (Calc)	GRO (AA-UK) HSA-GCFID	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Vanadium (MS)	Zinc (MS)	Barium.	Berylilium.	SO4-- (H2O sol) mg/l
			✓		✓	✓					✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
CL/1420186	WS5 0.40	23/07/14	E										EF														
CL/1420187	WS9 0.35	23/07/14																									
CL/1420188	WS4 0.40	23/07/14	E										EF														
CL/1420189	TP11 1.50	23/07/14	E										EF														
CL/1420190	TP11 1.30	23/07/14	E										EF														
CL/1420191	TP11 0.80	23/07/14	E										EF														
CL/1420192	TP11 0.35	23/07/14	E										EF														
CL/1420193	CBR5 0.60	23/07/14																									
CL/1420194	CBR2 0.40	23/07/14	E										EF														
CL/1420195	TP12 0.40	23/07/14			EF	EF																					
CL/1420196	SP1 CRUSHED	23/07/14			EF	EF																					
CL/1420197	SOIL BUND 1	23/07/14			EF	EF																					
CL/1420198	TP10 0.40	23/07/14	E										EF														

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S144614M

Customer Waterman EED
Site Imperial Way
Report No S144614M

Consignment No S42683
Date Logged 29-Jul-2014

Report Due 04-Aug-2014

ID Number	Description	MethodID	KoneNO3	LOI(%MM)	MCertS	MICROTMSS	PAHMSUS		PCBUSECDAR	PHSOIL	SFAPI		SFAS	Sub002a	Sub036						TPHFIDUS		TPHUSSI	VOCHSAS	WSLM59
		Sampled	Nitrate 2:1 mg/kg	L.O.I. % @ 450C	MCertS Analysis	Tot.Moisture @ 105C	PAH (16) by GCMS inc. Sum 8	PAH (17) by GCMS	PCB-7 Congeners Analysis	pH units (AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)	Sulphide as S (AR)	^Asbestos Screen	^Phenol	^Trimethylphenols	^Cresols	^Naphthols	^Xylenols	^Total Phenols	TPH Band (>C10-C40)	TPH by GCFID (AR)	TPH by GCFID (Si-UKCWG)>44	VOC HSA-GCMS	Total Organic Carbon
					✓	✓	✓	✓		✓	✓	✓		✓							✓	✓	✓	✓	
CL/1420186	WS5 0.40	23/07/14																							
CL/1420187	WS9 0.35	23/07/14																							
CL/1420188	WS4 0.40	23/07/14																							
CL/1420189	TP11 1.50	23/07/14																							
CL/1420190	TP11 1.30	23/07/14																							
CL/1420191	TP11 0.80	23/07/14																							
CL/1420192	TP11 0.35	23/07/14																							
CL/1420193	CBR5 0.60	23/07/14																							
CL/1420194	CBR2 0.40	23/07/14																							
CL/1420195	TP12 0.40	23/07/14																							
CL/1420196	SP1 CRUSHED	23/07/14																							
CL/1420197	SOIL BUND 1	23/07/14																							
CL/1420198	TP10 0.40	23/07/14																							

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	AMMAR	As Received	Determination of Exchangeable Ammonium in Soil using potassium chloride extraction, discrete colorimetric detection
Soil	ANC	Oven Dried @ < 35℃	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	ELESULP	Oven Dried @ < 35℃	Determination of Elemental Sulphur using Solvent Extraction followed by HPLC detection.
Soil	FOCS	Oven Dried @ < 35℃	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35℃	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35℃	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	ICPSOIL	Oven Dried @ < 35℃	Determination of Metals in soil samples by aqua regia digestion followed by ICPOES detection
Soil	ICPWSS	Oven Dried @ < 35℃	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	KoneNO3	Oven Dried @ < 35℃	Determination of Nitrate in soil samples by water extraction followed by colorimetric detection
Soil	LOI(%MM)	Oven Dried @ < 35℃	Determination of loss on ignition for soil samples at specified temperature by gravimetry
Soil	MICROTMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis utilising a microwave moisture meter
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SFAS	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	TPHUSSI	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection including quantitation of Aromatic and Aliphatic fractions.
Soil	VOCHSAS	As Received	Determination of Volatile Organic Compounds (VOC) by Headspace GCMS
Soil	WSLM59	Oven Dried @ < 35℃	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Waterman EED

Site : Imperial Way

Report Number : S14_4614

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1420186	WS5 0.40 (NVM)	Brown Silt STONE
CL/1420187	WS9 0.35	Brown Stone SAND
CL/1420188	WS4 0.40	Brown Stone SAND
CL/1420189	TP11 1.50	Brown Stone CLAY
CL/1420190	TP11 1.30	Brown Stone SILT
CL/1420191	TP11 0.80	Brown Stone SILT
CL/1420192	TP11 0.35	Brown Stone SILT
CL/1420193	CBR5 0.60	Brown Gravel CLAY
CL/1420194	CBR2 0.40	Brown Stone CLAY
CL/1420195	TP12 0.40 (NVM)	Brown Silt STONE
CL/1420196	SP1 CRUSHED	Brown MADE GROUND
CL/1420197	SOIL BUND 1	Brown CLAY
CL/1420198	TP10 0.40	Brown Stone SILT

Our Ref: EXR/181756 (Ver. 1)
Your Ref: C2611

August 13, 2014

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Mr M Amos
Waterman EED
Merchants House
Wapping Road
Bristol
BS1 4RW

For the attention of Mr M Amos

Dear Mr Amos

CEN Leachate 2:1 - Imperial Way

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

S Stone
Project Co-ordinator
01283 554463

TEST REPORT

1252

Report No. EXR/181756 (Ver. 1)

Waterman EED
Merchants House
Wapping Road
Bristol
BS1 4RW

Site: Imperial Way

The 3 samples described in this report were registered for analysis by ESG on 29-Jul-2014. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 13-Aug-2014

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (10) Results (Pages 5 to 7)
GC-FID Chromatograms (Pages 8 to 10)
Analytical and Deviating Sample Overview (Pages 11 to 12)
Table of Method Descriptions (Page 13)
Table of Report Notes (Page 14)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns

Operations Director
Laboratory and Analytical Business

Date of Issue: 13-Aug-2014

Tests marked '^' have been subcontracted to another laboratory.
Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

Units :			pH units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Method Codes :			WSLM3	Calc_HD	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPWATVAR	ICPMSW
Method Reporting Limits :				7	3	1	1	0.01	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.01	0.0001
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EXR	**Client Sample Description**	**Sample Date**	**pH units w**	**Total Hardness as CaCO3**	**Total Sulphur as SO4 (Dissolved) a**	**Calcium as Ca (Dissolved) a**	**Magnesium as Mg (Dissolved) a**	**Barium as Ba (Dissolved) a**	**Nickel as Ni (Dissolved)**	**Chromium as Cr (Dissolved)**	**Cadmium as Cd (Dissolved)**	**PAH GC-MS (16) o**	**Copper as Cu (Dissolved)**	**Lead as Pb (Dissolved)**	**Zinc as Zn (Dissolved)**	**Arsenic as As (Dissolved)**	**Boron as B (Dissolved) a**	**Mercury as Hg (Dissolved)**
1512250	WS5 0.40	23-Jul-14	7.8	74	35	18	7	0.22	<0.001	0.001	<0.0001	Req §	0.004	0.007	0.031	0.019	0.09	<0.0001
1512251	WS9 0.35	23-Jul-14	11.4	<316	51	125	<1	0.18	0.013	0.059	<0.0001	Req §	0.021	0.002	0.039	0.002	0.02	<0.0001
1512252	CBR5 0.60	23-Jul-14	8.3	142	27	42	9	0.11	0.002	0.003	<0.0001	Req §	0.007	0.004	0.068	0.001	0.11	<0.0001

ESG Environmental Scientifics Group
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Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name Waterman EED

Contact Mr M Amos

Imperial Way

CEN Leachate 2:1

Date Printed	**06-Aug-2014**
Report Number	**EXR/181756**
Table Number	**1**

Units :			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Method Codes :			ICPMSW	ICPMSW	KONENS	KONENS	SFAPI	SFAPI	SFAS	GROHSA	TPHFID	ICPWATVAR	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
Method Reporting Limits :			0.001	0.001	0.01	0.2	0.02	0.02	0.05	0.1	0.01	0.01	5	5	5	10	15	10
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EXR	**Client Sample Description**	**Sample Date**	**Selenium as Se (Dissolved)**	**Vanadium as V (Dissolved)**	**Ammoniacal Nitrogen as N**	**Nitrate as N**	**Cyanide (Free) as CN**	**Cyanide (Total) as CN**	**Sulphide as S**	**GRO-HSA o**	**TPH GC**	**Beryllium as Be (Dissolved) a**	**Ethyl Benzene**	**Benzene**	**Toluene**	**MTBE**	**Xylenes**	**m/p Xylenes**
1512250	WS5 0.40	23-Jul-14	0.001	0.003	0.05 §	<0.2	<0.02	<0.02	<0.05	<0.1	0.07	<0.01	<5	<5	<5	<10	<15	<10
1512251	WS9 0.35	23-Jul-14	0.002	0.004	0.20 §	<0.2	<0.02	<0.02	<0.05	<0.1	0.29	<0.01	<5	<5	<5	<10	<15	<10
1512252	CBR5 0.60	23-Jul-14	0.002	0.003	0.06 §	1.0	<0.02	1.33	<0.05	<0.1	0.06	<0.01	<5	<5	<5	<10	<15	<10

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Client Name Waterman EED

Contact Mr M Amos

Imperial Way

CEN Leachate 2:1

Date Printed	**06-Aug-2014**
Report Number	**EXR/181756**
Table Number	**1**

Where individual results are flagged see report notes for status.

Units :			µg/l	mg/l	mg/l	mg/l	mg/l											
Method Codes :			BTEXHSA	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL											
Method Reporting Limits :			5	0.0005	0.0005	0.0005	0.0005											
UKAS Accredited :			Yes	No	No	No	No											
LAB ID Number EXR	**Client Sample Description**	**Sample Date**	**o Xylene**	**Phenol**	**Cresols**	**Dimethylphenols**	**Trimethylphenols**											
1512250	WS5 0.40	**23-Jul-14**	<5	<0.0005	<0.0005	<0.0005	<0.0005											
1512251	WS9 0.35	**23-Jul-14**	<5	0.0312	<0.0010	0.0043	0.0015											
1512252	CBR5 0.60	**23-Jul-14**	<5	<0.0005	<0.0005	<0.0005	<0.0005											

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Client Name	**Waterman EED**
Contact	Mr M Amos

Imperial Way

CEN Leachate 2:1

Date Printed	**06-Aug-2014**
Report Number	**EXR/181756**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	WS5 0.40	**Job Number:**	W18_1756
LIMS ID Number:	EX1512250	**Date Booked in:**	29-Jul-14
QC Batch Number:	140500	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	801MS10.PAH\	**Matrix:**	Leachate
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.21	0.065	92
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.38	0.031	90
Fluorene	86-73-7	4.76	0.014	95
Phenanthrene	85-01-8	5.57	0.054	97
Anthracene	120-12-7	5.62	0.010	98
Fluoranthene	206-44-0	6.88	0.030	89
Pyrene	129-00-0	7.17	0.021	66
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.315	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	101
Acenaphthene-d10	100
Phenanthrene-d10	104
Chrysene-d12	98
Perylene-d12	89

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	80
Terphenyl-d14	63

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	WS9 0.35	**Job Number:**	W18_1756
LIMS ID Number:	EX1512251	**Date Booked in:**	29-Jul-14
QC Batch Number:	140500	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-14
Directory:	801MS10.PAH\	**Matrix:**	Leachate
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.21	0.106	92
Acenaphthylene	208-96-8	4.26	0.033	75
Acenaphthene	83-32-9	4.38	0.169	97
Fluorene	86-73-7	4.76	0.108	78
Phenanthrene	85-01-8	5.57	0.138	94
Anthracene	120-12-7	5.62	0.054	93
Fluoranthene	206-44-0	6.88	0.046	75
Pyrene	129-00-0	7.16	0.102	79
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	12.45	0.015	56
Total (USEPA16) PAHs	-	-	< 0.841	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	104
Acenaphthene-d10	102
Phenanthrene-d10	111
Chrysene-d12	109
Perylene-d12	105

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	70
Terphenyl-d14	62

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Imperial Way		
Sample Details:	CBR5 0.60	**Job Number:**	W18_1756
LIMS ID Number:	EX1512252	**Date Booked in:**	29-Jul-14
QC Batch Number:	140500	**Date Extracted:**	01-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	02-Aug-14
Directory:	801MS10.PAH\	**Matrix:**	Leachate
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.21	0.057	93
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.38	0.016	98
Fluorene	86-73-7	4.76	0.014	93
Phenanthrene	85-01-8	5.57	0.051	88
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.88	0.020	90
Pyrene	129-00-0	7.17	0.016	64
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.274	-

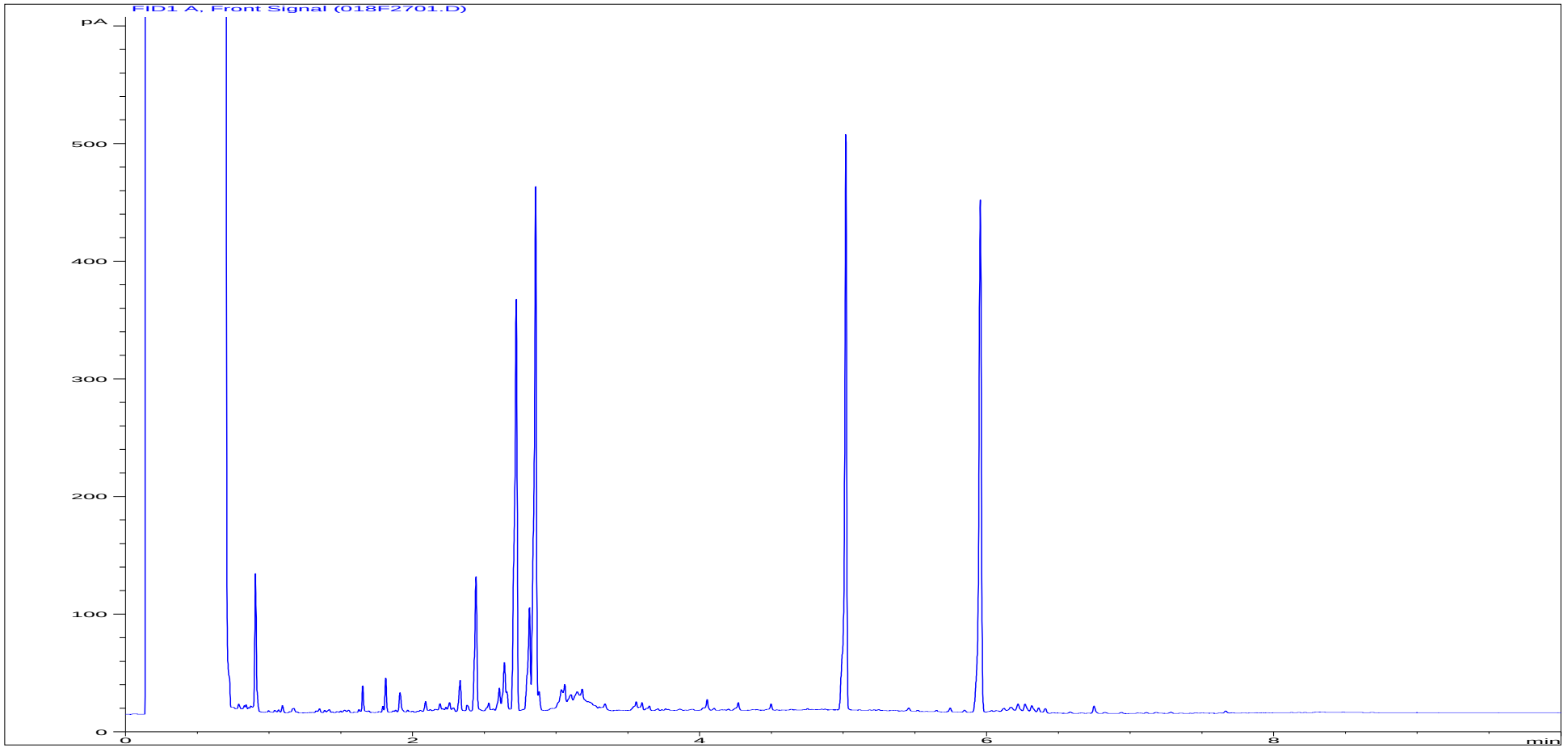
"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	103
Acenaphthene-d10	102
Phenanthrene-d10	110
Chrysene-d12	106
Perylene-d12	98

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	69
Terphenyl-d14	55

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

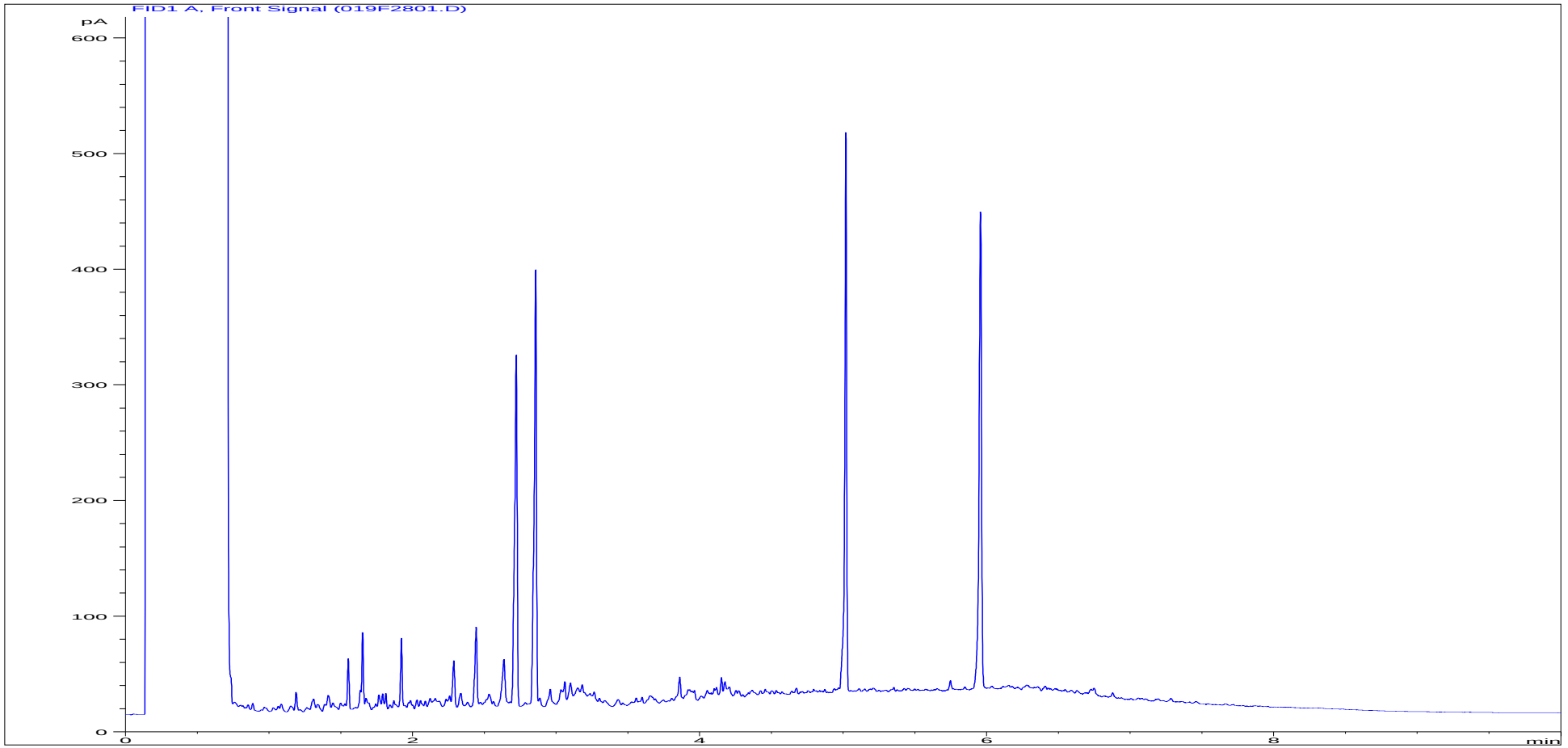
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1512250	**Job Number:**	W18_1756
Multiplier:	0.005	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	WS5 0.40
Acquisition Date/Time:	01-Aug-14, 17:13:39		
Datafile:	D:\TES\DATA\Y2014\080114TPH_GC17\080114 2014-08-01 09-00-32\018F2701.D		

Where individual results are flagged see report notes for status.

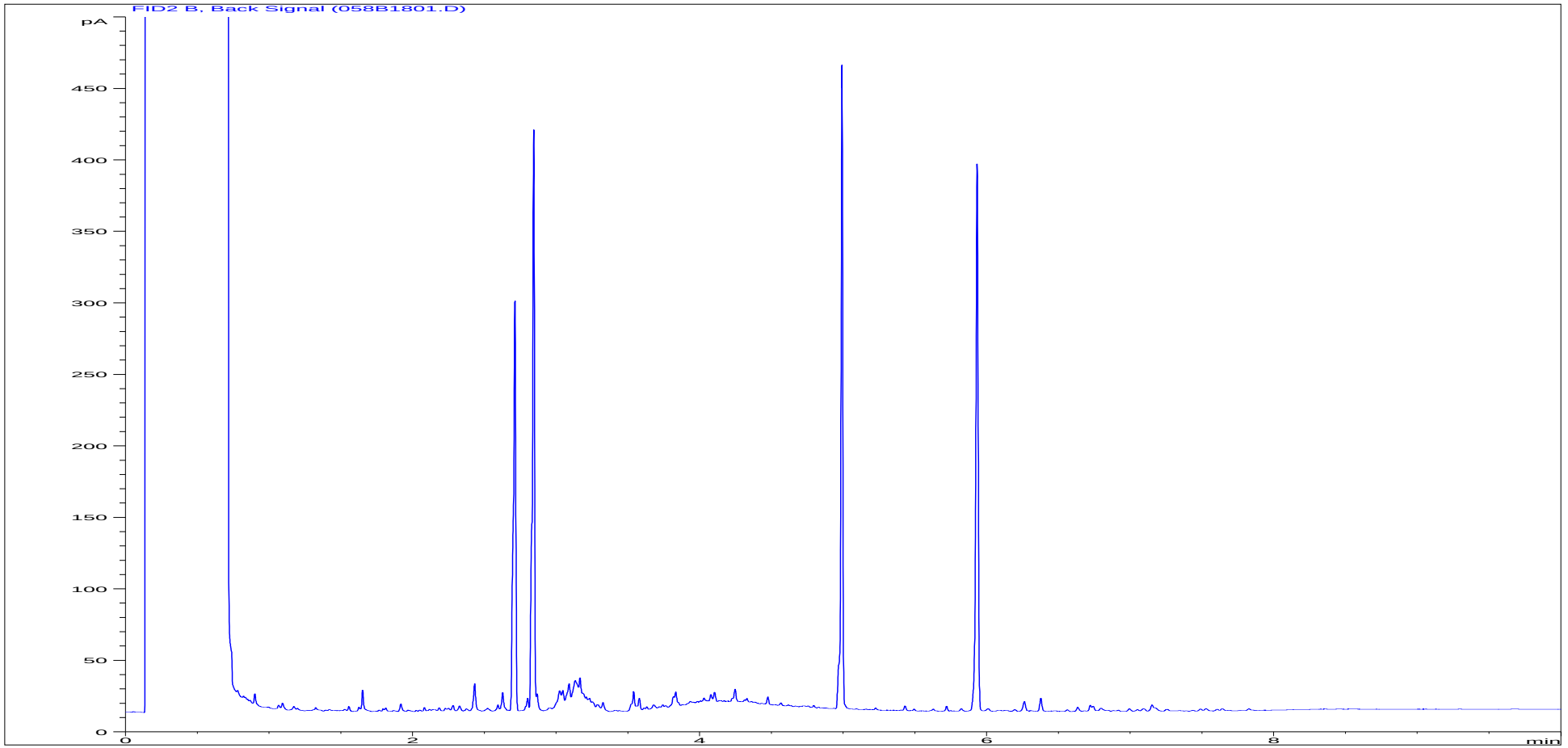
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1512251	**Job Number:**	W18_1756
Multiplier:	0.005	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	WS9 0.35
Acquisition Date/Time:	01-Aug-14, 17:32:37		
Datafile:	D:\TES\DATA\Y2014\080114TPH_GC17\080114 2014-08-01 09-00-32\019F2801.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1512252	**Job Number:**	W18_1756
Multiplier:	0.005	**Client:**	Waterman EED
Dilution:	1	**Site:**	Imperial Way
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	CBR5 0.60
Acquisition Date/Time:	01-Aug-14, 14:22:29		
Datafile:	D:\TES\DATA\Y2014\080114TPH_GC17\080114 2014-08-01 09-00-32\058B1801.D		

Where individual results are flagged see report notes for status.

CEN Leachate 2:1 Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W181756

Customer Waterman EED
Site Imperial Way
Report No W181756

Consignment No S42683
Date Logged 29-Jul-2014

Report Due 06-Aug-2014

ID Number	Description	MethodID	Matrix Type	Sampled	BTEXHSA	Calc_HD	CUSTSERV	GROHSA	ICPMSW										ICPWATVAR			
					BTEX-HSA + MTBE analysis	Total Hardness as CaCO3 (CALC)	Report A (CEN1)	GRO-HSA	Nickel as Ni MS (Dissolved)	Chromium as Cr MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Vanadium as V MS (Dissolved)	Total Sulphur as SO4 (Diss) VAR	Calcium as Ca (Dissolved) VAR	Magnesium as Mg (Dissolved) VAR	Barium as Ba (Dissolved) VAR
					✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EX/1512250	WS5 0.40		Laboratory Produced Leachate	23/07/14	E			E														
EX/1512251	WS9 0.35		Laboratory Produced Leachate	23/07/14	E			E														
EX/1512252	CBR5 0.60		Laboratory Produced Leachate	23/07/14	E			E														

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

CEN Leachate 2:1 Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W181756

Customer Waterman EED
Site Imperial Way
Report No W181756

Consignment No S42683
Date Logged 29-Jul-2014

Report Due 06-Aug-2014

ID Number	Description	Matrix Type	Sampled	MethodID												
				ICPWATVAR		KONENS		LeachPrep	PAHMSW	PHEHPLCVL	SFAPI		SFAS	TPHFID	WSLM3
				Boron as B (Dissolved) VAR	Beryllium as Be (Dissolved) VAR	Ammoniacal Nitrogen (Kone)	Nitrate as N (Kone calc)	Leachate Prep	PAH GC-MS (16)	Phenols by HPLC (Low Level)	Cyanide (Free) as CN SFA	Cyanide (Total) as CN SFA	Sulphide as S SFA	TPH GC	pH units
				✓		✓	✓		✓		✓	✓	✓	✓	✓
EX/1512250	WS5 0.40	Laboratory Produced Leachate	23/07/14			E	E				E	E			E
EX/1512251	WS9 0.35	Laboratory Produced Leachate	23/07/14			E	E				E	E			E
EX/1512252	CBR5 0.60	Laboratory Produced Leachate	23/07/14			E	E				E	E			E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	BTEXHSA	As Received	Benzene, Toluene, Ethylbenzene, & Xylenes by headspace extraction GCFID quantitation
Water	Calc_HD	As Received	Calculation based on Dissolved metals analysis by ICPOES
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	PHEHPLCVL	As Received	Determination of Phenols by HPLC
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Waterman EED
Site : Imperial Way
Report Number : W18_1756

Lab ID Number	Client ID	Description
EX/1512250	WS5 0.40	Laboratory Produced Leachate
EX/1512251	WS9 0.35	Laboratory Produced Leachate
EX/1512252	CBR5 0.60	Laboratory Produced Leachate

Our Ref: EXR/182428 (Ver. 1)
Your Ref:

August 14, 2014

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Mr M Amos
Waterman EED
Pickfords Wharf
Clink Street
London
SE1 9DG

For the attention of Mr M Amos

Dear Mr Amos

Sample Analysis - Worton Grange. Reading

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

S Stone
Project Co-ordinator
01283 554463

TEST REPORT

1252

Report No. EXR/182428 (Ver. 1)

Waterman EED
Pickfords Wharf
Clink Street
London
SE1 9DG

Site: Worton Grange. Reading

The 4 samples described in this report were registered for analysis by ESG on 08-Aug-2014. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 14-Aug-2014

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (10) Results (Pages 5 to 8)
Table of GRO Results (Page 9)
Table of TPH (Si) banding (0.01) (Page 10)
GC-FID Chromatograms (Pages 11 to 18)
Analytical and Deviating Sample Overview (Pages 19 to 20)
Table of Method Descriptions (Page 21)
Table of Report Notes (Page 22)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns

Operations Director
Laboratory and Analytical Business

Date of Issue: 14-Aug-2014

Tests marked '^' have been subcontracted to another laboratory.
Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
ESG accepts no responsibility for any sampling not carried out by our personnel.

Units :			pH units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Method Codes :			WSLM3	Calc_HD	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPWATVAR	ICPMSW
Method Reporting Limits :				7	3	1	1	0.01	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.01	0.0001
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EXR	**Client Sample Description**	**Sample Date**	**pH units w**	**Total Hardness as CaCO3**	**Total Sulphur as SO4 (Dissolved) a**	**Calcium as Ca (Dissolved) a**	**Magnesium as Mg (Dissolved) a**	**Barium as Ba (Dissolved) a**	**Nickel as Ni (Dissolved)**	**Chromium as Cr (Dissolved)**	**Cadmium as Cd (Dissolved)**	**PAH GC-MS (16) o**	**Copper as Cu (Dissolved)**	**Lead as Pb (Dissolved)**	**Zinc as Zn (Dissolved)**	**Arsenic as As (Dissolved)**	**Boron as B (Dissolved) a**	**Mercury as Hg (Dissolved)**
1515243	BH1 4.947	07-Aug-14	7.5	2370	1600	330	376	0.08	0.011	0.009	<0.0001	Req	0.004	0.001	0.015	0.002	0.4	<0.0001
1515244	BH3 2.670	07-Aug-14	8.3	2500	784	792	128	0.55	0.002	0.004	<0.0001	Req	0.002	<0.001	0.007	0.002	0.67	<0.0001
1515245	BH4 4.258	07-Aug-14	8.0	783	482	231	50	0.06	0.003	0.003	<0.0001	Req	0.003	<0.001	0.007	0.004	0.29	<0.0001
1515246	BH6 0.554	07-Aug-14	10.2	<261	124	103	<1	<0.01	<0.001	0.032	0.0004	Req	0.005	<0.001	0.002	0.006	0.07	<0.0001

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Client Name Waterman EED

Contact Mr M Amos

Worton Grange. Reading

Sample Analysis

Date Printed	**14-Aug-2014**
Report Number	**EXR/182428**
Table Number	**1**

Where individual results are flagged see report notes for status.

Units :			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Method Codes :			ICPMSW	ICPMSW	KONENS	KONENS	SFAPI	SFAPI	SFAS	TPHFID-Si	ICPWATVAR	GROHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
Method Reporting Limits :			0.001	0.001	0.01	0.2	0.02	0.02	0.05	0.01	0.01	0.1	5	5	5	10	15	10
UKAS Accredited :			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EXR	**Client Sample Description**	**Sample Date**	**Selenium as Se (Dissolved)**	**Vanadium as V (Dissolved)**	**Ammoniacal Nitrogen as N**	**Nitrate as N**	**Cyanide (Free) as CN**	**Cyanide (Total) as CN**	**Sulphide as S**	**TPH by GC(Si) o**	**Beryllium as Be (Dissolved) a**	**GRO-HSA (AA)**	**Ethyl Benzene**	**Benzene**	**Toluene**	**MTBE**	**Xylenes**	**m/p Xylenes**
1515243	BH1 4.947	07-Aug-14	0.003	0.005	0.19	<0.2	<0.02	<0.02	<0.05	Req	<0.01	Req	<5	<5	<5	<10	<15	<10
1515244	BH3 2.670	07-Aug-14	0.001	0.003	0.02	0.3	<0.02	<0.02	<0.05	Req	<0.1	Req	<5	<5	<5	<10	<15	<10
1515245	BH4 4.258	07-Aug-14	0.007	0.003	0.02	5.4	<0.02	<0.02	<0.05	Req	<0.01	Req	<5	<5	<5	<10	<15	<10
1515246	BH6 0.554	07-Aug-14	0.004	0.019	0.5	<0.2	<0.02	<0.02	<0.05	Req	<0.01	Req	<5	<5	<5	<10	<15	<10

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Client Name Waterman EED

Contact Mr M Amos

Worton Grange. Reading

Sample Analysis

Date Printed	**14-Aug-2014**
Report Number	**EXR/182428**
Table Number	**1**

Where individual results are flagged see report notes for status.

Units :			µg/l	mg/l	mg/l	mg/l	mg/l											
Method Codes :			BTEXHSA	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL											
Method Reporting Limits :			5	0.0005	0.0005	0.0005	0.0005											
UKAS Accredited :			Yes	No	No	No	No											
LAB ID Number EXI	**Client Sample Description**	**Sample Date**	**o Xylene**	**Phenol**	**Cresols**	**Dimethylphenols**	**Trimethylphenols**											
1515243	BH1 4.947	07-Aug-14	<5	<0.0005	<0.0005	<0.0005	<0.0005											
1515244	BH3 2.670	07-Aug-14	<5	<0.0005	<0.0005	<0.0005	<0.0005											
1515245	BH4 4.258	07-Aug-14	<5	<0.0005	<0.0005	<0.0005	<0.0005											
1515246	BH6 0.554	07-Aug-14	<5	0.0014	<0.0005	<0.0005	<0.0005											

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Client Name Waterman EED

Contact Mr M Amos

Worton Grange. Reading

Sample Analysis

Date Printed	**14-Aug-2014**
Report Number	**EXR/182428**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Worton Grange. Reading		
Sample Details:	BH1 4.947	**Job Number:**	W18_2428
LIMS ID Number:	EX1515243	**Date Booked in:**	08-Aug-14
QC Batch Number:	140523	**Date Extracted:**	12-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	14-Aug-14
Directory:	813MS17.PAH\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	94
Acenaphthene-d10	92
Phenanthrene-d10	95
Chrysene-d12	102
Perylene-d12	110

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	86
Terphenyl-d14	69

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Worton Grange. Reading		
Sample Details:	BH3 2.670	**Job Number:**	W18_2428
LIMS ID Number:	EX1515244	**Date Booked in:**	08-Aug-14
QC Batch Number:	140523	**Date Extracted:**	12-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	14-Aug-14
Directory:	813MS17.PAH\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	95
Acenaphthene-d10	93
Phenanthrene-d10	95
Chrysene-d12	102
Perylene-d12	110

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	79
Terphenyl-d14	67

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Worton Grange. Reading		
Sample Details:	BH4 4.258	**Job Number:**	W18_2428
LIMS ID Number:	EX1515245	**Date Booked in:**	08-Aug-14
QC Batch Number:	140523	**Date Extracted:**	12-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	14-Aug-14
Directory:	813MS17.PAH\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	7.03	0.013	96
Pyrene	129-00-0	7.32	0.011	M
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	10.98	0.011	59
Indeno[1,2,3-cd]pyrene	193-39-5	12.35	0.013	90
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	12.65	0.013	51
Total (USEPA16) PAHs	-	-	< 0.181	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	96
Acenaphthene-d10	95
Phenanthrene-d10	99
Chrysene-d12	106
Perylene-d12	111

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	83
Terphenyl-d14	67

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Waterman EED: Worton Grange. Reading		
Sample Details:	BH6 0.554	**Job Number:**	W18_2428
LIMS ID Number:	EX1515246	**Date Booked in:**	08-Aug-14
QC Batch Number:	140523	**Date Extracted:**	12-Aug-14
Quantitation File:	Initial Calibration	**Date Analysed:**	14-Aug-14
Directory:	813MS17.PAH\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.26	0.061	95
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.211	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	94
Acenaphthene-d10	94
Phenanthrene-d10	96
Chrysene-d12	105
Perylene-d12	115

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	64
Terphenyl-d14	54

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Gasoline Range Organics
(BTEX and Aliphatic Carbon Ranges)

Customer and Site Details: Waterman EED : Worton Grange. Reading
Job Number: W18_2428
Directory: D:\TES\DATA\Y2014\0813HSA_GC12\081314 2014-08-13 15-03-25\122B2201.D
Method: Headspace GCFID

Matrix: Water
Date Booked in: 08-Aug-14
Date extracted: 13-Aug-14
Date Analysed: 13-Aug-14, 22:0

*** Sample data with an asterisk are not UKAS accredited.**

			Concentration, (mg/l)					Aliphatics				
Sample ID	Client ID	Benzene	Toluene	Ethyl benzene	m/p-Xylene	o-Xylene	C5 - C6	>C6 - C7	>C7 - C8	>C8 - C10	Total GRO
* EX1515243	BH1 4.947	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.1	<0.1	<0.1	<0.1
* EX1515244	BH3 2.670	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.1	<0.1	<0.1	<0.1
* EX1515245	BH4 4.258	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.1	<0.1	<0.1	<0.1
* EX1515246	BH6 0.554	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.1	<0.1	<0.1	<0.1

Where individual results are flagged see report notes for status.

ALIPHATIC / AROMATIC FRACTION BY GC/FID

Customer and Site Details: Waterman EED : Worton Grange. Reading
Job Number: W18_2428
QC Batch Number: 140523
Directory: D:\TES\DATA\Y2014\081314TPH_GC15\081314 2014-08-13 10-56-34\069B2401.D
Method: Bottle

Separation: Silica gel
Eluents: Hexane, DCM

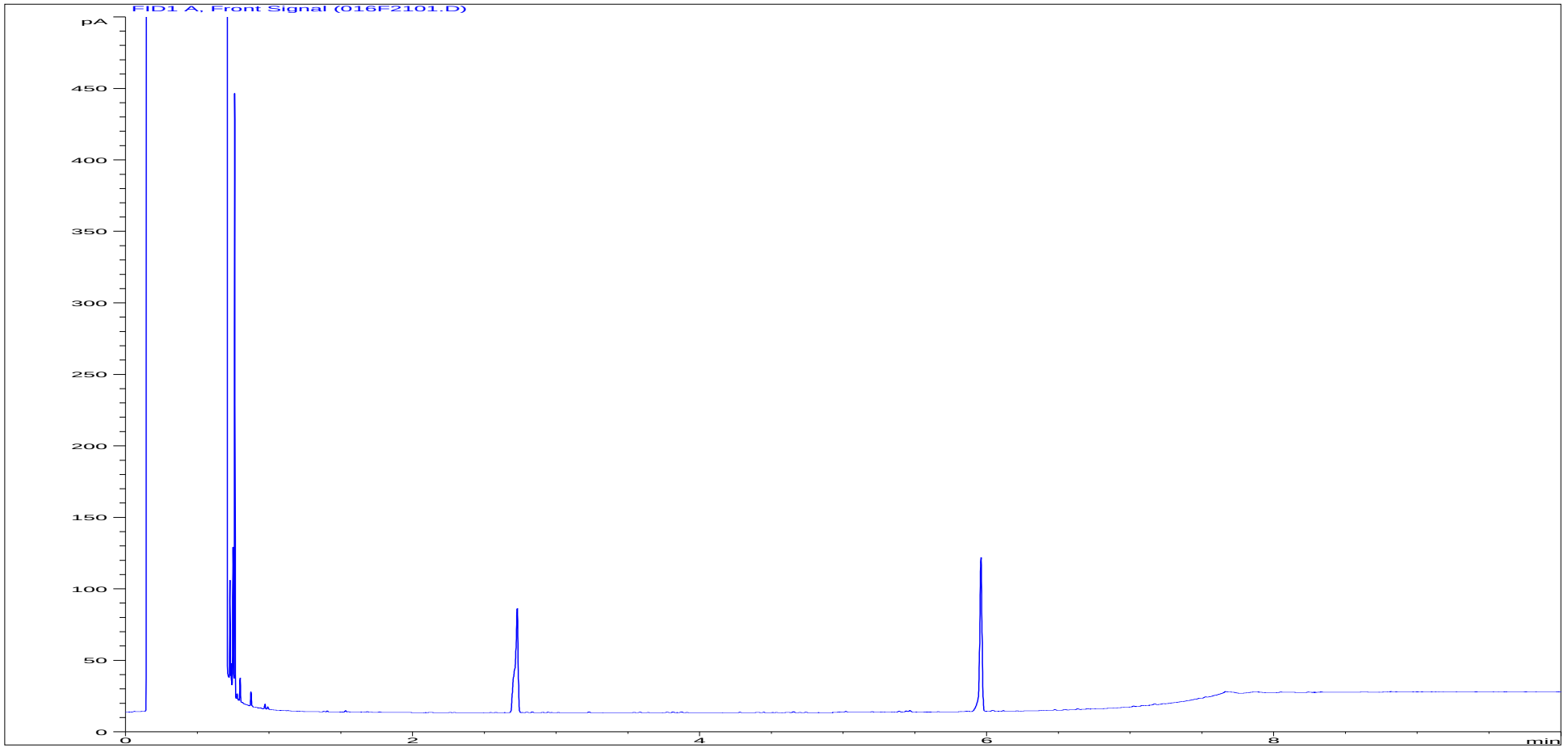
Matrix: Water
Date Booked in 08-Aug-14
Date Extracted 12-Aug-14
Date Analysed 13-Aug-14, 17:34:35

*** This sample data is not UKAS accredited.**

		Concentration, (mg/l)											
		>C8 - C10		>C10 - C12		>C12 - C16		>C16 - C21		>C21 - C35		>C8 - C40	
Sample ID	**Client ID**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**
EX1515243	BH1 4.947	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.012
EX1515244	BH3 2.670	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EX1515245	BH4 4.258	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EX1515246	BH6 0.554	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.011	<0.01

Where individual results are flagged see report notes for status.

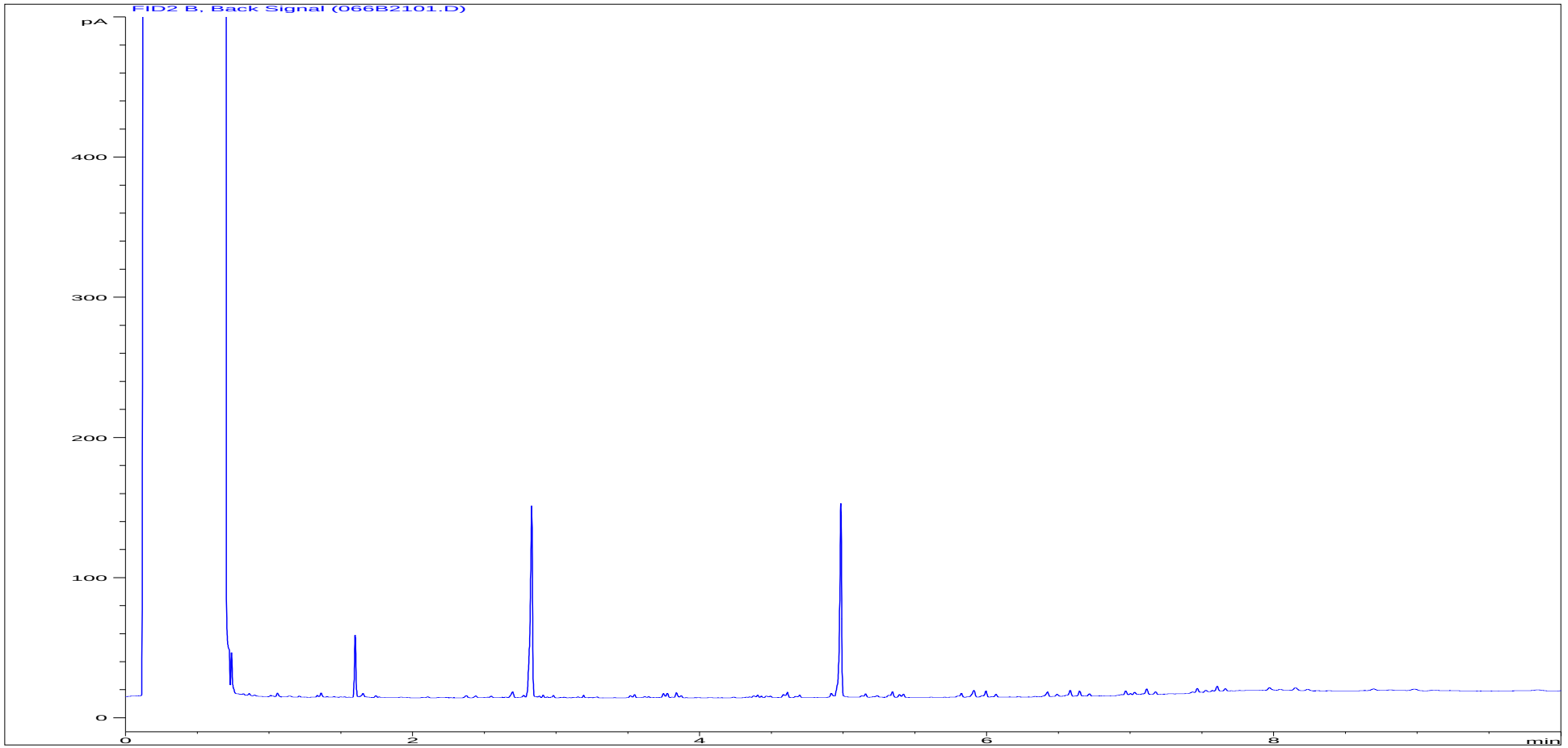
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	EX1515243ALI	**Job Number:**	W18_2428
Multiplier:	0.0188	**Client:**	Waterman EED
Dilution:	1	**Site:**	Worton Grange. Reading
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH1 4.947
Acquisition Date/Time:	13-Aug-14, 16:42:28		
Datafile:	D:\TES\DATA\Y2014\081314TPH_GC15\081314 2014-08-13 10-56-34\016F2101.D		

Where individual results are flagged see report notes for status.

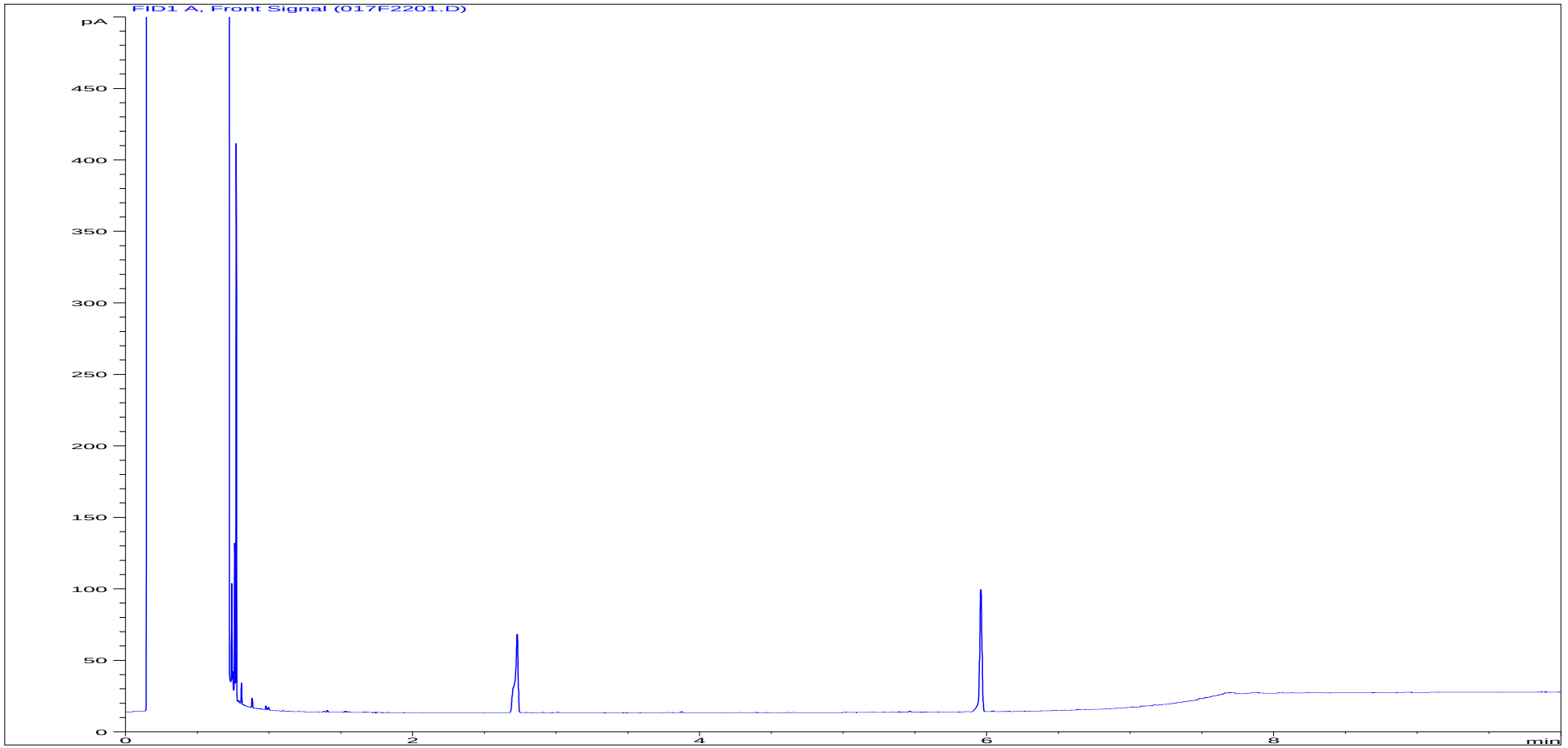
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	EX1515243ARO	**Job Number:**	W18_2428
Multiplier:	0.0148	**Client:**	Waterman EED
Dilution:	1	**Site:**	Worton Grange. Reading
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH1 4.947
Acquisition Date/Time:	13-Aug-14, 16:42:28		
Datafile:	D:\TES\DATA\Y2014\081314TPH_GC15\081314 2014-08-13 10-56-34\066B2101.D		

Where individual results are flagged see report notes for status.

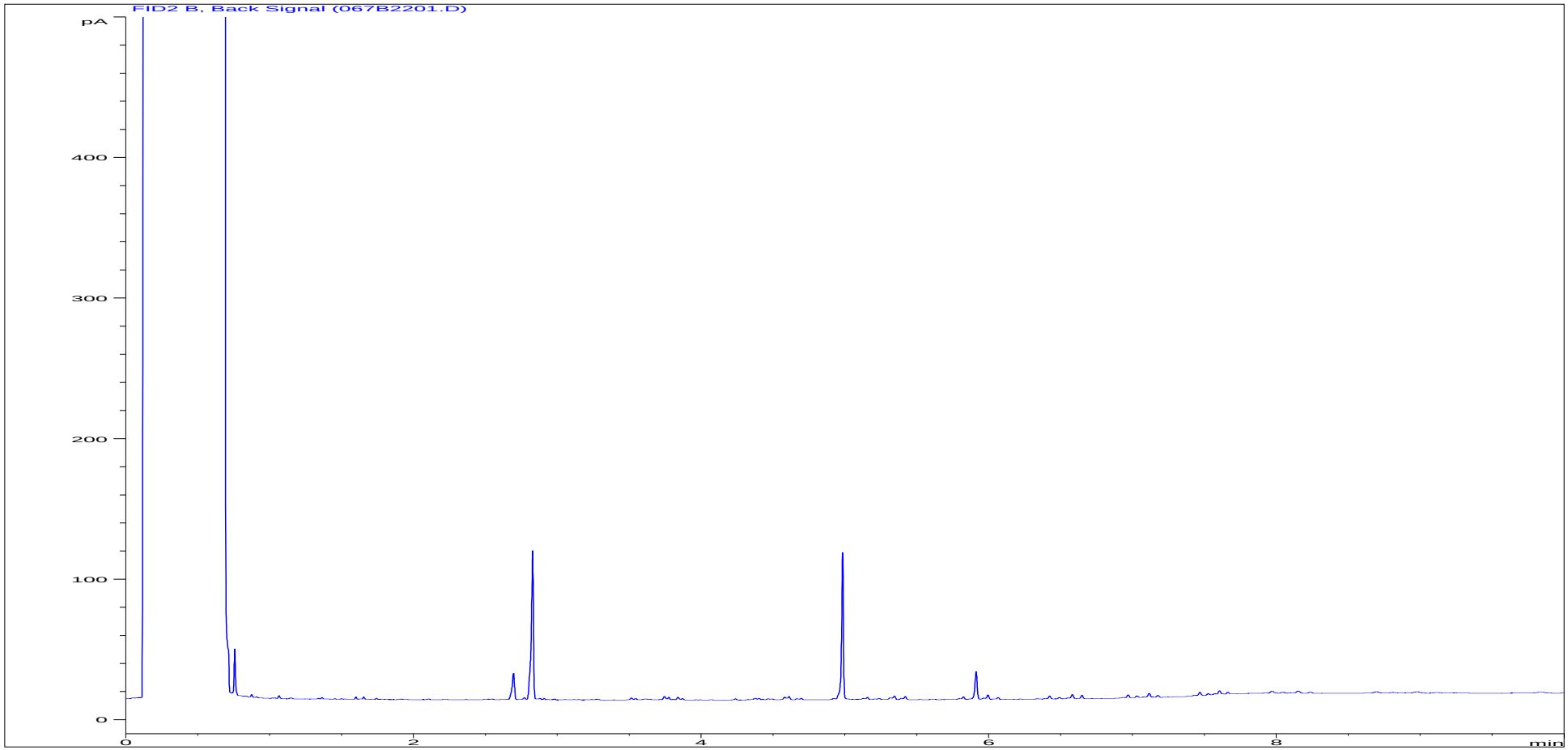
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	EX1515244ALI	**Job Number:**	W18_2428
Multiplier:	0.0186	**Client:**	Waterman EED
Dilution:	1	**Site:**	Worton Grange. Reading
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH3 2.670
Acquisition Date/Time:	13-Aug-14, 16:59:51		
Datafile:	D:\TES\DATA\Y2014\081314TPH_GC15\081314 2014-08-13 10-56-34\017F2201.D		

Where individual results are flagged see report notes for status.

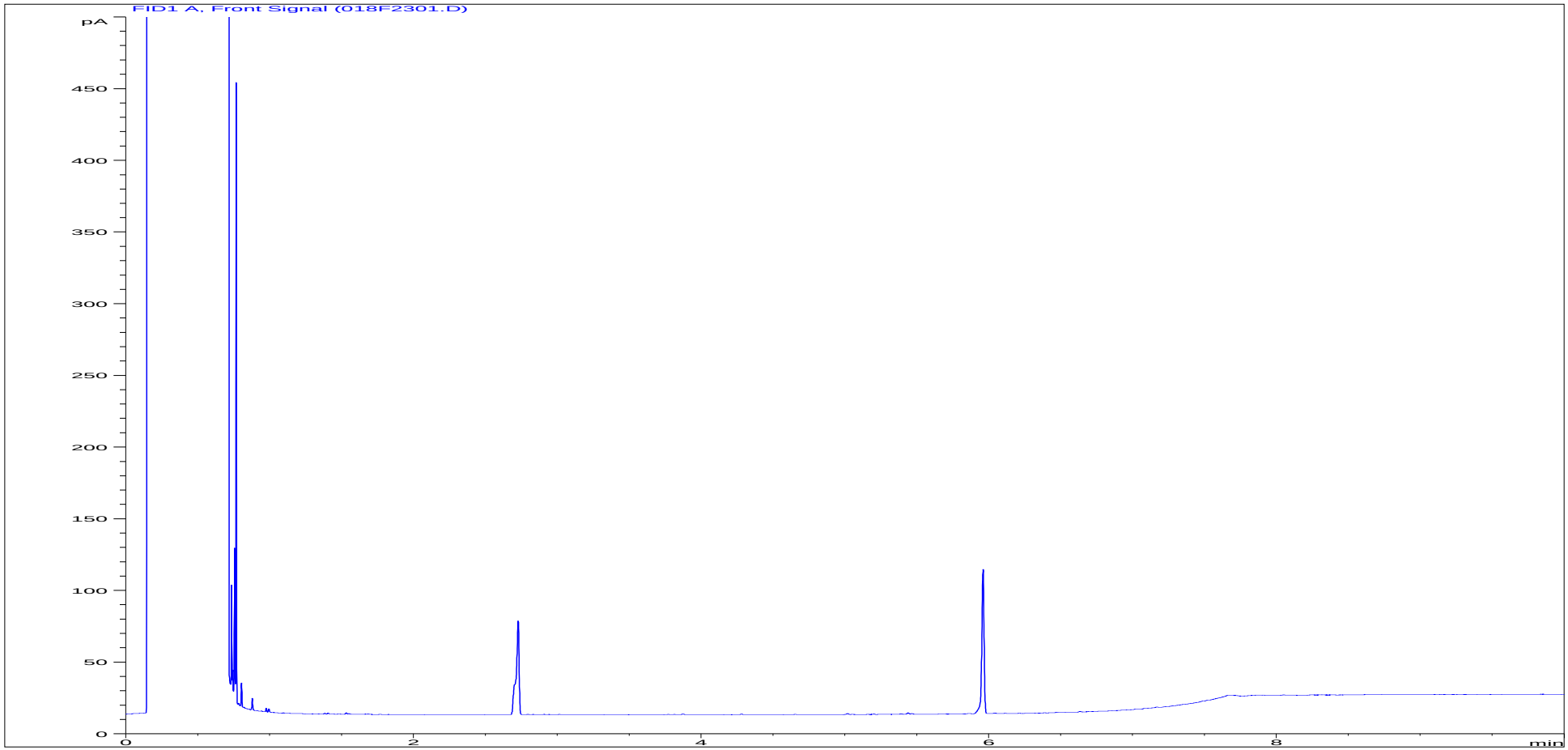
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	EX1515244ARO	**Job Number:**	W18_2428
Multiplier:	0.0145	**Client:**	Waterman EED
Dilution:	1	**Site:**	Worton Grange. Reading
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH3 2.670
Acquisition Date/Time:	13-Aug-14, 16:59:51		
Datafile:	D:\TES\DATA\Y2014\081314TPH_GC15\081314 2014-08-13 10-56-34\067B2201.D		

Where individual results are flagged see report notes for status.

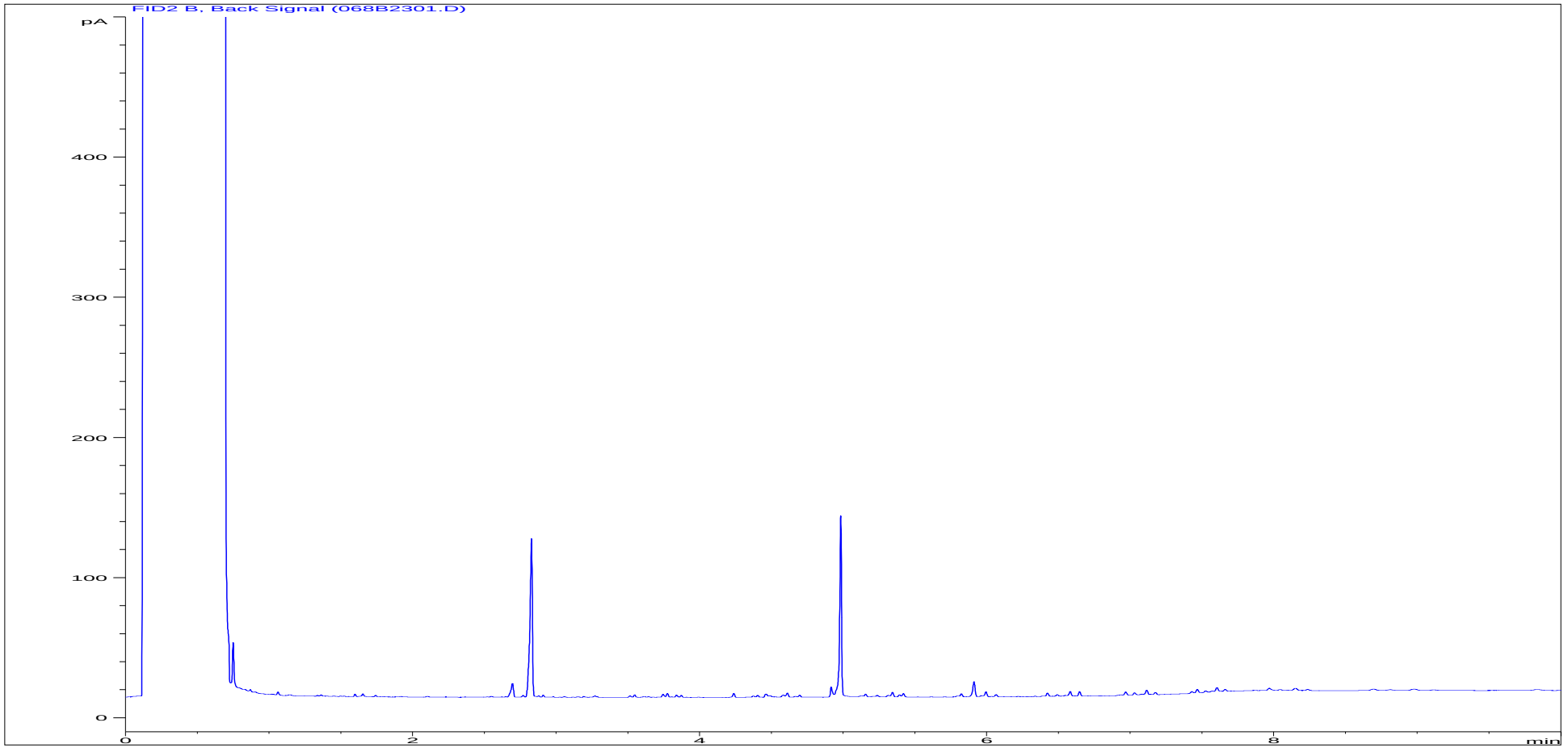
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	EX1515245ALI	**Job Number:**	W18_2428
Multiplier:	0.0188	**Client:**	Waterman EED
Dilution:	1	**Site:**	Worton Grange. Reading
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH4 4.258
Acquisition Date/Time:	13-Aug-14, 17:17:13		
Datafile:	D:\TES\DATA\Y2014\081314TPH_GC15\081314 2014-08-13 10-56-34\018F2301.D		

Where individual results are flagged see report notes for status.

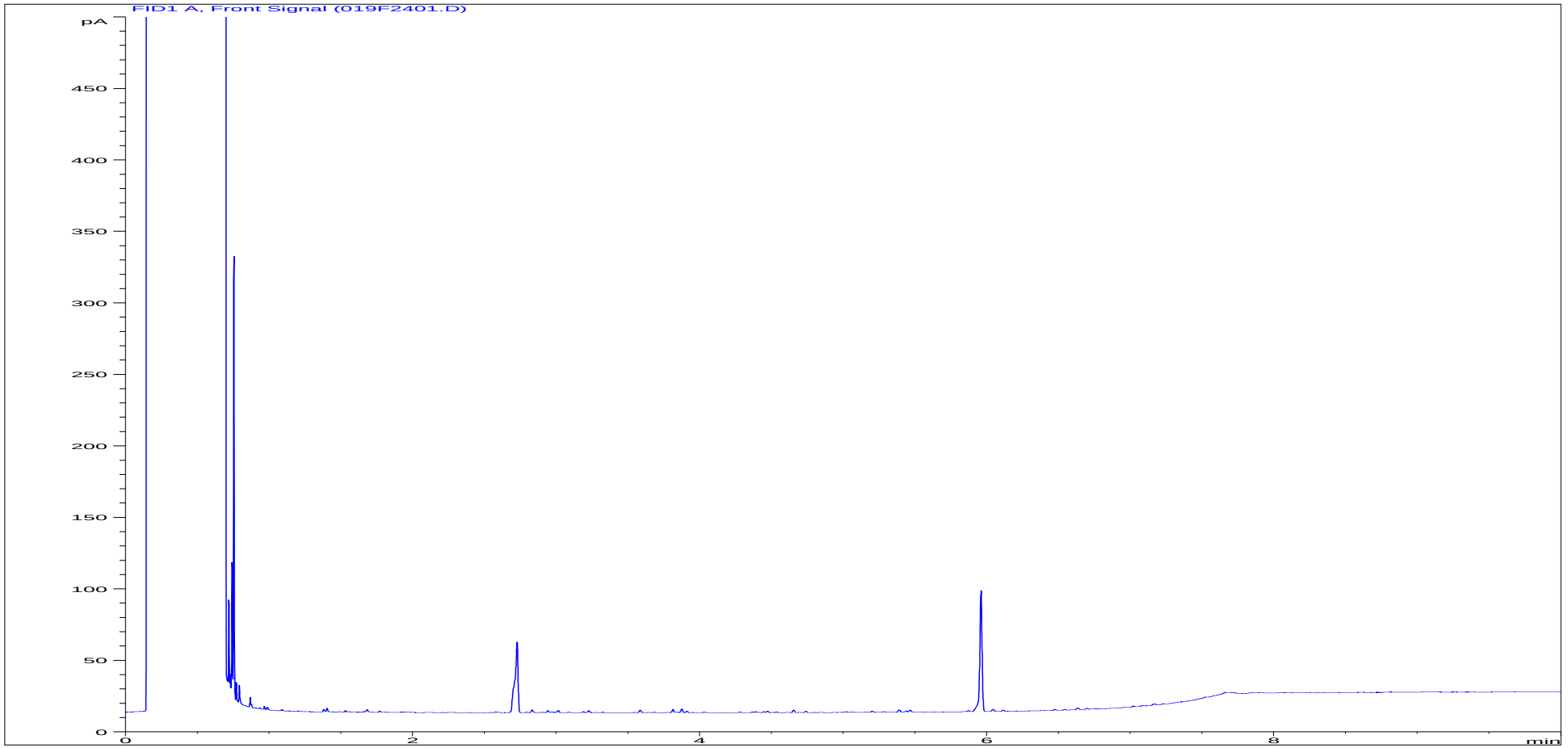
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	EX1515245ARO	**Job Number:**	W18_2428
Multiplier:	0.0146	**Client:**	Waterman EED
Dilution:	1	**Site:**	Worton Grange. Reading
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH4 4.258
Acquisition Date/Time:	13-Aug-14, 17:17:13		
Datafile:	D:\TES\DATA\Y2014\081314TPH_GC15\081314 2014-08-13 10-56-34\068B2301.D		

Where individual results are flagged see report notes for status.

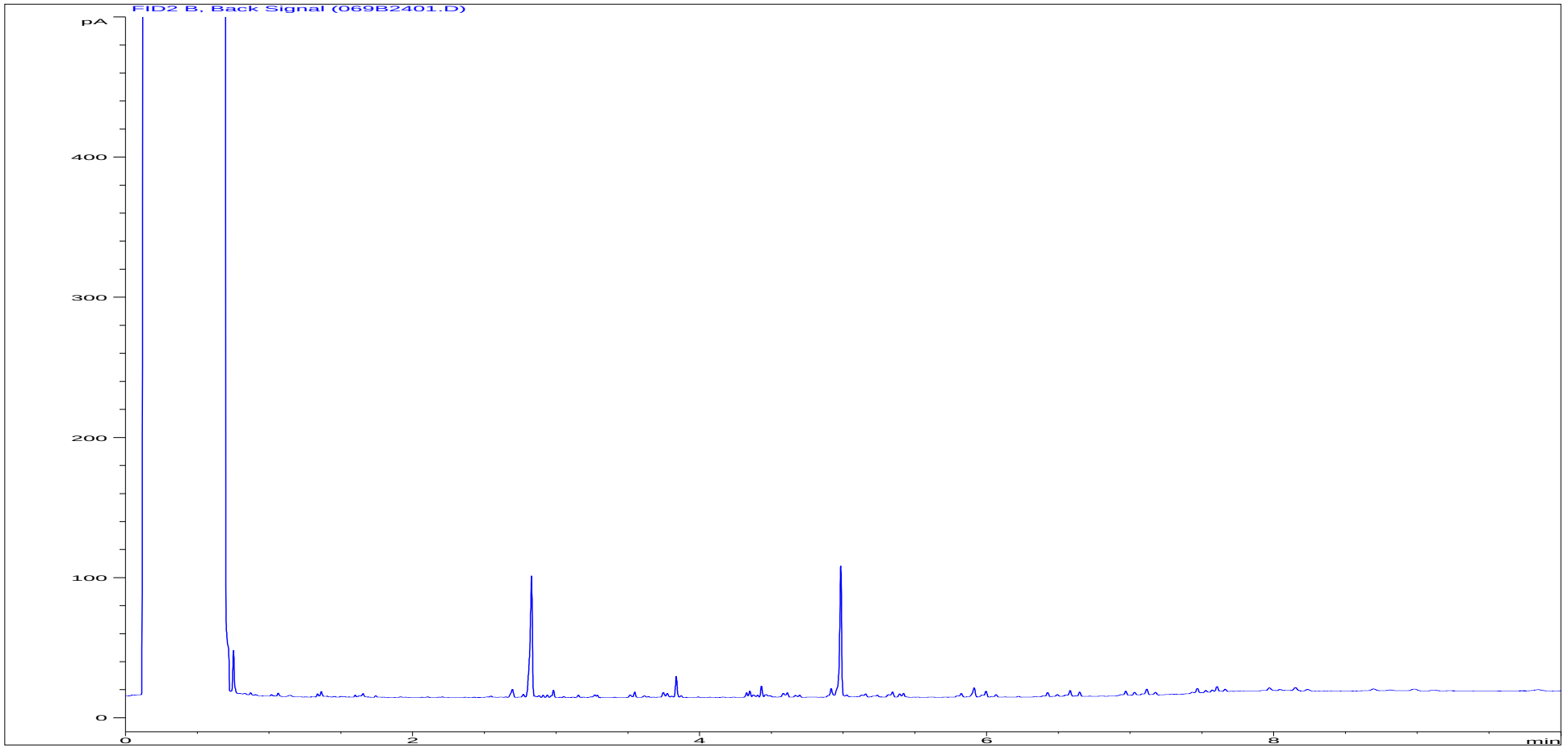
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	EX1515246ALI	**Job Number:**	W18_2428
Multiplier:	0.0188	**Client:**	Waterman EED
Dilution:	1	**Site:**	Worton Grange. Reading
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH6 0.554
Acquisition Date/Time:	13-Aug-14, 17:34:35		
Datafile:	D:\TES\DATA\Y2014\081314TPH_GC15\081314 2014-08-13 10-56-34\019F2401.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	EX1515246ARO	**Job Number:**	W18_2428
Multiplier:	0.0146	**Client:**	Waterman EED
Dilution:	1	**Site:**	Worton Grange. Reading
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	BH6 0.554
Acquisition Date/Time:	13-Aug-14, 17:34:35		
Datafile:	D:\TES\DATA\Y2014\081314TPH_GC15\081314 2014-08-13 10-56-34\069B2401.D		

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W182428

Customer Waterman EED
Site Worton Grange. Reading
Report No W182428

Consignment No W74638
Date Logged 08-Aug-2014

Report Due 14-Aug-2014

ID Number	Description	Matrix Type	Sampled	BTEX-HSA + MTBE analysis	Total Hardness as CaCO3 (CALC)	Report A	GRO-HSA GCFID (AA)	Nickel as Ni MS (Dissolved)	Chromium as Cr MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Vanadium as V MS (Dissolved)	Total Sulphur as SO4 (Diss) VAR	Calcium as Ca (Dissolved) VAR	Magnesium as Mg (Dissolved) VAR	Barium as Ba (Dissolved) VAR
MethodID				BTEXHSA	Calc_HD	CUSTSERV	GROHSA	ICPMSW										ICPWATVAR			
				✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EX/1515243	BH1 4.947	Groundwater	07/08/14																		
EX/1515244	BH3 2.670	Groundwater	07/08/14																		
EX/1515245	BH4 4.258	Groundwater	07/08/14																		
EX/1515246	BH6 0.554	Groundwater	07/08/14																		

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

Customer Waterman EED
Site Worton Grange. Reading
Report No W182428

Consignment No W74638
Date Logged 08-Aug-2014

Report Due 14-Aug-2014

ID Number	Description	Matrix Type	Sampled	MethodID											
				ICPWATVAR		KONENS		PAHMSW	PHEHPLCVL	SFAPI		SFAS	TPHFID-Si	WSLM3
				Boron as B (Dissolved) VAR	Beryllium as Be (Dissolved) VAR	Ammoniacal Nitrogen (Kone)	Nitrate as N (Kone calc)	PAH GC-MS (16)	Phenols by HPLC (Low Level)	Cyanide (Free) as CN SFA	Cyanide (Total) as CN SFA	Sulphide as S SFA	TPH by GC(Si)	pH units
				✓		✓	✓	✓		✓	✓	✓	✓	✓
EX/1515243	BH1 4.947	Groundwater	07/08/14											
EX/1515244	BH3 2.670	Groundwater	07/08/14											
EX/1515245	BH4 4.258	Groundwater	07/08/14											
EX/1515246	BH6 0.554	Groundwater	07/08/14											

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	BTEXHSA	As Received	Benzene, Toluene, Ethylbenzene, & Xylenes by headspace extraction GCFID quantitation
Water	Calc_HD	As Received	Calculation based on Dissolved metals analysis by ICPOES
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	PHEHPLCVL	As Received	Determination of Phenols by HPLC
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	TPHFID-Si	As Received	Determination of speciated pentane extractable hydrocarbons in water by GCFID
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Waterman EED

Site : Worton Grange. Reading

Report Number : W18_2428

Lab ID Number	Client ID	Description
EX/1515243	BH1 4.947	Groundwater
EX/1515244	BH3 2.670	Groundwater
EX/1515245	BH4 4.258	Groundwater
EX/1515246	BH6 0.554	Groundwater

Appendix F. Geotechnical Analysis

Geotechnical Test Results - CBR (11pages)

Geotechnical Test Results (25 pages)

PSL
Professional Soils Laboratory

LABORATORY REPORT

UKAS TESTING
4043

Contract Number: PSL14/3717

Client's Reference: Report Date: 24 July 2014

Client Name: Brownfield Solutions
Wychwood House
1 Queens Street
Northwich
Cheshire
CW9 5JL

For the attention of: James Doyle

Contract Title: Imperial Way, Reading.

Date Received: 23/7/2014
Date Commenced: 23/7/2014
Date Completed: 24/7/2014

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)
M Beastall (Laboratory Manager)

D Lambe (Senior Technician)
S Royle (Senior Technician)

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e-mail: awatkins@prosoils.co.uk

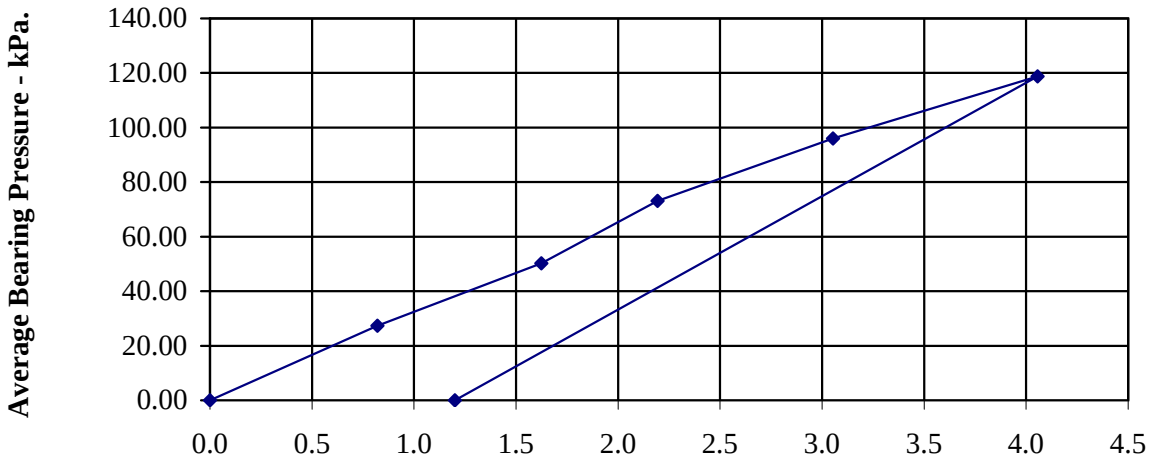
VERTICAL DEFORMATION TESTS.

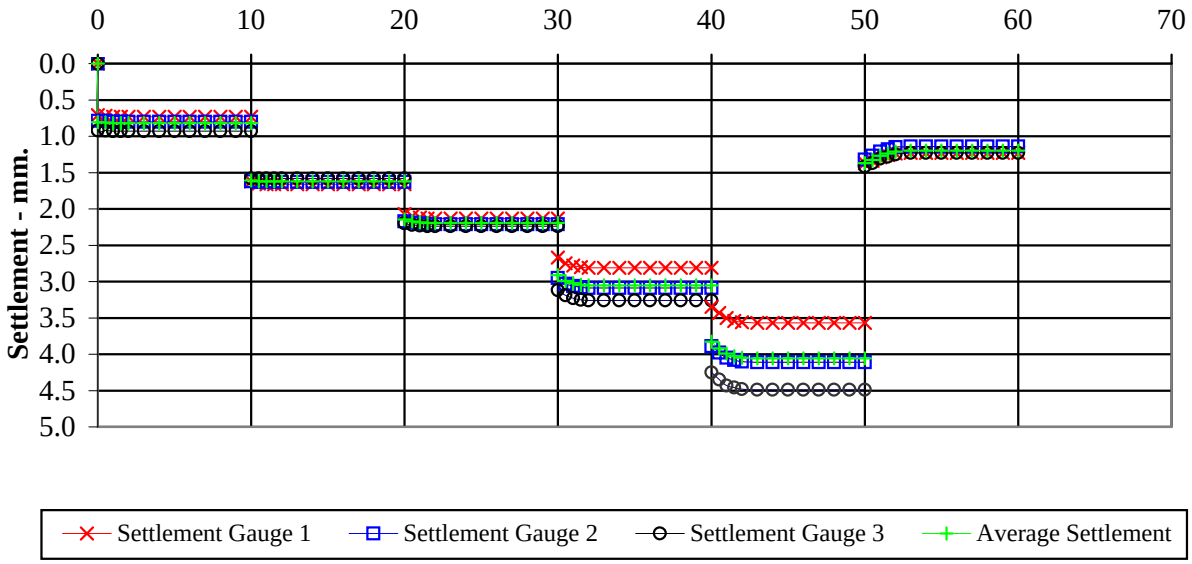
BS 1377 : Part 9 : 1990.

Date of Test: 22/07/14

Test Position: CBR01 **Depth (m):** 0.45

Plate Area (m2): 0.2827433 **Type of Kentledge:** Wheeled
Moisture Content (%) N/A
Maximum Applied Pressure (kPa): 118.82
Maximum Deformation (mm): 4.06
Description: Light brown slightly gravelly slightly sandy CLAY.





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Professional Soils Laboratory

Professional Soils Laboratory Ltd.
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Hexthorpe
Doncaster, DN4 0AR.
tel: 0844 8156641
fax: 0844 8156642

Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4
Incorporating IAN 73/06

Date of Test	**22/07/14**	
Test Position	**CBR01**	
Depth (m)	**0.45**	
Moisture Content(%)	**N/A**	
Description	**Light brown slightly gravelly slightly sandy CLAY.**	
Maximum Deflection	**4.06**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load(@1.25mm)	**40.0**	**kN/m^2**
Plate diameter	**600**	**mm**
Conversion factor for plate diameter	**0.804**	
K_{762}(modulus of subgrade reaction)	**25.7**	**$kN/m^2/mm$**
CBR Value	**2.7**	**%**

Checked/Approved	Date
M.Burns	23/07/14

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e-mail: awatkins@prosoils.co.uk

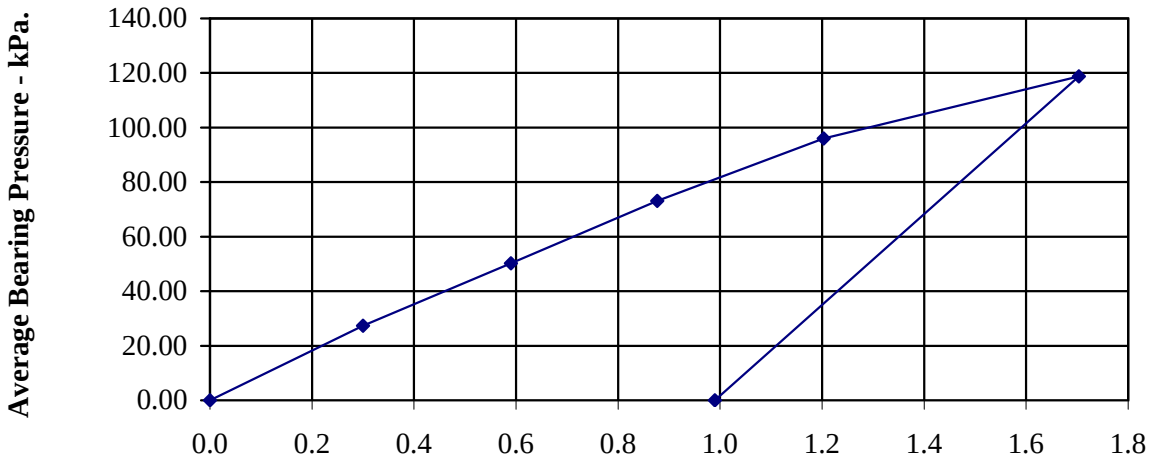
VERTICAL DEFORMATION TESTS.

BS 1377 : Part 9 : 1990.

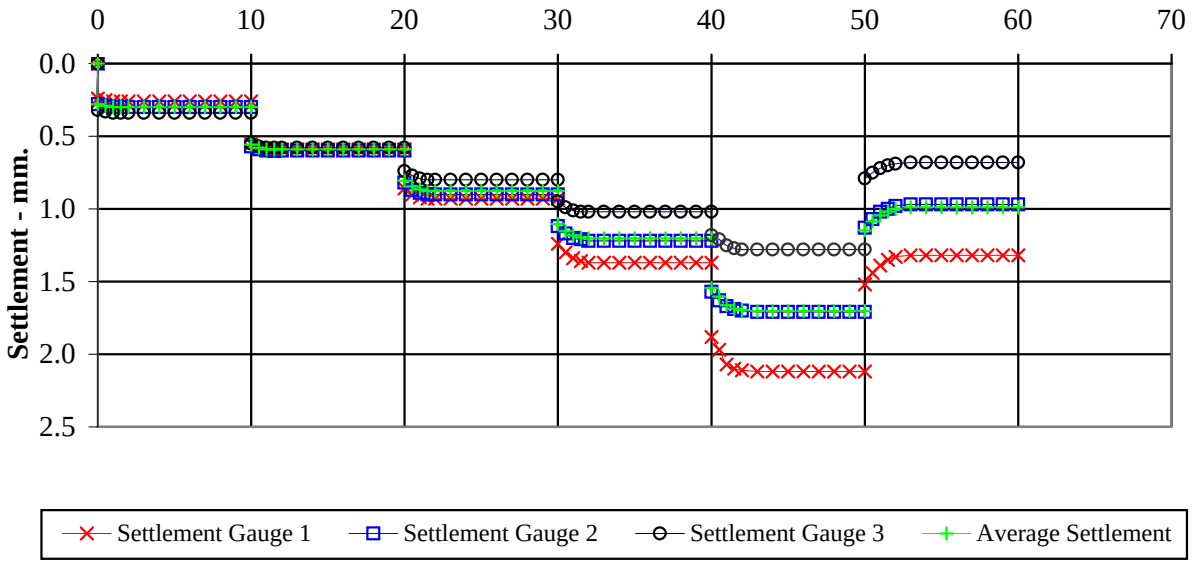
Date of Test: 22/07/14

Test Position: CBR02 **Depth (m):** 0.65

Plate Area (m2): 0.2827433 **Type of Kentledge:** Wheeled
Moisture Content (%) N/A
Maximum Applied Pressure (kPa): 118.82
Maximum Deformation (mm): 1.70
Description: Light brown slightly gravelly slightly sandy CLAY.



Time - minutes.



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Calculation of Equivalent CBR Value from Plate Bearing Test

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Incorporating IAN 73/06

Date of Test	**22/07/14**	
Test Position	**CBR02**	
Depth (m)	**0.65**	
Moisture Content(%)	**N/A**	
Description	**Light brown slightly gravelly slightly sandy CLAY.**	
Maximum Deflection	**1.70**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load(@1.25mm)	**98.0**	**kN/m^2**
Plate diameter	**600**	**mm**
Conversion factor for plate diameter	**0.804**	
K_{762}(modulus of subgrade reaction)	**63.1**	**$kN/m^2/mm$**
CBR Value	**12.7**	**%**

Checked/Approved	Date
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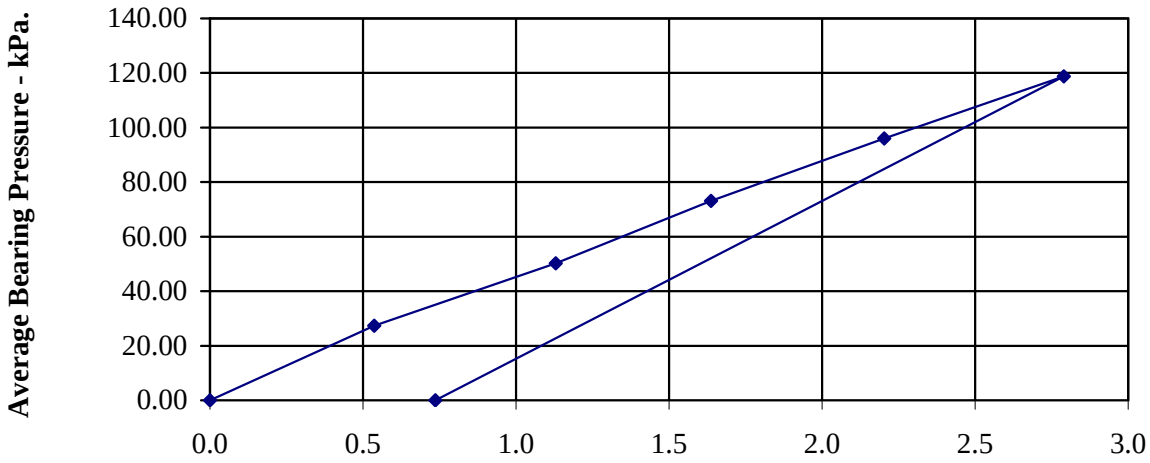
VERTICAL DEFORMATION TESTS.

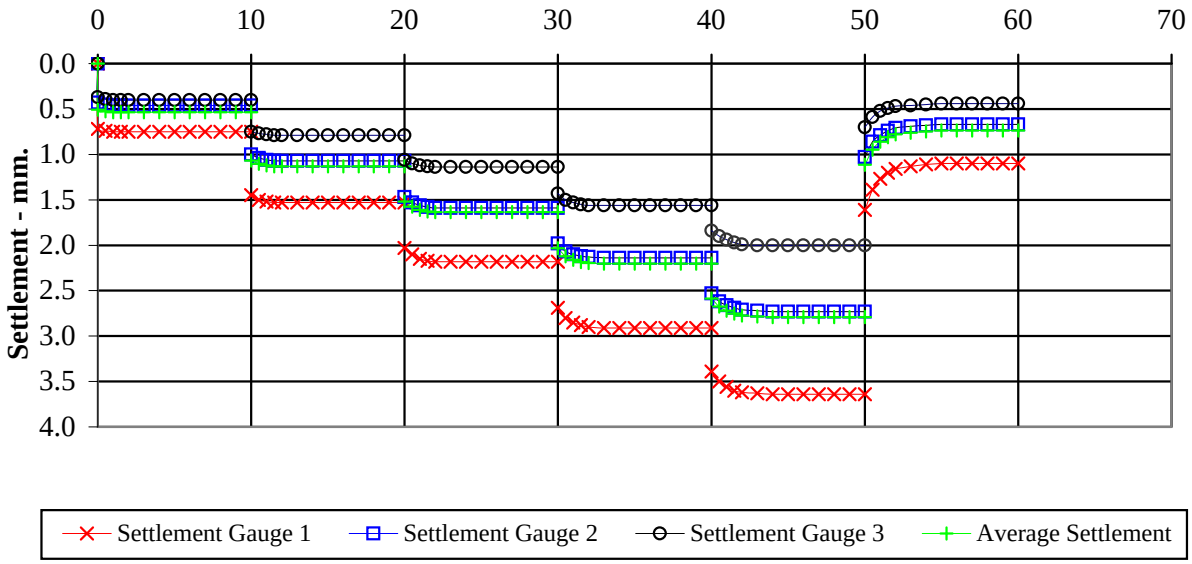
BS 1377 : Part 9 : 1990.

Date of Test: 22/07/14

Test Position: CBR03 **Depth (m):** 0.45

Plate Area (m2): 0.2827433 **Type of Kentledge:** Wheeled
Moisture Content (%) N/A
Maximum Applied Pressure (kPa): 118.82
Maximum Deformation (mm): 2.79
Description: Light brown slightly gravelly slightly sandy CLAY.





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Calculation of Equivalent CBR Value from Plate Bearing Test

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Incorporating IAN 73/06

Date of Test	**22/07/14**	
Test Position	**CBR03**	
Depth (m)	**0.45**	
Moisture Content(%)	**N/A**	
Description	**Light brown slightly gravelly slightly sandy CLAY.**	
Maximum Deflection	**2.79**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load(@1.25mm)	**57.0**	**kN/m^2**
Plate diameter	**600**	**mm**
Conversion factor for plate diameter	**0.804**	
K_{762}(modulus of subgrade reaction)	**36.7**	**$kN/m^2/mm$**
CBR Value	**5.0**	**%**

Checked/Approved	Date
M.Burns	23/07/14

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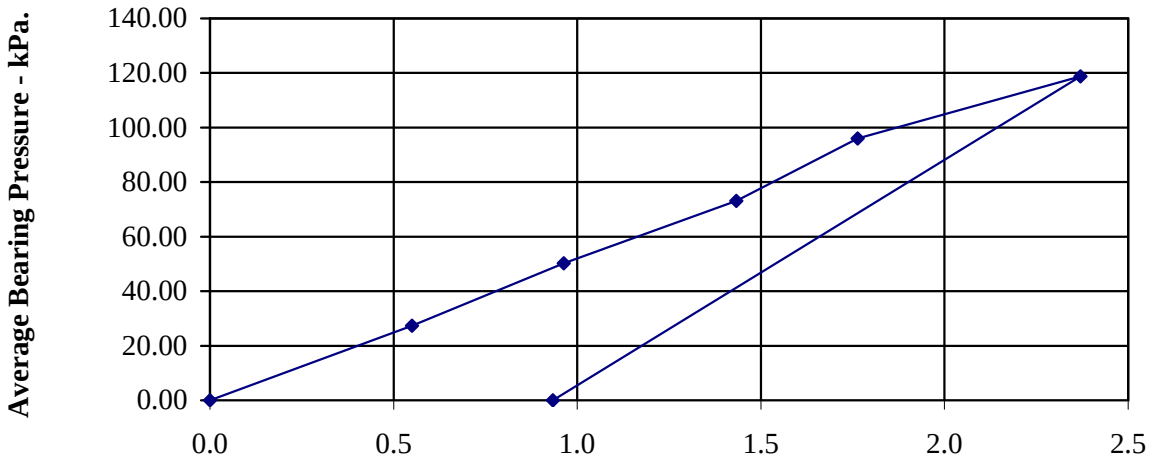
VERTICAL DEFORMATION TESTS.

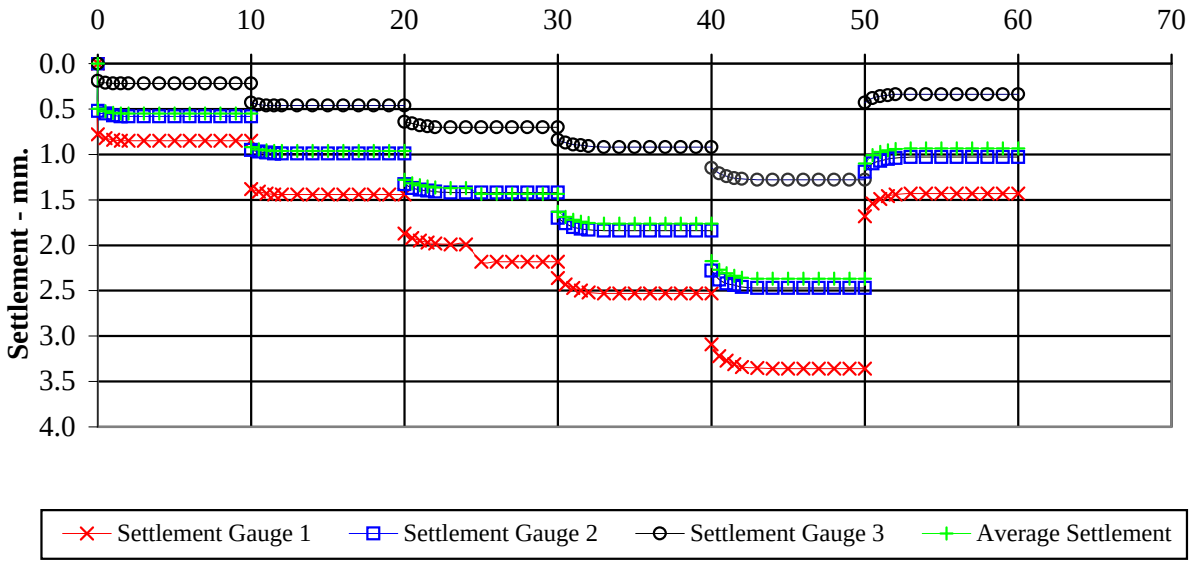
BS 1377 : Part 9 : 1990.

Date of Test: 22/07/14

Test Position: CBR04 **Depth (m):** 0.00

Plate Area (m2): 0.2827433 **Type of Kentledge:** Wheeled
Moisture Content (%) N/A
Maximum Applied Pressure (kPa): 118.82
Maximum Deformation (mm): 2.37
Description: Light brown slightly gravelly slightly sandy CLAY.





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Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4
Incorporating IAN 73/06

Date of Test	**22/07/14**	
Test Position	**CBR04**	
Depth (m)	**0.00**	
Moisture Content(%)	**N/A**	
Description	**Light brown slightly gravelly slightly sandy CLAY.**	
Maximum Deflection	**2.37**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load(@1.25mm)	**64.0**	**kN/m^2**
Plate diameter	**600**	**mm**
Conversion factor for plate diameter	**0.804**	
K_{762}(modulus of subgrade reaction)	**41.2**	**$kN/m^2/mm$**
CBR Value	**6.1**	**%**

Checked/Approved	Date
M.Burns	23/07/14

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tel: 0844 8156641 . fax: 0844 8156642
e-mail: awatkins@prosoils.co.uk

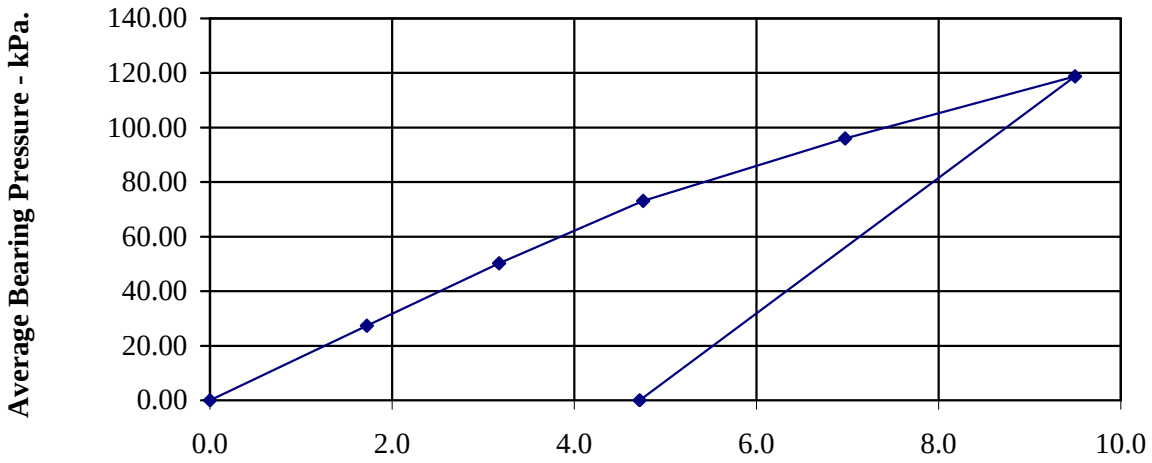
VERTICAL DEFORMATION TESTS.

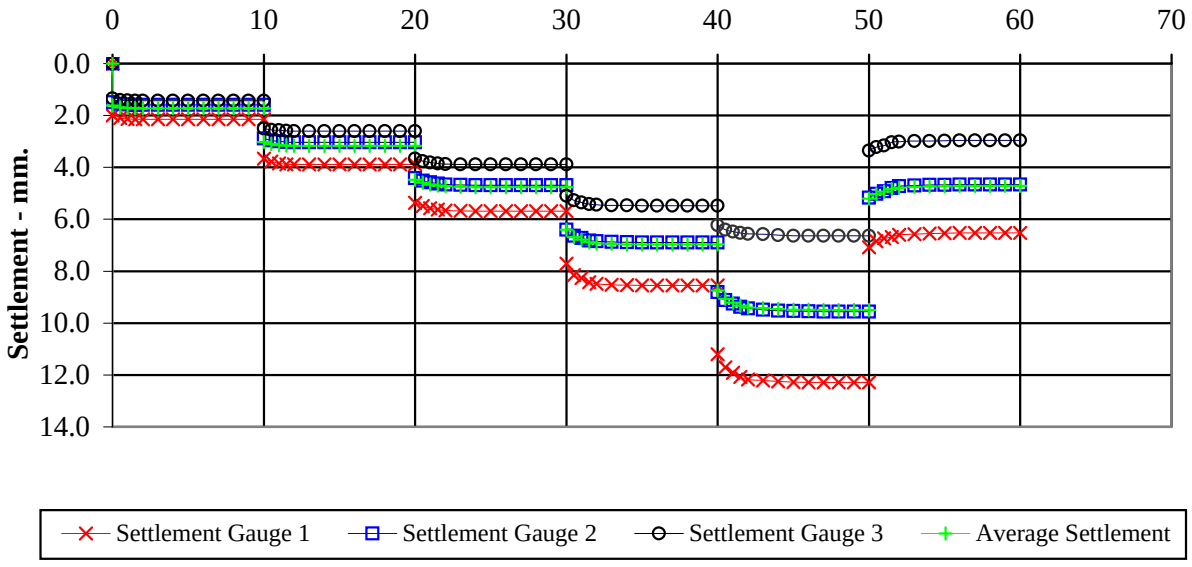
BS 1377 : Part 9 : 1990.

Date of Test: 22/07/14

Test Position: CBR05 **Depth (m):** 0.70

Plate Area (m2): 0.2827433 **Type of Kentledge:** Wheeled
Moisture Content (%) N/A
Maximum Applied Pressure (kPa): 118.82
Maximum Deformation (mm): 9.50
Description: Light brown slightly gravelly slightly sandy CLAY.





Compiled By	Date	Checked By	Date	Approved By	Date	Contract No.
	23/07/14		23/07/14		23/07/14	PSL14/3717

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Professional Soils Laboratory Ltd.
5-7 Hexthorpe Road
Hexthorpe
Doncaster, DN4 0AR.
tel: 0844 8156641
fax: 0844 8156642

Calculation of Equivalent CBR Value from Plate Bearing Test

Design Manual for Roads and Bridges Volume 7 Section 2 Chapter 4
Incorporating IAN 73/06

Date of Test	**22/07/14**	
Test Position	**CBR05**	
Depth (m)	**0.70**	
Moisture Content(%)	**N/A**	
Description	**Light brown slightly gravelly slightly sandy CLAY.**	
Maximum Deflection	**9.50**	**mm**
Deflection required for CBR value	**1.25**	**mm**
Load(@1.25mm)	**20.0**	**kN/m^2**
Plate diameter	**600**	**mm**
Conversion factor for plate diameter	**0.804**	
K_{762}(modulus of subgrade reaction)	**12.9**	**$kN/m^2/mm$**
CBR Value	**0.8**	**%**

Checked/Approved	Date
M.Burns	23/07/14

IMPERIAL WAY, READING.	**Contract No.** **PSL14/3717**

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LABORATORY REPORT

UKAS TESTING
4043

Contract Number: PSL14/3901

Client's Reference: Report Date: 22 August 2014

Client Name: Brownfield Solutions
Wychwood House
1 Queens Street
Northwich
Cheshire
CW9 5JL

For the attention of: Will Griffiths

Contract Title: Imperial Way, Reading.

Date Received: 4/8/2014
Date Commenced: 4/8/2014
Date Completed: 22/8/2014

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)
M Beastall (Laboratory Manager)

D Lambe (Senior Technician)
S Royle (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Depth m	Description of Sample
BH01		U	1.50	Stiff brown mottled grey gravelly slightly sandy CLAY.
BH01		U	3.50	Stiff brown slightly gravelly slightly sandy CLAY.
BH01		U	6.50	Stiff dark brown slightly sandy CLAY.
BH01		U	10.50	Stiff dark brown slightly sandy CLAY.
BH01		B	1.00	Brown slightly gravelly slightly sandy CLAY.
BH02		U	2.50	Firm brown mottled grey slightly sandy CLAY.
BH02		U	7.50	Stiff dark brown slightly sandy CLAY.
BH02		U	4.50	Stiff dark brown slightly sandy CLAY.
BH02		D	1.50	Brown mottled grey slightly sandy CLAY.
BH03		U	8.50	Stiff dark brown slightly sandy CLAY.
BH03		U	12.50	Stiff dark brown slightly sandy CLAY.
BH04		U	3.50	Stiff dark brown mottled grey slightly sandy LAY.
BH04		U	14.50	Very stiff brown mottled grey sandy CLAY.
BH04		U	6.50	Stiff dark brown slightly sandy CLAY.
BH04		U	10.50	Firm dark brown slightly sandy CLAY.
BH05		U	3.50	Stiff brown slightly sandy CLAY.
BH05		U	5.50	Stiff brown slightly sandy CLAY.
BH05		B	1.00	Brown slightly gravelly sandy CLAY.
BH06		U	1.50	Stiff brown mottled grey slighty gravelly slightly sandy CLAY.

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Contract No: PSL14/3901

Client Ref: C2611

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Depth m	Description of Sample
BH06		U	3.50	Stiff dark brown slightly sandy CLAY.
BH06		U	5.50	Stiff dark brown slightly sandy CLAY.
BH06		U	9.50	Stiff dark brown slightly sandy CLAY.
BH06		B	1.00	Brown slightly sandy CLAY.
TP11		B	1.20	MADE GROUND brown sandy silty gravel.
TP12		B	0.60	MADE GROUND brown sandy silty gravel.

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Contract No: PSL14/3901

Client Ref: C2611

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
BH01		B	1.00	16				62	26	36	95	High plasticity CH.
BH02		D	1.50	27				56	25	31	98	High plasticity CH.
BH05		B	1.00	12				51	24	27	95	High plasticity CH.
BH06		B	1.00	26				66	26	40	100	High plasticity CH.

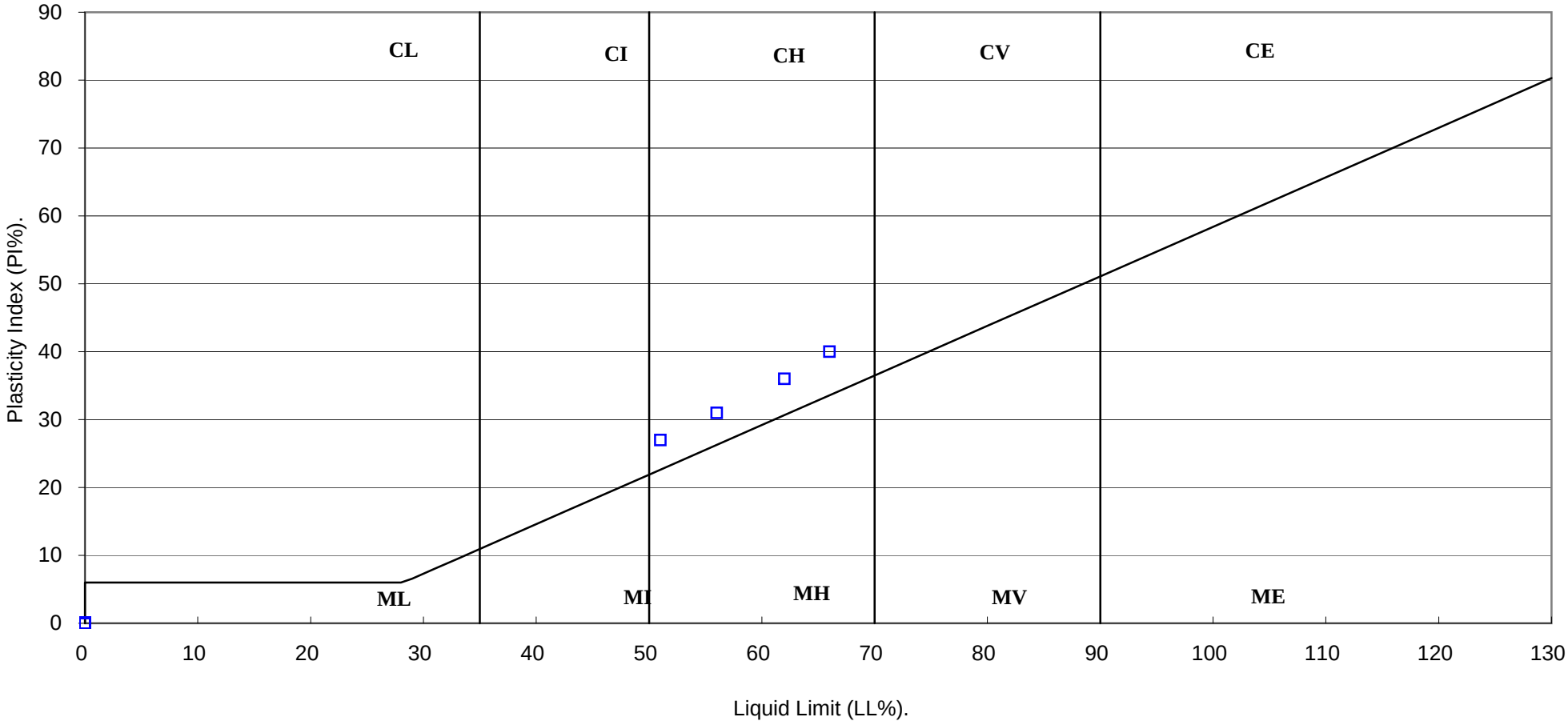
SYMBOLS : NP : Non Plastic *** : Liquid Limit and Plastic Limit Wet Sieved.**

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				Client Ref:	C2611

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



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	IMPERIAL WAY, READING.				Contract No:	PSL14/3901
					Client Ref:	C2611

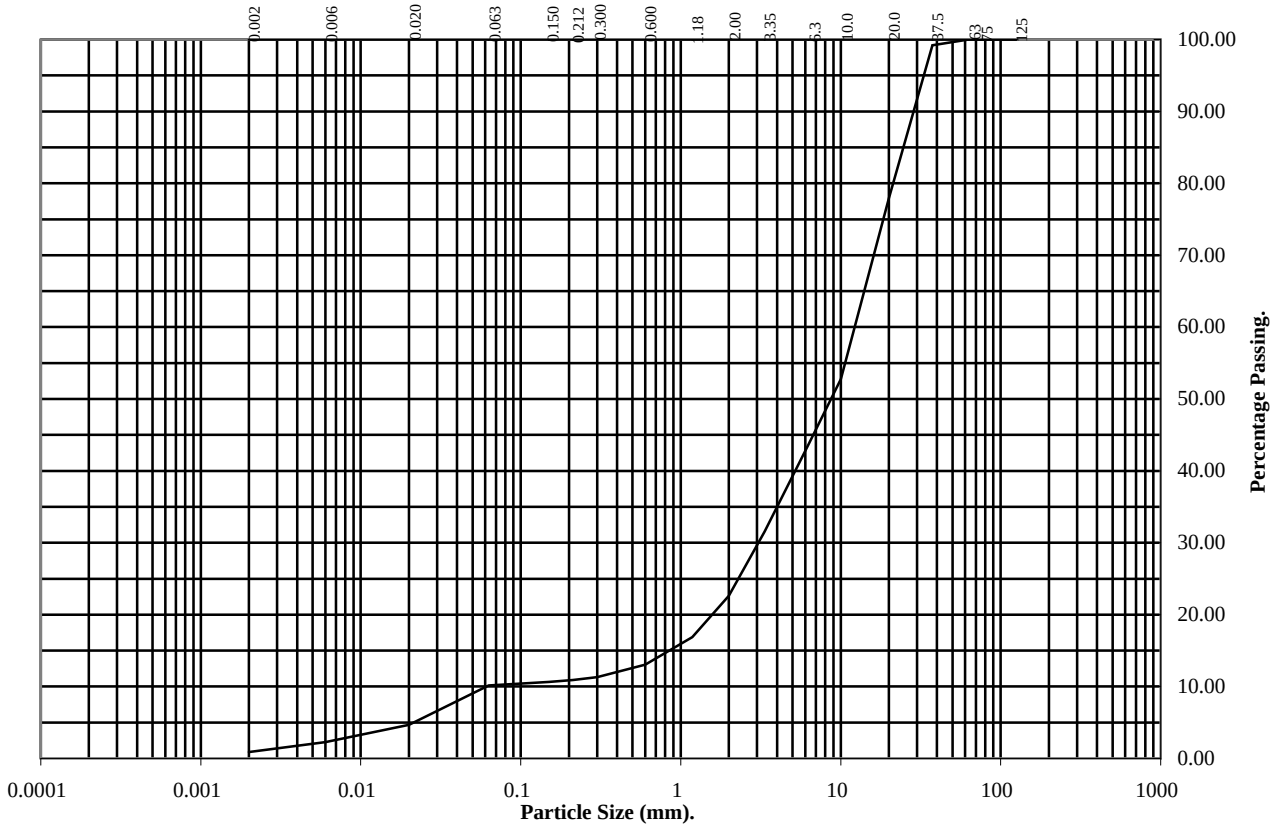
Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: **TP11** **Depth (m):** **1.20**

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



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	99
20	78
10	53
6.3	44
3.35	32
2	23
1.18	17
0.6	13
0.3	11
0.212	11
0.15	11
0.063	10

Particle Diameter	Percentage Passing
0.02	5
0.006	2
0.002	1

Soil Fraction	Total Percentage
Cobbles	0
Gravel	77
Sand	13
Silt	9
Clay	1

Remarks:
See summary of soil descriptions.

Checked By	Date	Approved By	Date
	22/08/14		22/08/14

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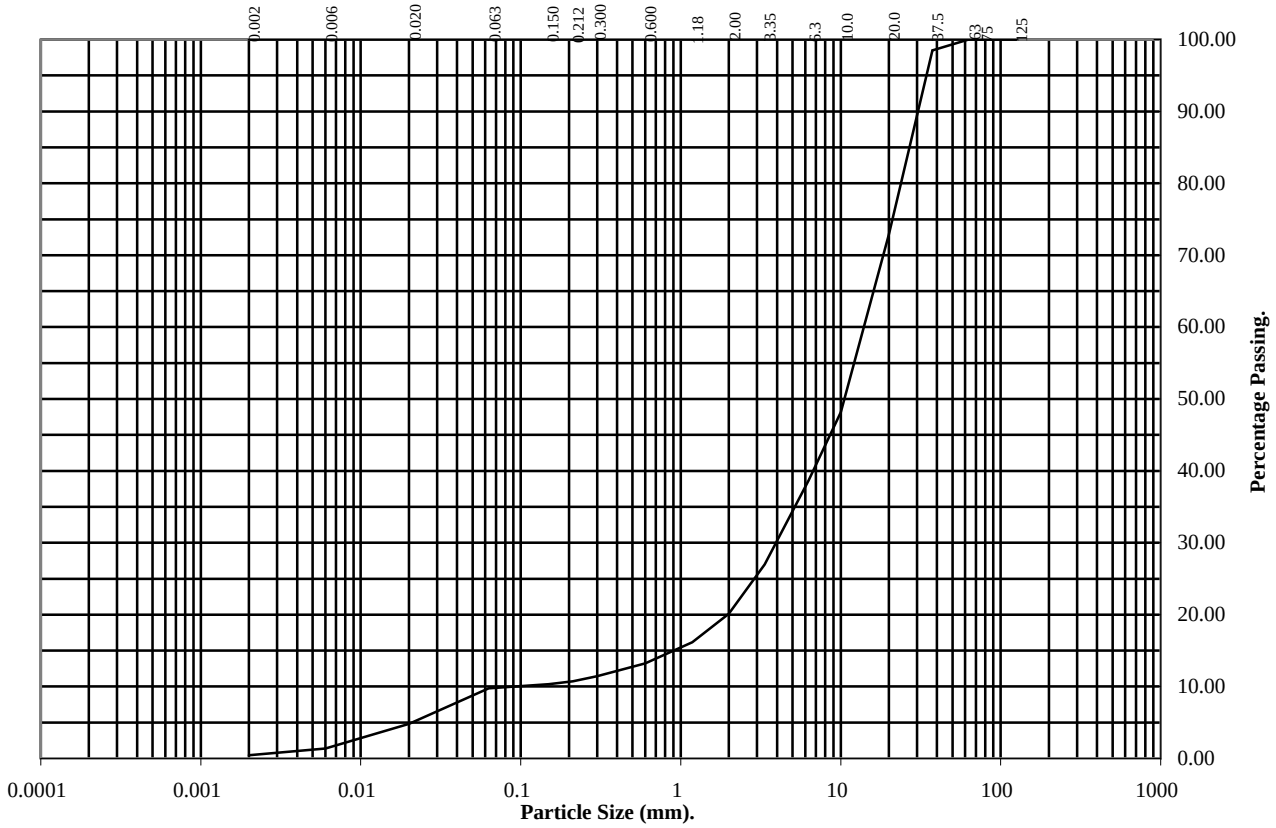
Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: **TP12** **Depth (m):** **0.60**

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



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	99
20	73
10	48
6.3	39
3.35	27
2	20
1.18	16
0.6	13
0.3	11
0.212	11
0.15	10
0.063	10

Particle Diameter	Percentage Passing
0.02	5
0.006	1
0.002	0

Soil Fraction	Total Percentage
Cobbles	0
Gravel	80
Sand	10
Silt	10
Clay	0

Remarks:
See summary of soil descriptions.

Checked By	Date	Approved By	Date
M.Sm	22/08/14	M.Sm	22/08/14

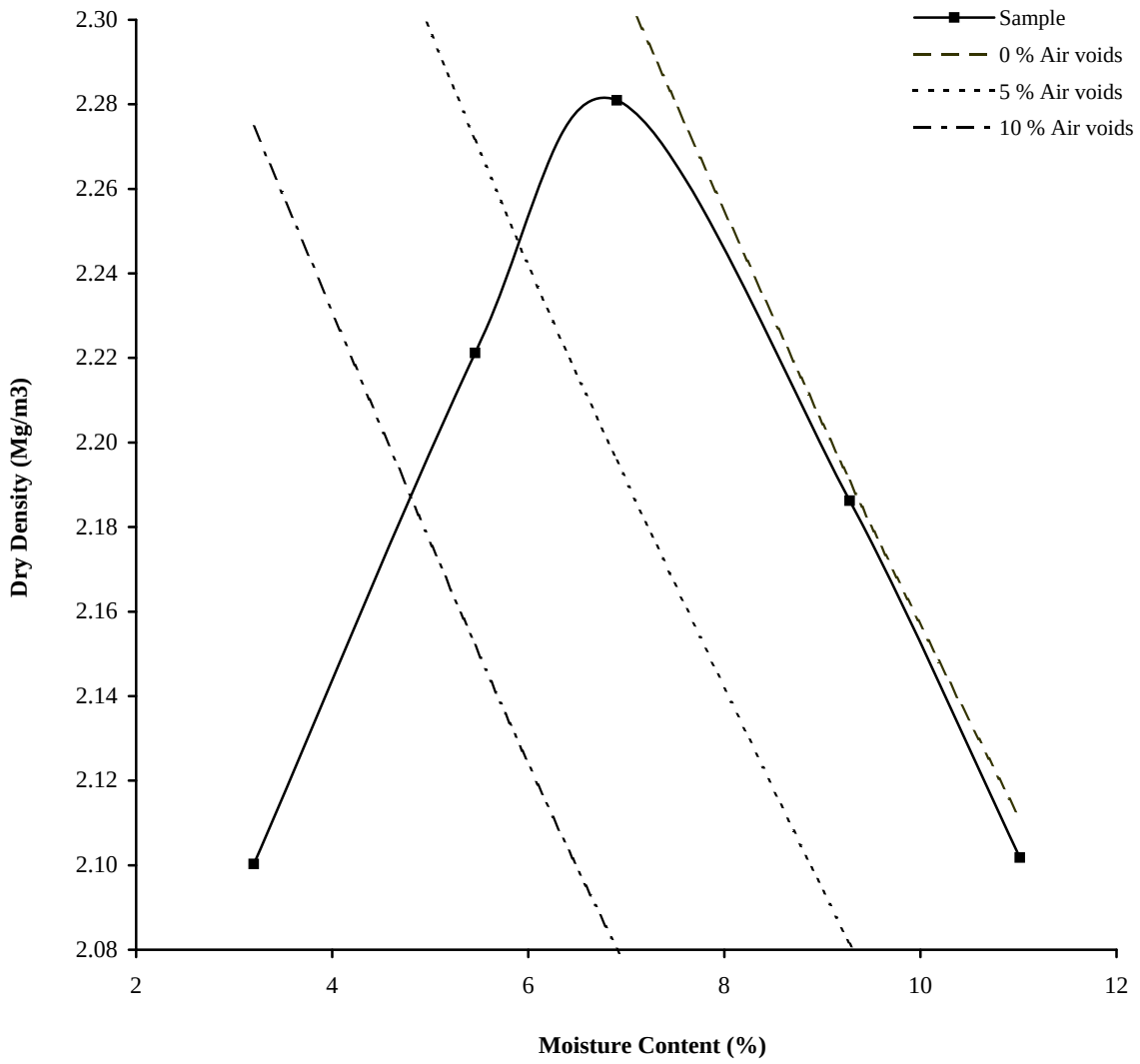
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Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Hole Number: TP11 **Depth (m) :** 1.20

Sample Number: **Sample Type:** B



Initial Moisture Content:	3	Method of Compaction	2.5kg / Separate Sample	
Particle Density (Mg/m3):	2.75	Assumed	Material Retained on 37.5 mm Test Sieve (%):	1
Maximum Dry Density (Mg/m3):		2.28	Material Retained on 20.0 mm Test Sieve (%):	21
Optimum Moisture Content (%):		7		
Remarks	See Summary of Soil Descriptions.			

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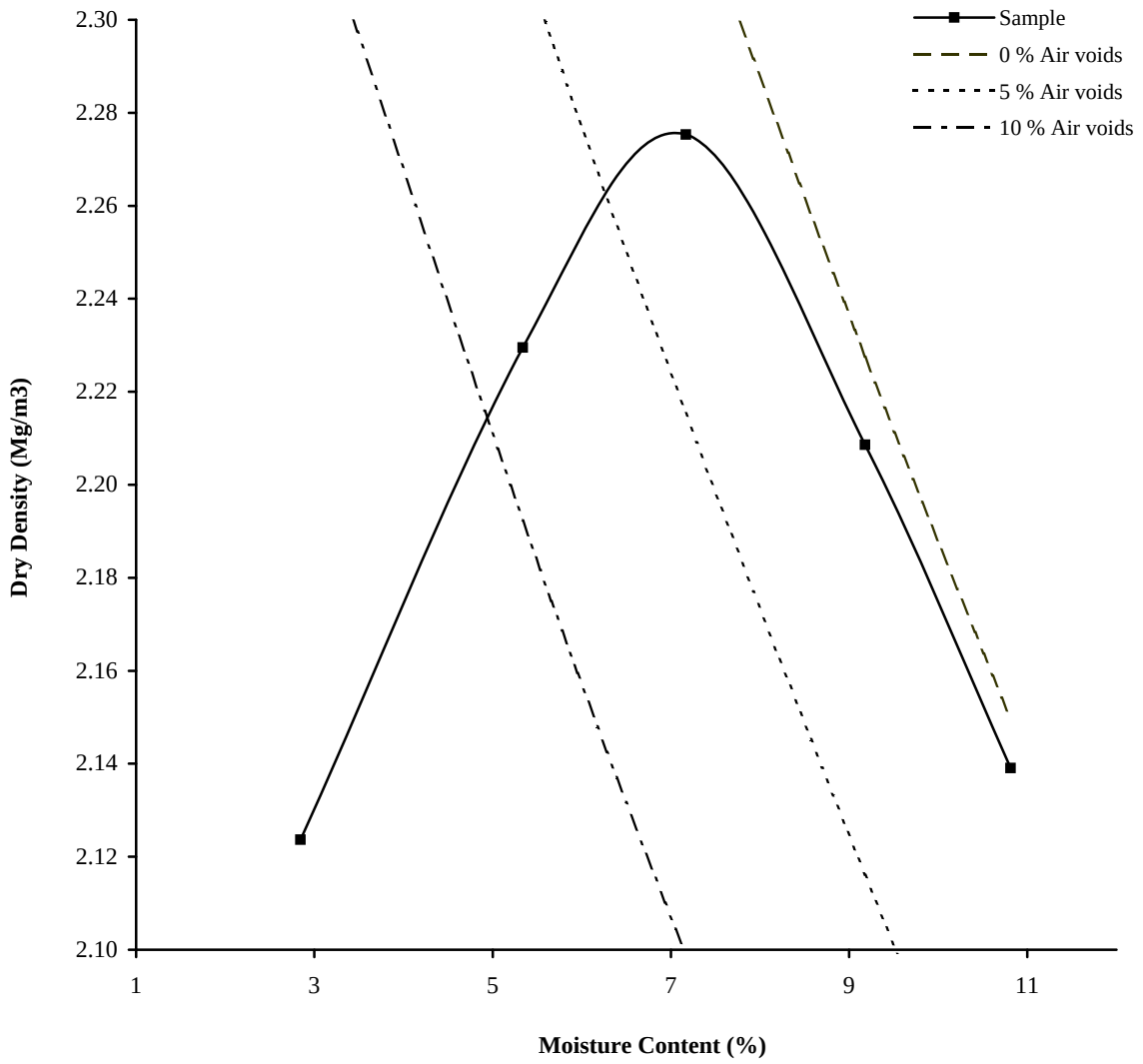
Contract No. PSL14/3901

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Hole Number: TP12 **Depth (m) :** 0.60

Sample Number: **Sample Type:** B



Initial Moisture Content:	3.0	Method of Compaction	2.5kg / Separate Sample	
Particle Density (Mg/m3):	2.8	Assumed	Material Retained on 37.5 mm Test Sieve (%):	1
Maximum Dry Density (Mg/m3):		2.28	Material Retained on 20.0 mm Test Sieve (%):	26
Optimum Moisture Content (%):		7		
Remarks	See Summary of Soil Descriptions.			

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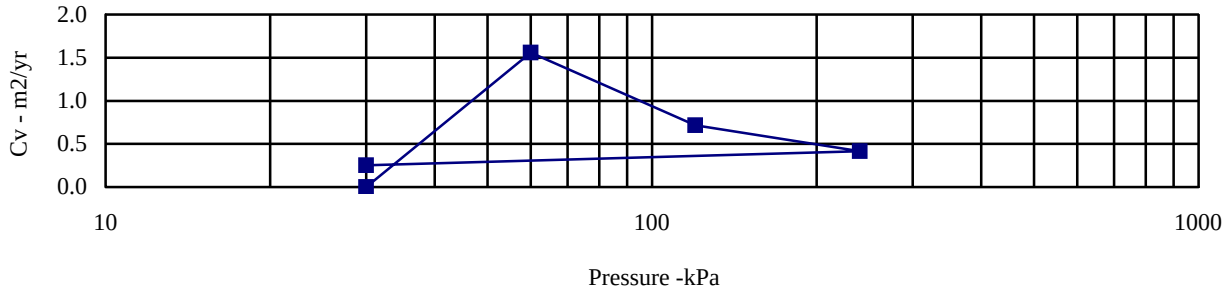
One Dimensional Consolidation Properties

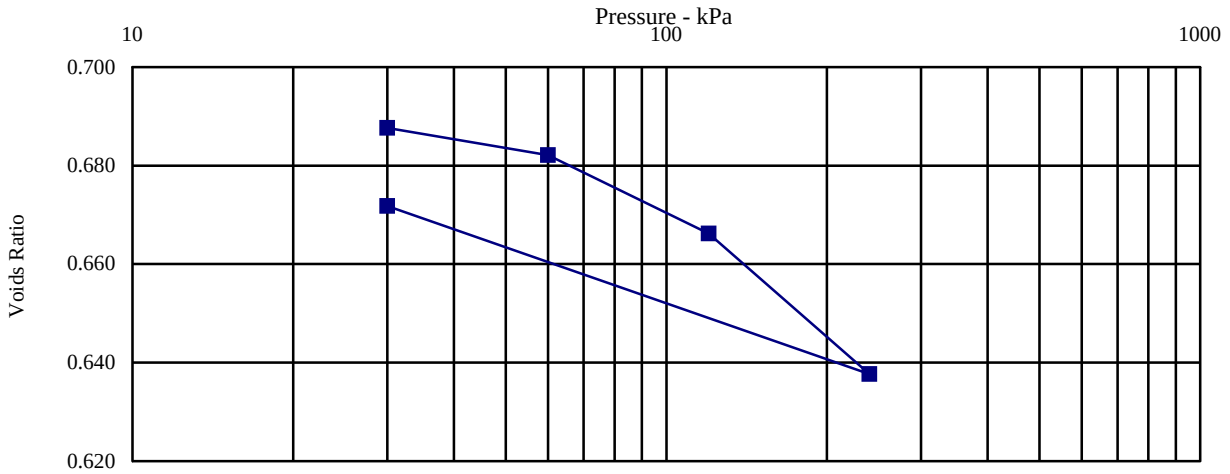
BS 1377: Part 5: 1990

Hole Number: **BH01** **Depth (m):** **1.50**

Sample Number: **Sample Type:** **U**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	25							
Bulk Density (Mg/m3):	1.99	0	-	30	Swelling	Swelling	Method used to determine CV:	t90
Dry Density (Mg/m3):	1.59	30	-	60	0.109	1.557		
Voids Ratio:	0.670	60	-	120	0.158	0.718	Nominal temperature during test ' C:	20
Degree of saturation:	100.1	120	-	240	0.142	0.414		
Height (mm):	19.99	240	-	30	0.099	0.251	Remarks: See summary of soils description.	
Diameter (mm)	75.19							
Particle Density (Mg/m3): Assumed	2.65							





Checked by	Date	Approved by	Date
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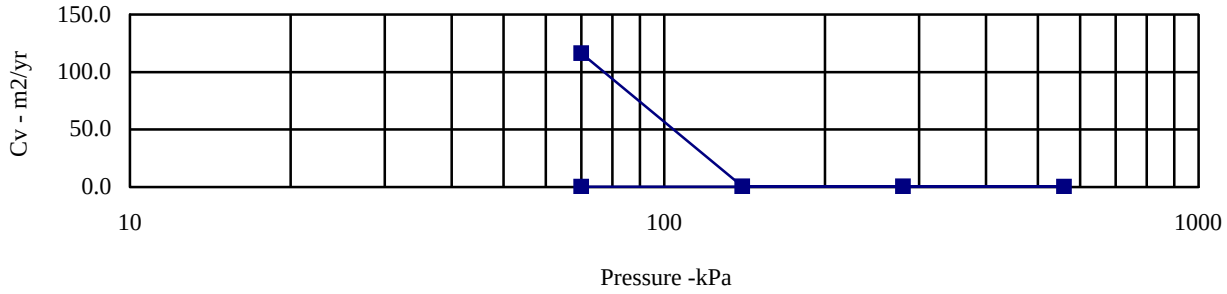
One Dimensional Consolidation Properties

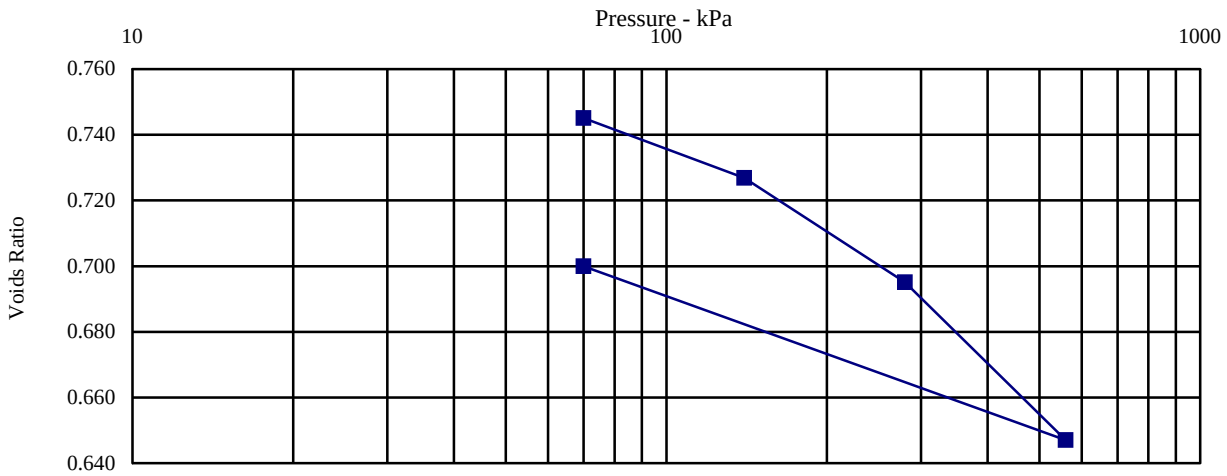
BS 1377: Part 5: 1990

Hole Number: BH01 **Depth (m): 3.50**

Sample Number: **Sample Type: U**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	27							
Bulk Density (Mg/m3):	1.91	0	-	70	0.148	116.403	Method used to	
Dry Density (Mg/m3):	1.50	70	-	140	0.149	0.692	determine CV:	t90
Voids Ratio:	0.763	140	-	280	0.131	0.495	Nominal temperature	
Degree of saturation:	95.1	280	-	560	0.101	0.395	during test ' C:	20
Height (mm):	20.59	560	-	70	0.066	0.368	Remarks:	
Diameter (mm)	75.21						See summary of soils description.	
Particle Density (Mg/m3):	2.65							
Assumed								





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	22/08/14		22/08/14

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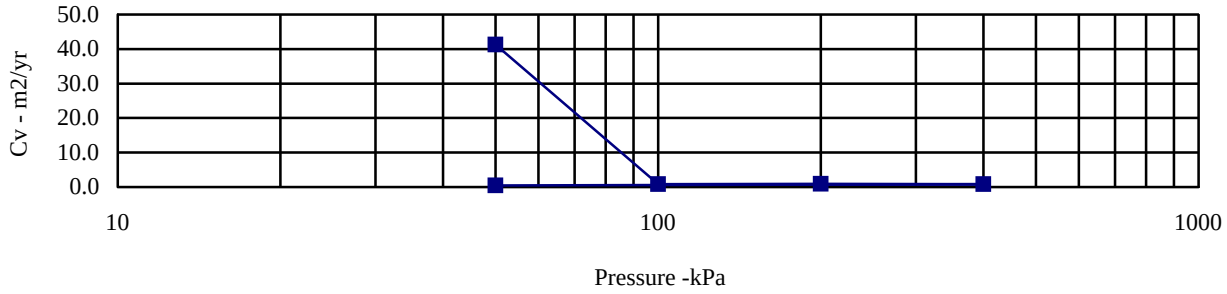
One Dimensional Consolidation Properties

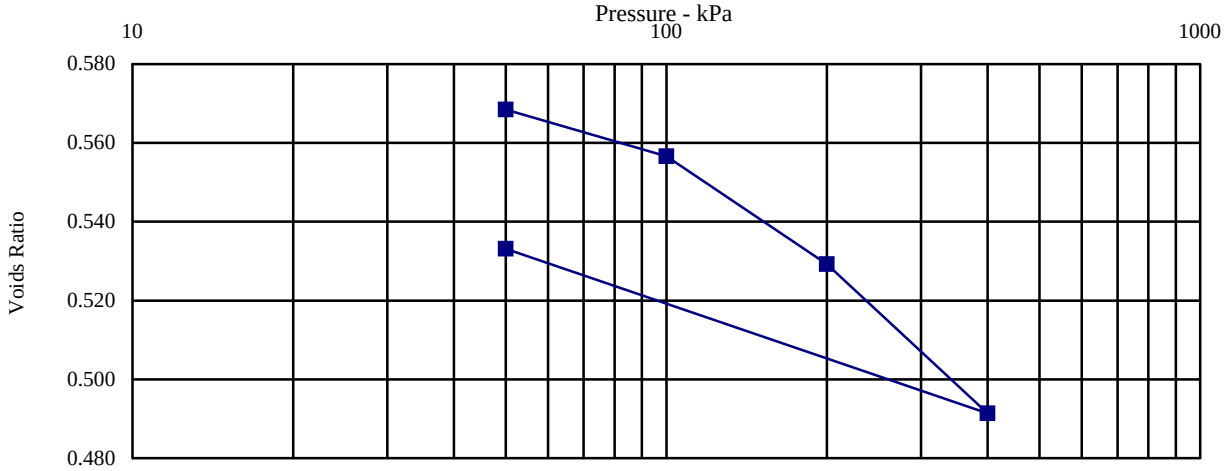
BS 1377: Part 5: 1990

Hole Number: **BH02** **Depth (m):** **2.50**

Sample Number: **Sample Type:** **U**

Initial Conditions		Pressure Range			Mv	Cv	Specimen location	
Moisture Content (%):	22	kPa			m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	2.06	0	-	50	-0.061	41.319	Method used to	
Dry Density (Mg/m3):	1.69	50	-	100	0.151	0.880	determine CV:	t90
Voids Ratio:	0.564	100	-	200	0.176	0.940	Nominal temperature	
Degree of saturation:	101.5	200	-	400	0.124	0.847	during test ' C:	20
Height (mm):	20.02	400	-	50	0.080	0.481	Remarks:	
Diameter (mm)	75.21						See summary of soils description.	
Particle Density (Mg/m3):	2.65							
Assumed								





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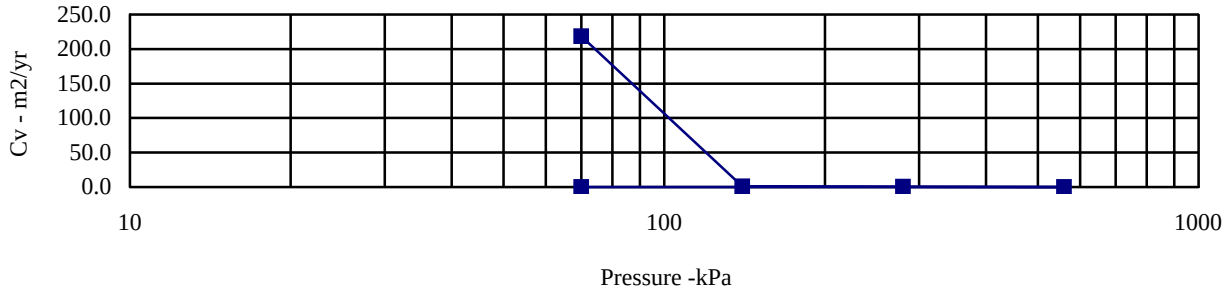
One Dimensional Consolidation Properties

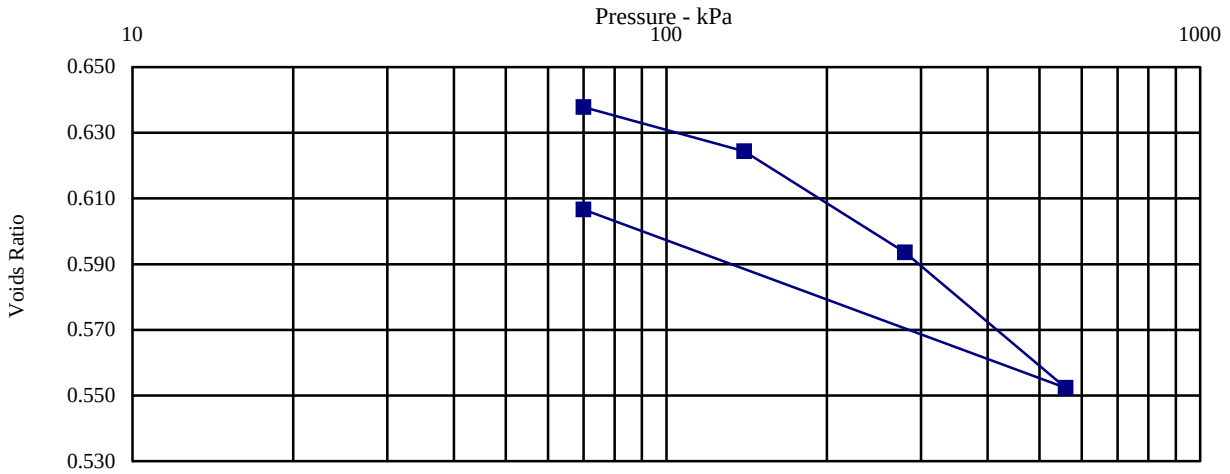
BS 1377: Part 5: 1990

Hole Number: BH05 **Depth (m): 3.50**

Sample Number: **Sample Type: U**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	22							
Bulk Density (Mg/m3):	1.94	0	-	70	0.231	218.594	Method used to	
Dry Density (Mg/m3):	1.59	70	-	140	0.117	0.867	determine CV:	t90
Voids Ratio:	0.665	140	-	280	0.136	0.307	Nominal temperature	
Degree of saturation:	87.8	280	-	560	0.092	0.230	during test ' C:	20
Height (mm):	20.01	560	-	70	0.071	0.178	Remarks:	
Diameter (mm)	75.24						See summary of soils description.	
Particle Density (Mg/m3):	2.65							
Assumed								





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	21/08/14		21/08/14

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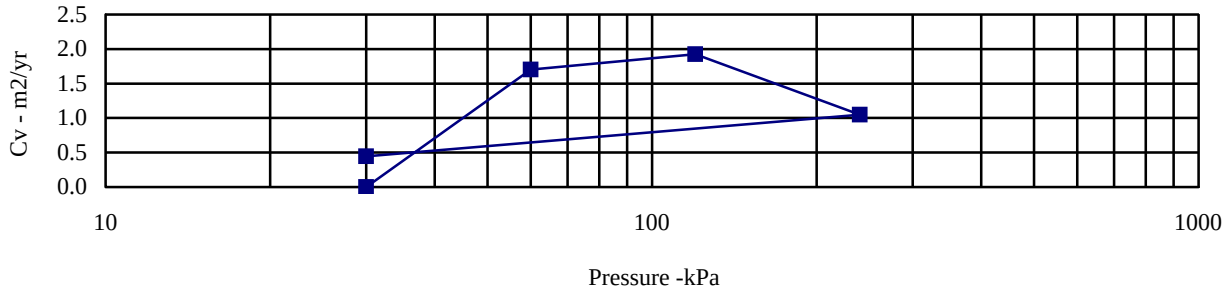
One Dimensional Consolidation Properties

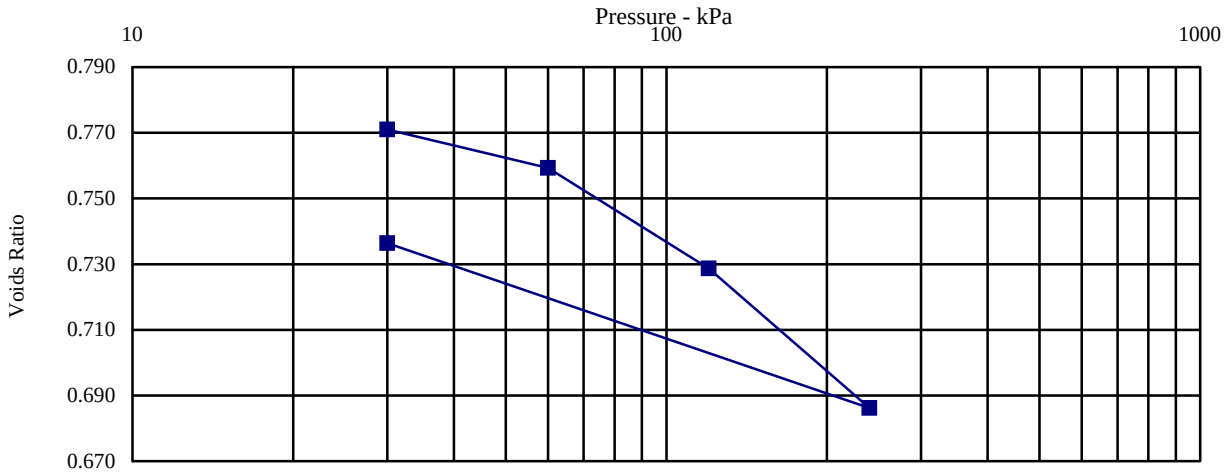
BS 1377: Part 5: 1990

Hole Number: **BH06** **Depth (m):** **1.50**

Sample Number: **Sample Type:** **U**

Initial Conditions		Pressure Range kPa			Mv m2/MN	Cv m2/yr	Specimen location within tube:	Top
Moisture Content (%):	28							
Bulk Density (Mg/m3):	1.92	0	-	30	Swelling	Swelling	Method used to	
Dry Density (Mg/m3):	1.51	30	-	60	0.221	1.701	determine CV:	t90
Voids Ratio:	0.759	60	-	120	0.290	1.925	Nominal temperature	
Degree of saturation:	96.1	120	-	240	0.205	1.051	during test ' C:	20
Height (mm):	19.97	240	-	30	0.142	0.444	Remarks:	
Diameter (mm)	75.2						See summary of soils description.	
Particle Density (Mg/m3):	2.65							
Assumed								





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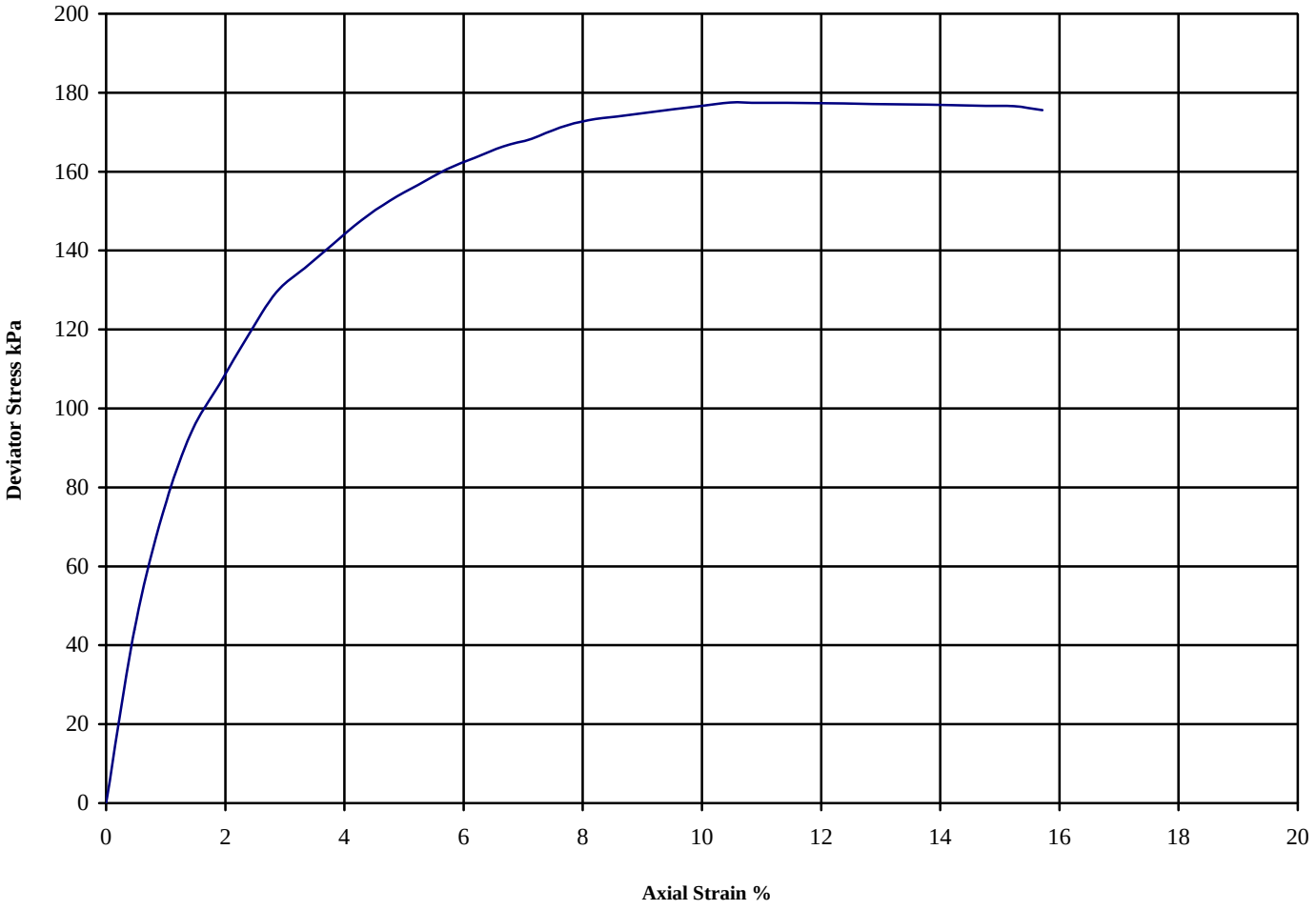
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH01** **Depth (m):** **1.50-1.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	24	1.94	1.56	30	178	89	10.5	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	22/08/14		22/08/14

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Contract No: PSL14/3901

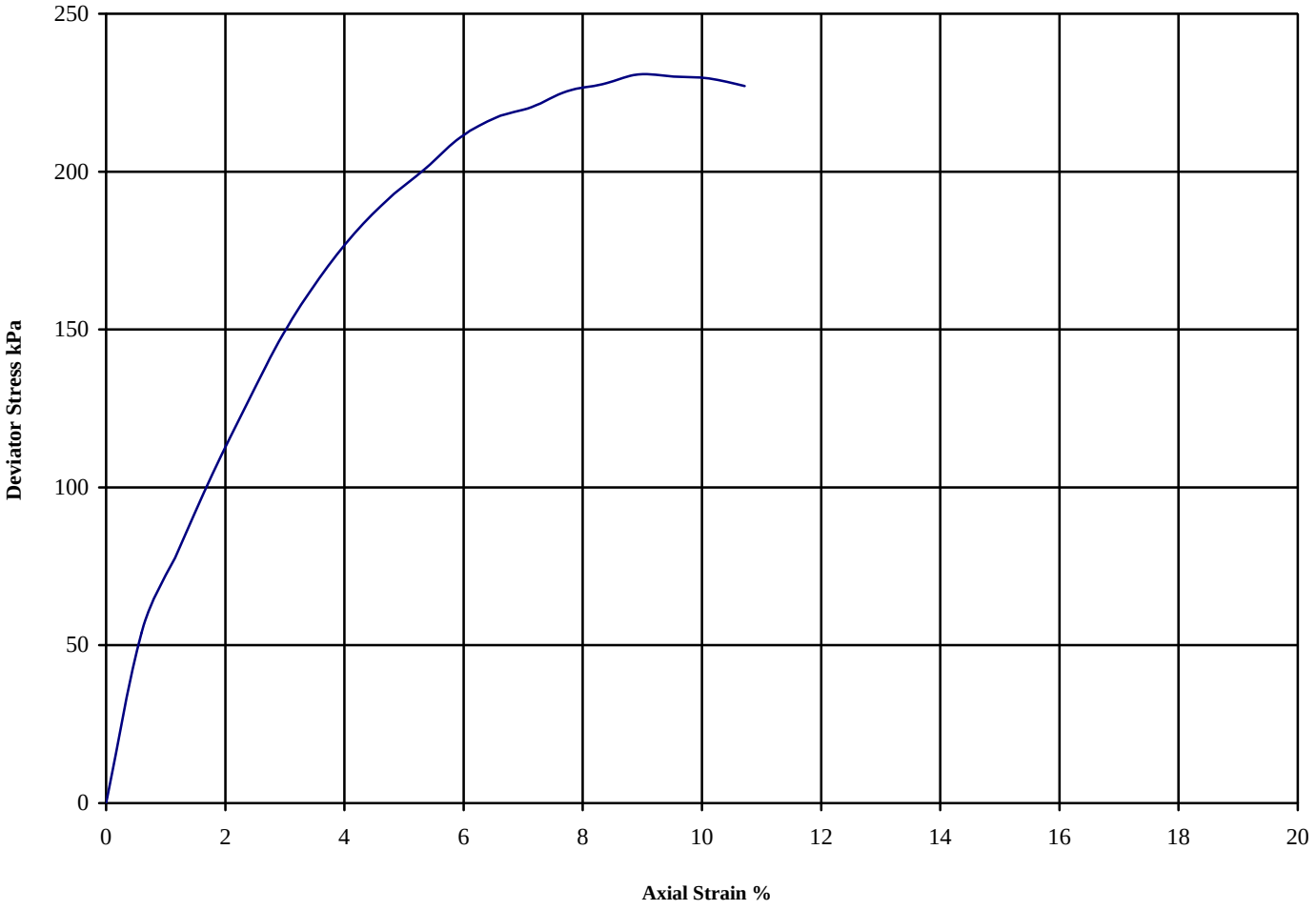
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH01** **Depth (m):** **3.50-3.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		168.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	25	2.02	1.62	70	231	115	8.9	Brittle	Sample taken from top of tube Rate of strain = 2.3 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.36 kPa See summary of soil descriptions.

Checked	Date	Approved	Date
	22/08/14		22/08/14

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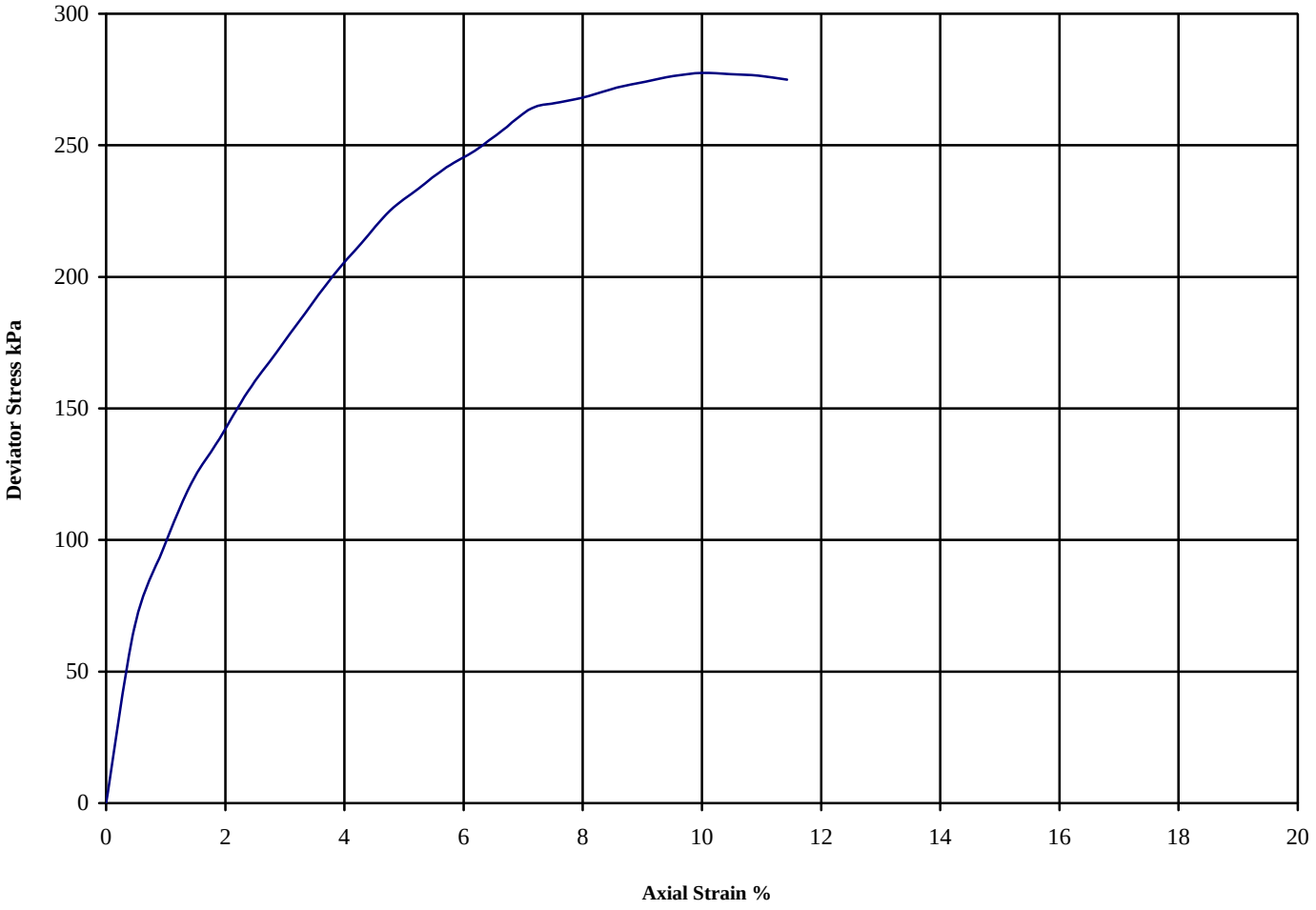
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH01** **Depth (m):** **6.50-6.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	24	2.03	1.64	130	278	139	10.0	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

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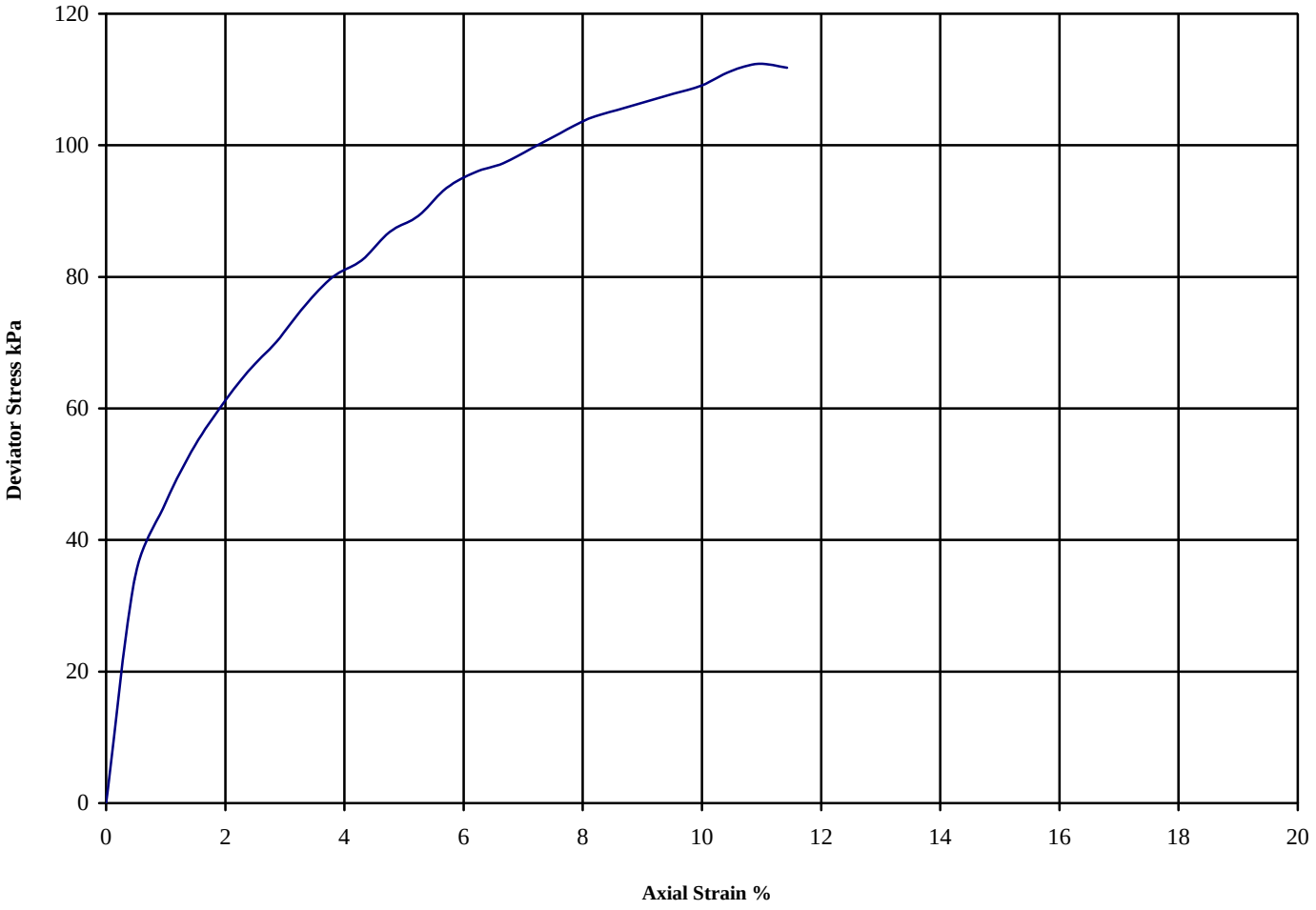
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH02** **Depth (m):** **2.50-2.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	26	2.00	1.59	50	112	56	11.0	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

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	22/08/14		22/08/14

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Contract No: PSL14/3901

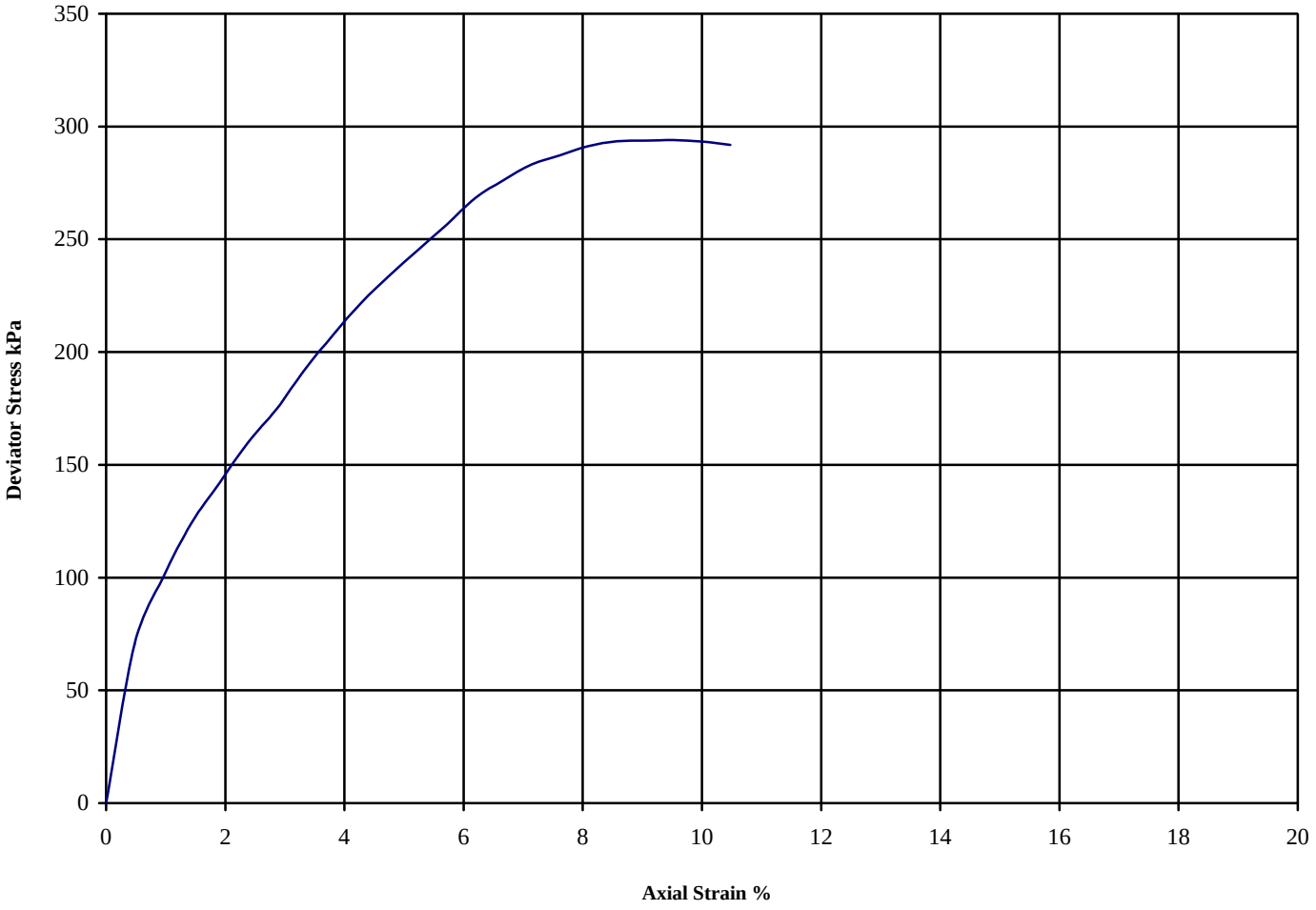
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH02** **Depth (m):** **7.50-7.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	24	2.04	1.65	150	294	147	9.5	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

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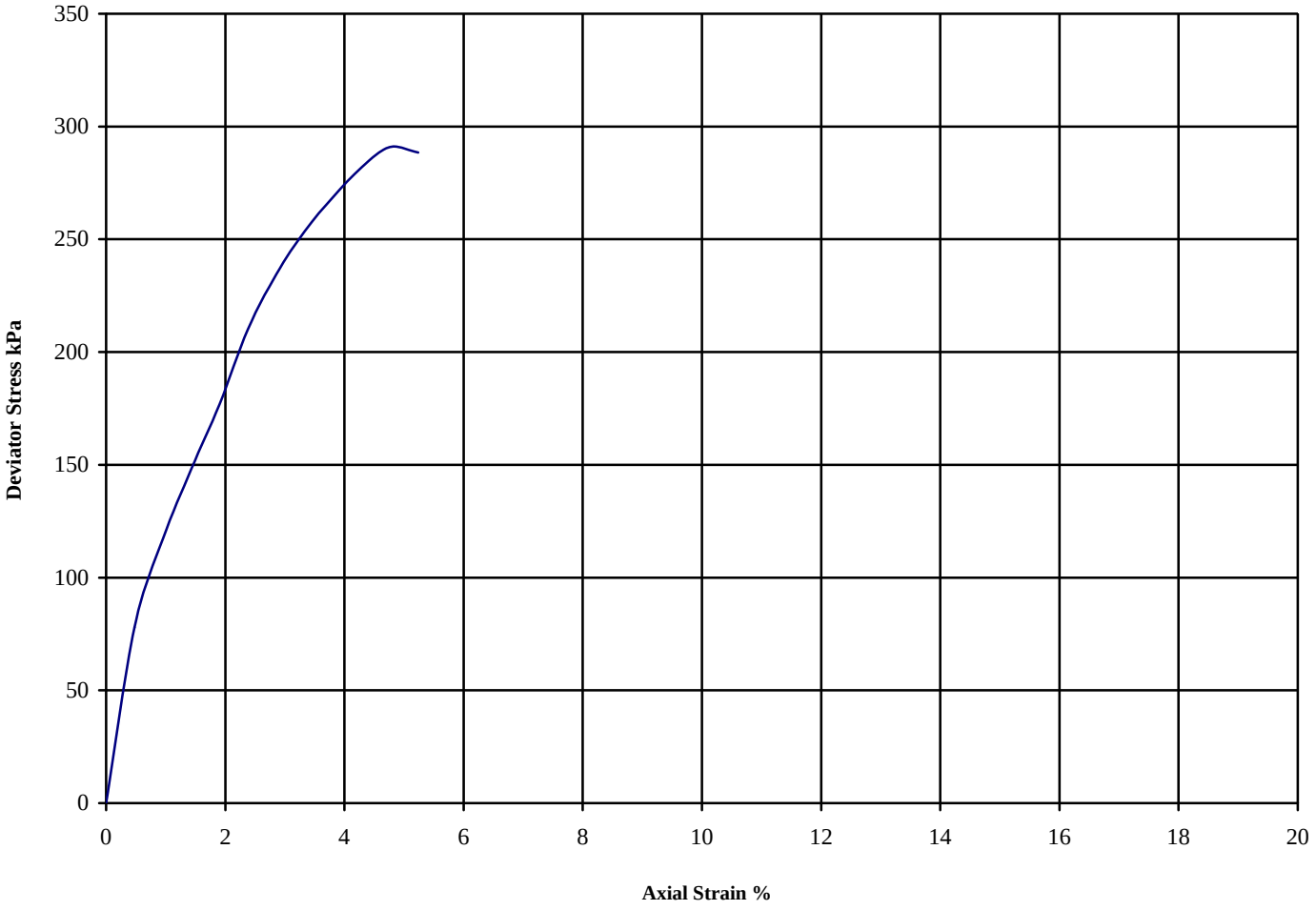
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH03** **Depth (m):** **8.50-8.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	23	2.06	1.67	90	291	145	4.8	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.36 kPa See summary of soil descriptions.

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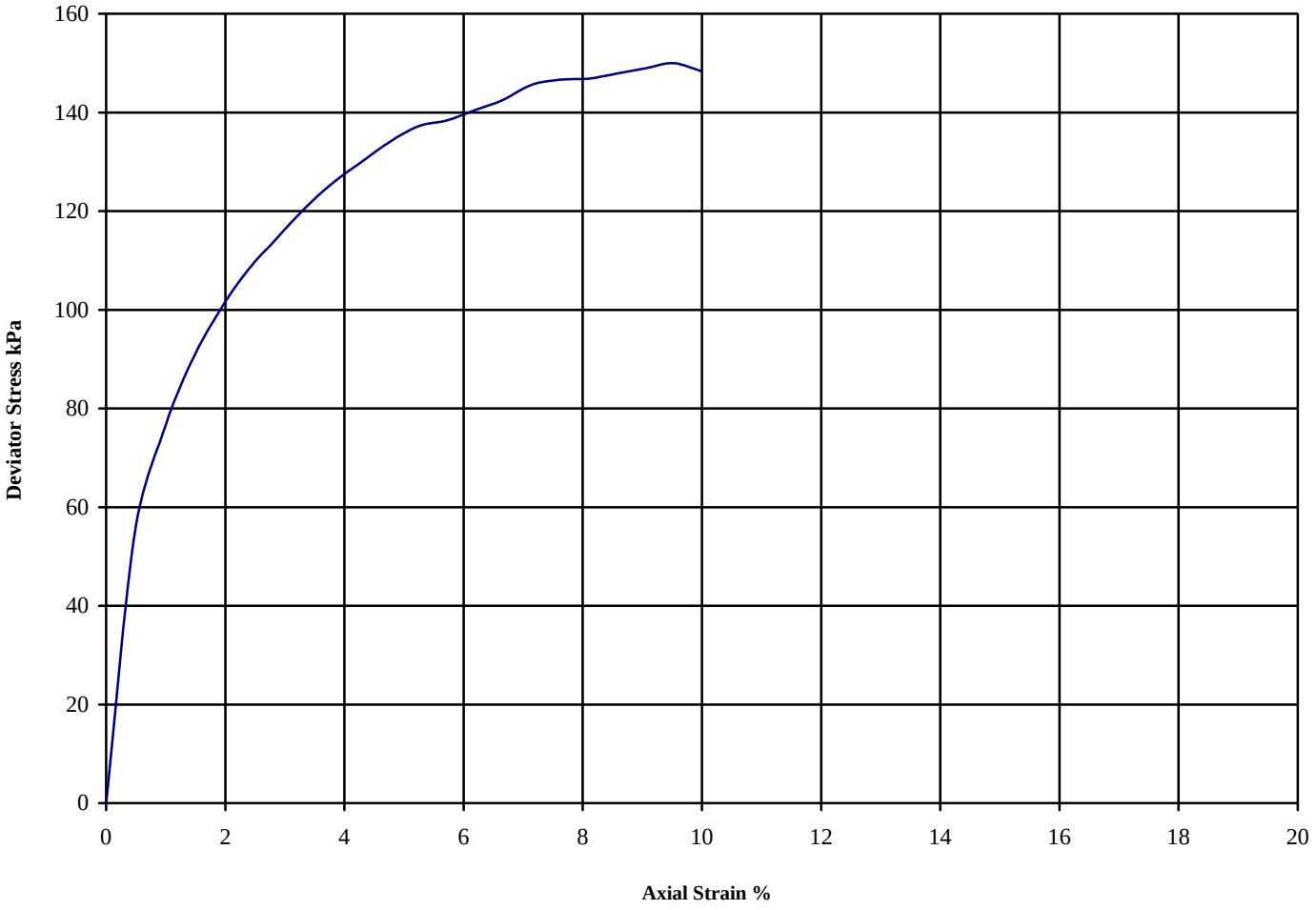
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH04** **Depth (m):** **3.50-3.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	29	1.89	1.47	70	150	75	9.5	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

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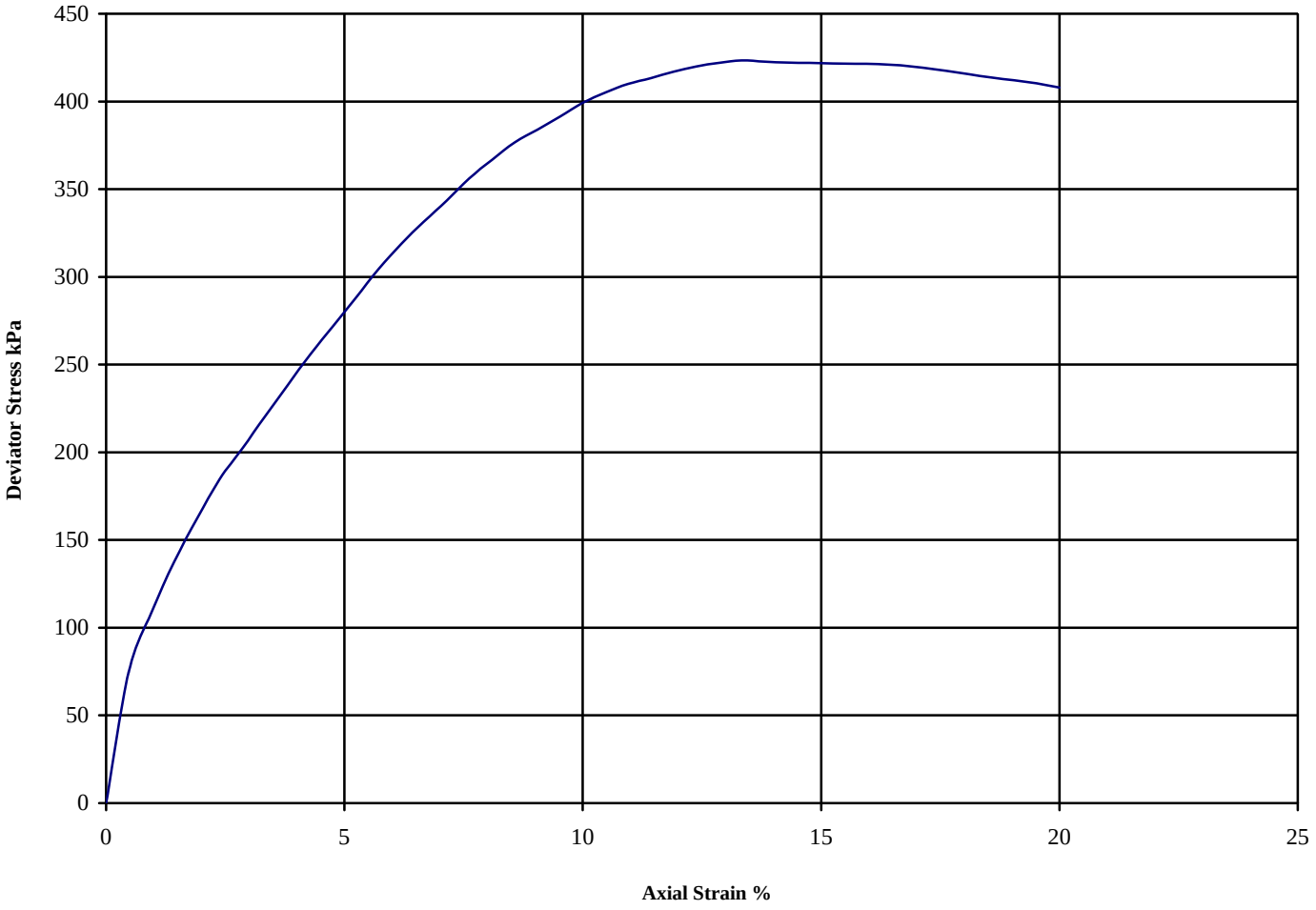
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH04** **Depth (m):** **14.50-14.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	22	2.00	1.63	290	423	212	13.3	Compound	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

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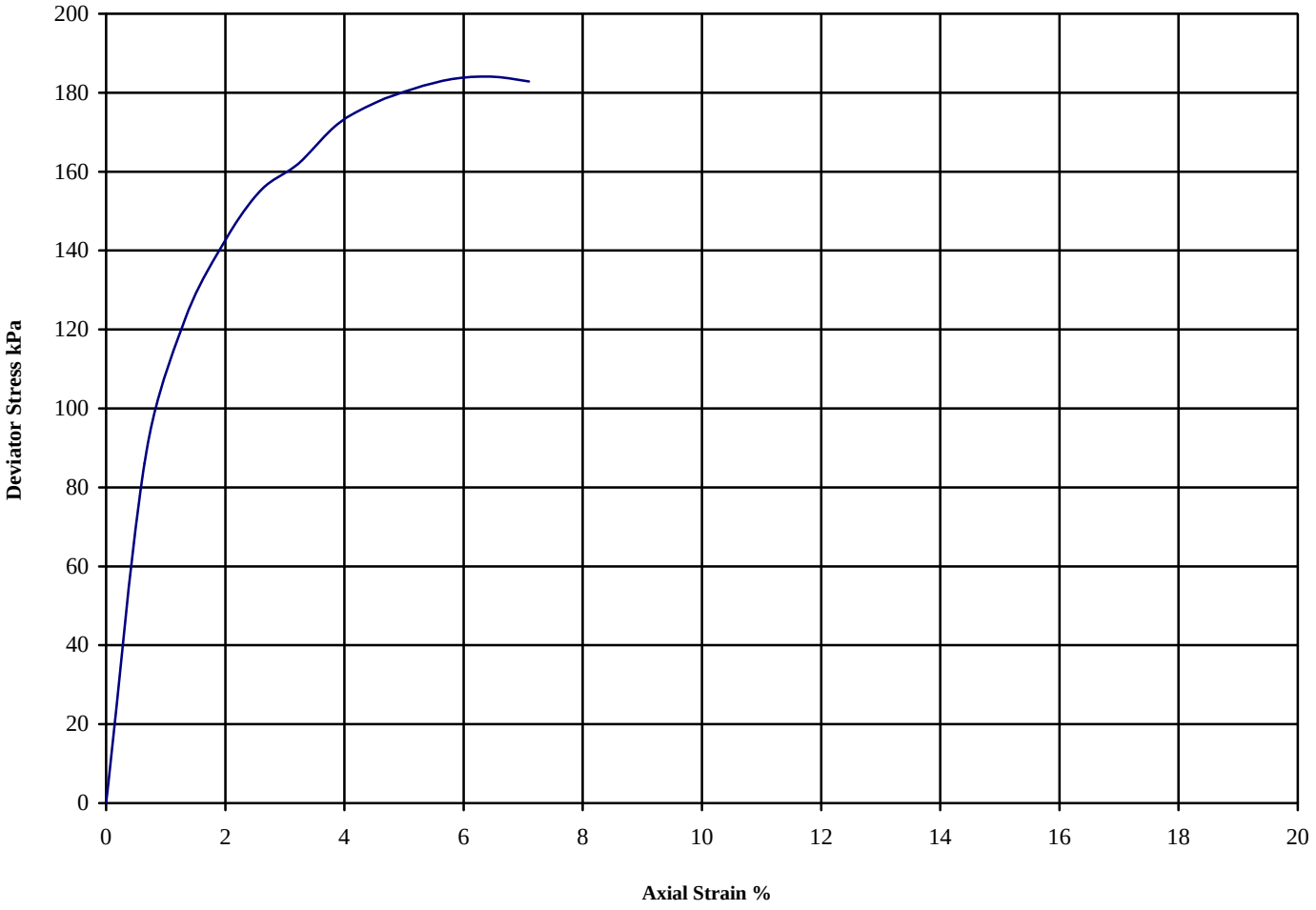
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH05** **Depth (m):** **3.50-3.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		155.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	25	1.96	1.56	70	184	92	6.5	Compound	Sample taken from top of tube Rate of strain = 2.5 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.36 kPa See summary of soil descriptions.

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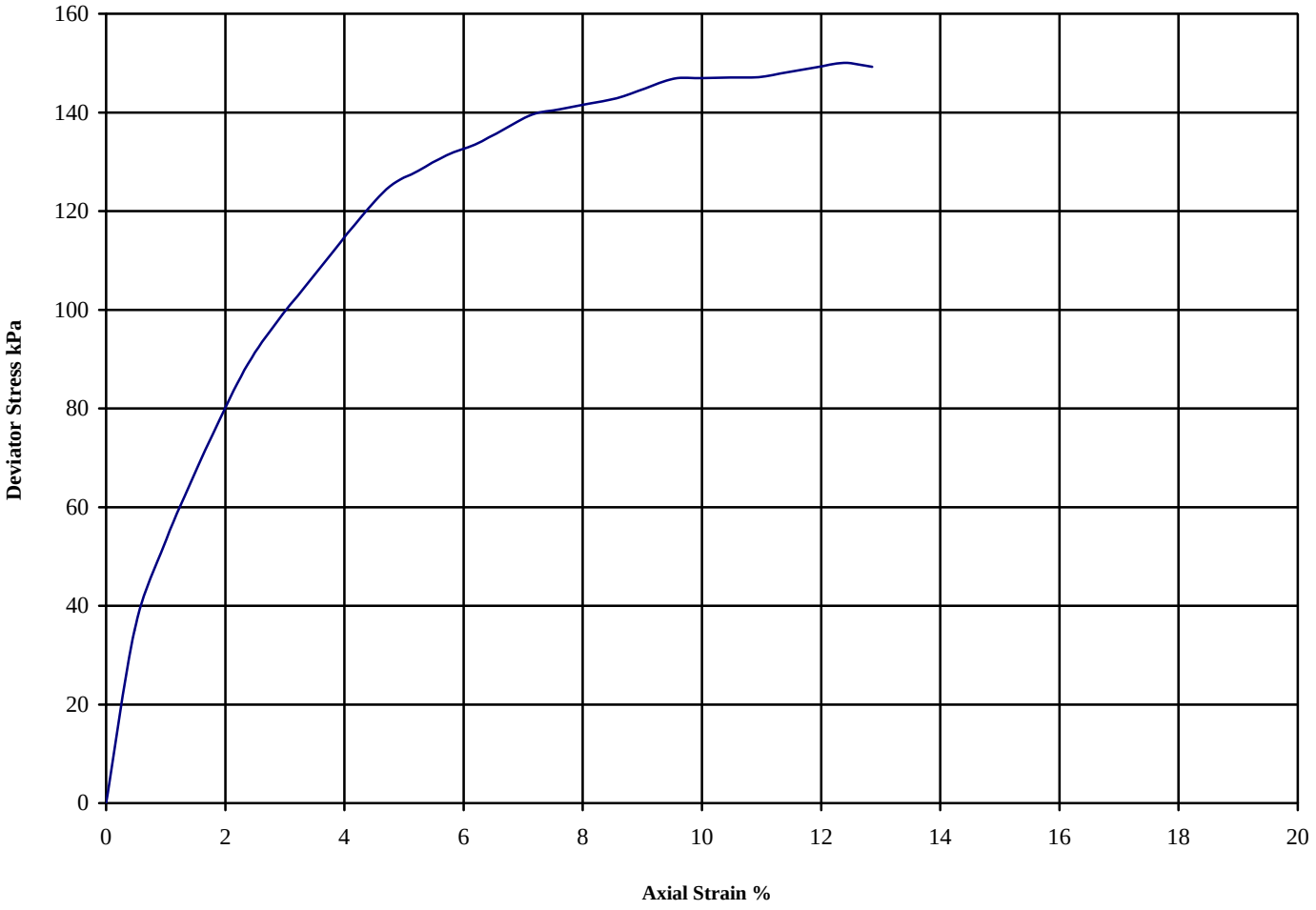
Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

B.S. 1377 : Part7 : Clause 8 : 1990

Hole Number: **BH06** **Depth (m):** **1.50-1.95**

Sample Number: **Sample Type:** **U**



Diameter (mm):		102.0	Height (mm):		210.0	Test:	100 mm Single Stage. Undisturbed		
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^1/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Remarks
A	28	2.00	1.56	30	150	75	12.4	Brittle	Sample taken from top of tube Rate of strain = 1.9 %/min Latex Membrane used 0.2 mm thickness, Correction applied 0.35 kPa See summary of soil descriptions.

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SUMMARY OF LABORATORY HAND VANE TESTS

Hole Number	Sample Number	Sample Type	Depth m	Moisture Content %	Shear Strength kPa	Description
BH01		U	10.50	22	>120	Stiff dark brown slightly sandy CLAY.
BH02		U	4.50	25	>120	Stiff dark brown slightly sandy CLAY.
BH03		U	8.50	23	109	Stiff dark brown slightly sandy CLAY.
BH03		U	12.50	24	>120	Stiff dark brown slightly sandy CLAY.
BH04		U	6.50	24	>120	Stiff dark brown slightly sandy CLAY.
BH04		U	10.50	23	74	Firm dark brown slightly sandy CLAY.
BH05		U	5.50	27	>120	Stiff dark brown slightly sandy CLAY.
BH06		U	3.50	28	90	Stiff dark brown slightly sandy CLAY.
BH06		U	5.50	25	>120	Stiff dark brown slightly sandy CLAY.
BH06		U	9.50	23	84	Stiff dark brown slightly sandy CLAY.

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Compiled by	Date	Checked by	Date	Approved by	Date
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Client Ref: C2611

Appendix G. Risk Rating Matrix

Table G.1: Risk rating for contaminated land qualitative risk assessment

Level of Severity	Likelihood		
	Most Likely	Reasonably Foreseeable	Unlikely
Acute harm or severe chronic harm. Direct pollution of sensitive water receptors or serious pollution of other water bodies.	High	High	Low
Harm from long-term exposure. Slight pollution of sensitive receptors or pollution of other water bodies.	Medium	Medium	Low
No significant harm in either short or long term. No pollution of water that is likely to affect sensitive receptors. No more than slight pollution of other water bodies.	Low	Low	Low

Table G.2: Pollution to controlled waters

'Section 78A(9) of the EPA 1990 defines the pollution of controlled waters as: "the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter".' (A35)

'Before determining that pollution of controlled water is being, or is likely to be, caused, the local authority should be satisfied that a substance is continuing to enter controlled waters or is likely to enter controlled waters. The local authority should regard something as being "likely" to be caused when the local authority judge it more likely than not to occur.' (A36)

'Land should **not** be designated as contaminated land where:

(a) a substance is already present in controlled waters;

(b) entry into controlled waters of that substance from land has ceased; and

(c) it is not likely that further entry will take place.' (A37)

'Substances should be regarded as having entered controlled waters where:

(a) they are dissolved or suspended in those waters; or

(b) if they are immiscible with water, they have direct contact with those waters on or beneath the surface of the water.' (A38)

The term 'continuing to enter' should be taken to mean any entry additional to any which has already occurred. (A39)

Reproduced from DEFRA (2006) Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990 Circular 01/2006 and Scottish Executive Rural Affairs Department (2006) Edition 2 (Paper SE/2006/44). Environmental Protection Act 1990: Part IIA – Contaminated Land.

Table G3: Significant harm to various receptors.

Type of receptor	Description of harm to that type of receptor that is to be regarded as significant harm
Human beings	Death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.

Type of receptor	Description of harm to that type of receptor that is to be regarded as significant harm
	In the Guidance, this description of significant harm is referred to as a 'human health effect'.
Any ecological system, or living organism forming part of such a system, within a location which is: • an area notified as an Area of Special Scientific Interest under Section 28 of the Wildlife and Countryside Act 1981. • any land declared a National Nature Reserve under Section 35 of that Act • any area designated as a Marine Nature Reserve under Section 36 of that Act • an area of Special Protection of Birds, established under Section 3 of that Act • any European Site within the meaning of Regulation 1 0 of the Conservation (Natural Habitats etc) Regulations 1994 (ie Special Areas of Conservation and Special protection Areas) • any candidate Special Areas of Conservation or potential Special Protection Areas given equivalent protection • any habitat or site afforded policy protection under paragraph 6 of Planning Policy Statement (PPS9) on nature conservation (i.e. candidate Special Areas of Conservation, potential Special protection Areas and listed Ramsar sites); or • any nature reserve established under Section 21 of the National Parks and Access to the Countryside Act 1949.	For any protected location: Harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or Harm which affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location. In addition, in the case of a protected location that is a European Site (or a candidate Special Area of Conservation or a potential Special Protection Area), harm which is incompatible with the favourable conservation status of natural habitats at that location or species typically found there. In determining what constitutes such harm, the local authority should have regard to the advice of English nature and to the requirements of the Conservation (Natural Habitats etc) Regulations 1994. In the Guidance this description of significant harm is referred to as an 'ecological system effect'.
Property in the form of: • crops, including timber • produce grown domestically, or on allotments, for consumption • livestock • other owned or domesticated animals; • wild animals which are the subject of shooting or fishing rights.	For crops, a substantial diminution in yield or other substantial loss in their value, resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage. The local authority should regard a substantial loss in value as occurring only when a substantial proportion of the animals or crops are dead or otherwise no longer fit for their intended purpose. Food should be regarded as being no longer fit for purpose when it fails to comply with the provisions of the Food Safety Act 1990. Where a diminution in yield or loss in value is caused by a pollutant linkage, a 20% diminution or loss should be regarded as a benchmark for what constitutes a substantial diminution or loss. In the Guidance this description of significant ham is referred to as an 'animal or crop effect'.
Property in the form of buildings. For this purpose 'building' means any structure or erection and any part of a building, including any part below ground level, but does not include plant or	Structural failure, substantial damage or substantial interference with any right of occupation. For this purpose, the local authority should regard substantial damage or substantial interference as occurring when any

Type of receptor	Description of harm to that type of receptor that is to be regarded as significant harm
machinery comprised in a building.	part of the building ceases to be capable of being used for the purpose for which it is or was intended. Additionally, in the case of a scheduled Ancient Monument, substantial damage should be regarded as occurring when the damage significantly impairs the historic, architectural, traditional, artistic or archaeological interest by reason of which the monument was scheduled in the Guidance this description of significant harm is referred to as a 'building effect'.

Reproduced from DEFRA (2006) Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990. Circular 01/2006 and Scottish Executive Rural Affairs Department (2006) Edition 2 (Paper SE/2006/44). Environmental Protection Act 1990: Part IIA – Contaminated Land.

Appendix H. Generic Assessment Criteria

Human Health Generic Assessment Criteria

Background

In order to be able to make inference on whether the results obtained during the site investigation (e.g. chemical concentrations in soils, waters and gas) point to the presence of a potential hazard to human health, it is necessary to distinguish between the results, reflecting background and/or insignificantly elevated levels of contamination (i.e. with negligible potential to cause harm or pollution) and the results with significantly elevated concentrations (i.e. with significant potential to cause harm or pollution).

The approach to risk assessment with respect to risks to human health from contaminated land in the UK is set out in the publication Model Procedures for the Management of Land Contamination (CLR11) Environment Agency (2004).

This sets out a tiered approach:

- Preliminary Risk Assessment (e.g. establishing potential pollutant linkages);
- Generic Quantitative Risk Assessment (GQRA) (e.g. comparison of site contaminant concentrations against generic standards and compliance criteria e.g. Soil Guideline Values (SGV) or other Generic Assessment Criteria including an assessment of risk using the source pathway target model); and
- Detailed Quantitative Risk Assessment (DQRA) (e.g. the comparison of contaminant concentrations against site specific assessment criteria).

Preliminary Risk Assessment

This typically encompasses a desk based generation of a conceptual model to establish the potential pollutant linkages associated with the site and any proposed development. Works would typically involve:

- Evaluation of the potential sources of contamination on the site and in the locality and from both a current and historical perspective
- Statutory Consultation;
- Evaluation of a sites geology, hydrology and hydrogeology;
- Site inspection;
- Additional pertinent information as necessary on a site by site basis.

Where works indicate the presence of a potential pollutant linkage further evaluation and potentially site investigation works are necessary to determine the significance of the linkage.

Generic Quantitative Risk Assessment (GQRA)

In August 2008 the Environment Agency (EA) and Department of Environment Food and Rural Affairs (DEFRA) announced the withdrawal of the Contaminated Land Reports CLR7 – 10, CLEA UK (beta) and existing SGV reports as they no-longer fully reflected the revised approach to human health risk assessment.

New partial guidance (in particular Science Reports SR2, SR3 and SR7) and new risk assessment tools (CLEA model version v1.04, v1.05 and currently v1.06) were published and these allow environmental practitioners to derive generic and site specific Soil Assessment Criteria (GAC and SAC). The EA and DEFRA are currently in the process of updating the existing TOX reports and Soil Guideline Values (SGVs) to reflect the new guidance. Thus far SGVs for arsenic, nickel, mercury, selenium and BTEX compounds (benzene, toluene, ethylbenzene and xylenes) have been made available.

In addition Land Quality Management (LQM), Chartered Institute of Environmental Health (CIEH) and Contaminated Land Applications in Real Environments (CL:AIRE) have undertaken the production of GAC values using CLEA 1.04 for parameters not covered by SGV's.

Alterations have been made to the CLEA model since the GAC's calculated by LQM / CIEH and CL:AIRE, which used software version v1.04. The Environment Agency have however confirmed that v1.05 has only a "minor effect on assessment criteria calculated using the CLEA software 1.04" and consequently the GAC's derived are considered to remain valid. Environment Agency SGV's generated using v1.04 have also not been updated. Software version v1.06 is identical to v1.05 with some password protection enhancements that in no way effect the GAC values generated.

Waterman Energy Environment and Design have used the following hierarchy for the generic assessment of soils to evaluate Human Health.

- Published Soil Guideline Values (SGV's), or in their absence;
- GAC prepared in accordance with the CLEA v1.04 / v1.06 model by authoritative bodies (e.g. Chartered Institute of Environmental Health (CIEH), Land Quality Management (LQM) and Contaminated Land Applications in Real Environments (CL:AIRE), or in their absence,
- Waterman in-house GAC prepared in accordance with the CLEA V1.04 model or associated documents.

Tabulated values of the GACs used are presented overleaf. The references of the sources quoted in the table are:

- Environment Agency, 2009. CLEA Software, version 1.06.
- DEFRA, Environment Agency, 2004. Model Procedures for the Management of Land Contamination, Contaminated Land Report 11.
- Environment Agency, 2009. Human health toxicological assessment of contaminants in soil. Report SC050021/SR2.
- Environment Agency, 2009. Updated technical background to the CLEA model. Report SC050021/SR3.
- Environment Agency, 2008. Compilation of chemical data for priority organic pollutants for derivation of Soil Guideline Values. Report SC050021/SR7.
- LQM / CIEH, 2009. Generic assessment criteria for human health risk assessment, 2nd edition.
- EIC / CL:AIRE, 2010. Soil generic assessment criteria for human health risk assessment.

Detailed Quantitative Risk Assessment (DQRA)

Detailed Quantitative Risk Assessments are undertaken on a site specific basis and full details of the alterations to the CLEA model and generic land use scenarios will be described within the specific reports.

Generic Quantitative Risk Assessment Criteria

Proposed End Use	units	Residential			Commercial			Source
Soil Organic Matter Content	%	1	2.5	6	1	2.5	6	
Arsenic	mg/kg	32			640			CLEA SGV 2009
Antimony	mg/kg	550			7500			CL:AIRE 2009
Barium	mg/kg	1300			22000			CL:AIRE 2009
Beryllium	mg/kg	51			420			LQM / CIEH
Boron (Water Soluble)	mg/kg	291			192000			LQM / CIEH
Cadmium	mg/kg	10			230			CLEA SGV 2009
Chromium (Total)	mg/kg	3000			30400			LQM / CIEH
Chromium (VI)	mg/kg	4.3			35			LQM / CIEH
Cobalt	mg/kg	240			240			Dutch Intervention
Copper	mg/kg	2330			71700			LQM / CIEH
Lead	mg/kg	450			750			CLEA SGV 2002 (Withdrawn in 2008)
Mercury	mg/kg	1			26			CLEA SGV 2009
Molybdenum	mg/kg	670			17000			CL:AIRE 2009
Nickel	mg/kg	130			1800			CLEA SGV 2009
Selenium	mg/kg	350			13000			CLEA SGV 2009
Vanadium	mg/kg	75			3160			LQM / CIEH
Zinc	mg/kg	3750			665000			LQM / CIEH
Cyanide (Free)	mg/kg	26			16000			Waterman GAC - CLEA v1.06
Complex Cyanide	mg/kg	63000			430000			
Thiocyanate	mg/kg	230			22000			Waterman GAC - CLEA v1.06
Aliphatic EC5 - EC6	mg/kg	30			3400			LQM / CIEH
Aliphatic EC6 - EC8	mg/kg	73			8300			LQM / CIEH
Aliphatic EC8-EC10	mg/kg	19			2100			LQM / CIEH
Aliphatic EC10-EC12	mg/kg	93			10000			LQM / CIEH
Aliphatic EC12-EC16	mg/kg	740			61000			LQM / CIEH
Aliphatic EC16-EC35	mg/kg	45000			160000			LQM / CIEH
Aliphatic EC35-EC44	mg/kg	45000			160000			LQM / CIEH
Aromatic C6-C7 (Benzene)	mg/kg	0.08			28			CLEA SGV 2009 / Waterman GACs - CLEA v1.04
Aromatic C7-C8 (Toluene)	mg/kg	120			870			
Aromatic C8-C10	mg/kg	27			3700			LQM / CIEH

Proposed End Use	units	Residential			Commercial			Source
Soil Organic Matter Content	%	1	2.5	6	1	2.5	6	
Aromatic C10-C12	mg/kg	69			17000			LQM / CIEH
Aromatic C12-C16	mg/kg	140			36000			LQM / CIEH
Aromatic C16-C21	mg/kg	250			28000			LQM / CIEH
Aromatic C21-C35	mg/kg	890			28000			LQM / CIEH
Benzene	mg/kg	0.08			28			CLEA SGV 2009 / Waterman GACs - CLEA v1.04
Toluene	mg/kg	120			870			
Ethyl Benzene	mg/kg	65			520			
Xylene - o	mg/kg	45			480			
MTBE (Methyl tert-butyl ether)	mg/kg	49			7900			CL:AIRE 2009
Naphthalene	mg/kg	1.5			200			LQM / CIEH
Acenaphthylene	mg/kg	170			84000			LQM / CIEH
Acenaphthene	mg/kg	210			85000			LQM / CIEH
Fluorene	mg/kg	160			64000			LQM / CIEH
Phenanthrene	mg/kg	92			22000			LQM / CIEH
Anthracene	mg/kg	2300			530000			LQM / CIEH
Fluoranthene	mg/kg	260			23000			LQM / CIEH
Pyrene	mg/kg	560			54000			LQM / CIEH
Benzo(a)anthracene	mg/kg	3.1			90			LQM / CIEH
Chrysene	mg/kg	6			140			LQM / CIEH
Benzo(b)fluoranthene	mg/kg	5.6			100			LQM / CIEH
Benzo(k)fluoranthene	mg/kg	8.5			140			LQM / CIEH
Benzo(a)pyrene	mg/kg	0.83			14			LQM / CIEH
Indeno(1,2,3-cd)pyrene	mg/kg	3.2			60			LQM / CIEH
Di-benzo(a.h.)anthracene	mg/kg	0.76			13			LQM / CIEH
Benzo(g.h.i.) Perylene	mg/kg	44			650			LQM / CIEH
Phenols	mg/kg	210			3200			CLEA 2006 / CLEA SGV 1.04
Phenol	mg/kg	210			3200			

Soil Contamination – Risk of Harm to Property

Structures and Underground Services

Buried Concrete

BRE Special Digest 1 (2005), 3rd Edition, entitled *Concrete in aggressive ground*, provides guidance on the specification for concrete for installation in natural ground and in brownfield locations. The procedures given for the ground assessment and concrete specification cover the fairly common occurrences of sulfates, sulfides and acids, and the more rarely occurring aggressive carbon dioxide found in some ground and surface waters, which affects concrete foundations and sub-structures. It gives procedures for specification of concrete and applies to both buildings and civil engineering construction.

Water Supply Pipes

Guidance is provided in the Water Regulations Advisory Scheme Information and Guidance Note entitled *"The selection of materials for water supply pipes to be laid in contaminated land"* No. 9-04-03, October 2002.

Where soil concentrations exceed these threshold values, it is likely that special consideration of material selection will be required.

Notwithstanding the above, it is reasonable to assume that if contaminants are present above background concentrations, problems will arise and therefore materials should be selected accordingly. In cases where there is uncertainty; eg potentially aggressive contaminants are present for which there are no critical thresholds, some organic contaminants may have a greater effect on polyethylene (PE) pipes when present in mixtures than singly; this approach is recommended by the Water Suppliers,.

The material selection thresholds contained in this document are reproduced in the table below:

Contaminant concentrations in Soils

Contaminant	Material selection threshold mg/kg
Corrosion	
Sulphate	2000
Sulphur	5000
Sulphide	250
Ph	Less than pH5 greater than pH8
Toxic Substances	
Antimony	10
Arsenic	10*
Cadmium	3
Chromium (total)	600
Chromium (hexavalent)	25
Cyanide (free)	25*
Cyanide (complex)	250*
Lead	500
Mercury	1
Selenium	3
Thiocyanate	50

Contaminant	Material selection threshold mg/kg
Organic Contaminants	
Coal tar	50
Cyclohexane extractable	50
Phenol	5
PAHs	50
Toluene extractable	50
Petroleum hydrocarbons	50

Footnotes: * It is not recommended that water pipes should be laid in sites where these substances are identified or expected

Soil Contamination – Risk of Combustion

The combustibility of soils is a complex function of soil type, energy content, and availability of oxygen. The Building Research Establishment (BRE) has published guidance based on Calorific Value (i.e. energy content, alone), namely *IP 2/87, Fire and explosion hazards associated with the redevelopment of contaminated land*. This document provides a level below which combustibility is unlikely (2MJ/kg) and a level above which combustibility is likely (10MJ/kg). In the range between these two values combustibility is uncertain. Therefore, where the lower value is exceeded, the other key factors mentioned above need to be considered.

Soil Contamination – Risk of Harm to Vegetation

Where there is topsoil present on Site and it is being considered for reuse in landscaped areas then it needs to be assessed for its suitability for use by an appropriately qualified specialist. Topsoil can be both naturally-occurring and manufactured. The requirements for topsoil that is to be reused on site are specified in BS3882:2007 and cover a range of properties including texture, organic matter content, grading, pH, nutrients and phytotoxic contaminants. The specification for phytotoxic contaminants is reproduced in the table below:

Phytotoxic Contaminants (by soil pH) for Topsoil

Contaminant*	pH		
	<6	6.0 to 7.0	>7
Zinc (Nitric acid extractable**)	<200mg/kg	<200mg/kg	<300mg/kg
Copper (Nitric acid extractable**)	<100mg/kg	<135mg/kg	<200mg/kg
Nickel (Nitric acid extractable**)	<60mg/kg	<75mg/kg	<110mg.kg

Footnotes: * The lower of the Generic Assessment Criteria for chemical contaminants (human health and the environment) and phytotoxicity shall be used for topsoil

** The method of testing is given in Annex D to BS3882:2007 Specification for topsoil and requirements for use.

The risk to human health and the environment needs to be considered as well as phytotoxicity and this will be carried out using the Generic Assessment Criteria selected for these risks as described elsewhere in this appendix and this report.

In order to assess the suitability of topsoil to be reused the full range of testing specified needs to be carried out and assessed by an appropriately qualified specialist.

Controlled Waters Generic Assessment Criteria

The Screening Values adopted by Waterman for ground and surface water quality have been selected on the basis of the water quality standards that apply at the controlled water receptor considered to be at potential risk of harm. Where the receptor is to be assessed for potential harm to aquatic life then the Environmental Quality Standards (EQS) for List 1 and List 2 dangerous substances (EC Dangerous Substances Directive (76/464/EEC)) will be used. Where the receptor is to be assessed for potential harm with respect to use as a drinking water resource then the Water Supply (Water Quality) Regulations 1989 and 2000 as amended will be used. Where the receptor is to be used by aquatic life and for drinking water purposes both sets of criteria will be used. The standards for the substances tested for in this investigation are provided in Table D3 and D4 below.

Environmental Quality Standards

Environmental Quality Standards (EQS) annual average		Freshwater
pH (Alkaline)		9.0
Arsenic	µg/l	50
Cadmium	µg/l	5
Chromium	µg/l	5 – 250(1)
Lead	µg/l	4 -250(1)
Mercury	µg/l	1
Boron	µg/l	2000
Beryllium	µg/l	NV
Copper	µg/l	1 - 28(1)
Nickel	µg/l	50 - 200(1)
Mercury	µg/l	1
Vanadium	µg/l	60
Zinc	µg/l	75 - 500(1)
Sulphate	mg/l	400
Total Sulphur as Sulphate	mg/l	400
Total Petroleum Hydrocarbons (TPH)	mg/l	0.01
Phenol	µg/l	30
Benzene	µg/l	30
Toluene	µg/l	50
Ethyl Benzene	µg/l	NV
Xylene	µg/l	30
Naphthalene	µg/l	2.4
Anthracene	µg/l	0.1
Flouranthene	µg/l	0.1
Benzo(b)fluoranthene	µg/l	0.03
Benzo(k)fluoranthene	µg/l	0.03
Benzo(a)pyrene	µg/l	0.05
Benzo(g.h.i.) Perylene	µg/l	0.002

Footnotes:
NV – No value
(1) – Dependant on Hardness (See DoE circular 7/89).

UK Drinking Water Supply Standards

Water Supply (Water Quality) Regulations 1989 and 2000- as amended		
Barium	µg/l	1000
Calcium	mg/l	250
Magnesium	mg/l	50
Selenium	µg/l	10
Ammonium (NH4+)	µg/l	500
Nitrate (as $N0_3$)	mg/l	50
Total/Complex Cyanide	µg/l	50
Selenium	µg/l	10
EU Surface Water Directive (75/440/EEC) - Class A1 – only simple treatment required.		
Sulphide	mg/l	*150*

Ground Gas and Volatile Organic Compounds Generic Assessment Criteria

Ground Gas

The Building Regulations 2000 Approved Document C (2004 Edition) require that methane and other gases from the ground are considered on a risk assessment basis. Methane and other gases from the ground are defined in this document as *"hazardous soil gases which originate from waste deposited in landfill sites or are generated naturally"*. Ground gas can also be generated by fill materials present on sites that are not classed as landfills. Therefore a preliminary ground gas risk assessment should consider the potential for methane or other gases to be present. This includes identification of the potential sources on or near to the site that could produce methane or other ground gas.

The most common gases assessed with respect to development are methane and carbon dioxide. Methane forms a potentially explosive mixture when mixed with air within certain concentration limits, known as the 'explosive range'. The Lower Explosive Limit (LEL) for methane is 5%. Carbon dioxide (CO_2) is a dense gas, capable of accumulating in confined spaces such as basements, causing a potential asphyxiation hazard. The Occupational Exposure Limit (OEL) for a short-term exposure to carbon dioxide is 1.5% over a 15 minute period. Both methane and carbon dioxide when present at high concentrations can act as simple asphyxiants by reducing the oxygen content by dilution.

Reference in the Building Regulations is made to guidance documents produced by a variety of organisations, primarily those produced by the Construction Industry Research and Information Association (CIRIA). These include the following documents:

- CIRIA Report 149 Protecting development from methane, 1995
- CIRIA Report 131 The measurement of methane and other gases from the ground, 1993.
- CIRIA Report 150 Methane investigation strategies, 1995
- CIRIA Report 151 Interpreting measurements of gas in the ground, 1995
- CIRIA Report 152 Risk assessment for methane and other gases from the ground, 1995

In addition guidance is provided in the BRE document 'Construction of new buildings on gas-contaminated land (BRE Report BR212)'.

CIRIA, Report 131, 1993, suggests that there are no fixed rules for safe gas concentrations on a site since this risk is dependent on a number of factors that include gas emission rate from the ground and the potential for gas to enter into structures.

The Building Regulations relate to domestic dwellings. However, for non-domestic dwellings the same principle of risk assessment applies.

The latest guidance document is provided by CIRIA Report C665, *"Assessing risks posed by hazardous ground gases to buildings"*, 2007 and BS8485:2007: *"Code of practice for the characterisation and remediation from ground gas in affected developments"*.

CIRIA C665 aims to consolidate good practice in investigation, facilitate the collection of relevant data, instigate appropriate monitoring programmes, all in a risk based approach to gas contaminated land. As with BS8485, this document largely focuses on Methane and Carbon Dioxide. However, much of the text is also relevant to consideration of other contamination present in vapour phase.

BS8485, 2007 describes methods for the investigation and assessment of the ground gases methane and carbon dioxide provides recommendations for protection of new development on affected sites. This standard is not intended for the assessment of completed developments and considers only methane and carbon dioxide.

Both of these publications have been prepared to be generally consistent with CLR11, *Model Procedures for the management of land contamination,* (DEFRA and the Environment Agency, 2004a) and follow a step by step approach summarised below:-

1. Desk Study and Site Walkover
2. Development of a Preliminary Conceptual Model and Risk Assessment
3. Site Investigation (If deemed necessary from stage 2)
4. Risk Assessment and Site Characterisation
5. Recommendation and Mitigation

Where, the preliminary conceptual model has deemed further investigation necessary to characterise the ground gas regime, an appropriate site investigation and monitoring regime should be designed and undertaken. In-depth guidance to assist in the design of the investigation is provided within C665, which describes intrusive investigation techniques and provides guidance on selecting the number and location of monitoring wells based on the site specific conceptual model.

Waterman has generally followed the approach recommended in CRIRIA C665 with respect to characterising a site and determining the levels of gas protection methods required. This approach is generally consistent with the guidance provided in BS8485.

In accordance with C665, to assess the ground gas regime at a site, the ground gas monitoring data should be assessed by determining the Gas Screening Value (GSV) (l/hr) (BS8485 refers to the GSV as the Hazardous Gas Flow Rate). The GSV is calculated as follows:

GSV = (Measured Maximum CO_2 or CH_4 Gas Concentration (%) / 100) x Maximum Measured Gas Flow Rate from boreholes (l/hr)

Where the gas flow rate has been measured as less than the detection limit of the instrument used (ie <0.1 l/hr), C665 recommends that the detection limit for the Gas Analyser is used as the gas flow rate (ie 0.1l/hr).

The Gas Screening Value is used to classify the site, subject to the proposed end use of the site, falling into either Situation A or Situation B, as described below.

Situation A – For All Development Types except Low Rise Housing with a ventilated underfloor void (150mm)

For situation A, the Modified Wilson and Card classification system is used. This system attributes a Characteristic Situation (CS) value to the site/zone depending upon the calculated GSV. When attributing a CS, additional factors including the maximum recorded gas concentration and the maximum recorded

gas flow rate should also be taken into account and may result in an increase in the CS value. The Table below, outlines the CS values associated GSV's and additional factors which must be taken into account.

Modified Wilson and Card Classification

Characteristic Situation (CIRIA 149)	Risk Classification	Gas screening value (CH_4 CO_2) l/hr	Additional Factors	Typical source of generation
1	**Very low risk**	**<0.07**	Typically methane ≤1% and / or carbon dioxide ≤5%. Otherwise consider increase to CS 2.	Natural soils with low organic content 'Typical' made ground
2	**Low risk**	**<0.7**	Borehole air flow rate not to exceed 70 l/hr. Otherwise consider increase to CS 3.	Natural soil, high peat/organic content. 'Typical' made ground
3	**Moderate risk**	**<3.5**		Old landfill, inert waste, mineworking flooded
4	**Moderate to high risk**	**<15**	Quantitative risk assessment required to evaluate scope of protective measures.	Mineworking – susceptible to flooding, completed landfill (WMP 26B criteria)
5	**High risk**	**<70**		Mineworking unflooded inactive with shallow workings near surface
6	**Very High risk**	**>70**		Recent landfill site

Notes:

1) Gas screening value: litres of gas / hour is calculated by multiplying the gas concentration (%) by the measured borehole flow rate (l/hr)
2) Source of gas and generation potential/performance must be identified.
3) If there is no detectable flow use the limit of detection of the instrument.

Once the characteristic situation has been determined, the requirements and scope of gas protection measures can be determined based on the Table below (based on guidance provided within C665):

Modified Wilson and Card Protection Measures

CS*	Risk Classification	Residential building (not those subject to NHBC Classification Method		Office/commercial/industrial development	
		No. of levels of protection	Typical scope of protective measures	No. of levels of protection	Typical scope of protective measures
1	**Very low risk**	**None**	No special precautions	None	
2	**Low risk**	**2**	a) Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 1200g DPM[2,7] and underfloor venting. b) Beam and block or pre-cast concrete and 2000g DPM[7]/ reinforced gas membrane and underfloor venting. All joints and penetrations sealed	1 to 2	a) Reinforced concrete cast in situ floor slab (Suspended, non-suspended or raft) with at least 1200g DPM[2,7]. b) Beam and block or pre-cast concrete slab and minimum 2000g DPM / reinforced gas membrane. c) Possibly underfloor venting or pressurisation in combination with a) and b) depending on use. All joints and penetrations sealed
3	**Moderate risk**	**2**	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space.	1 to 2	All types of floor slab as above. All joints and penetrations sealed. Minimum 2000g/reinforced gas proof membrane and passively ventilated underfloor sub-space or positively pressurised underfloor sub-space.
4	**Moderate to high risk**	**3**	All types of floor slab as above. All joins and penetrations sealed. Proprietary gas resistant membrane and passively ventilated underfloor sub-space or positively pressurised underfloor sub-space, oversite capping or binding and in ground venting layer.	2 to 3	All types of floor slab as above. All joins and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space.
5	**High risk**	**4**	Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft). All joints and penetrations sealed. Proprietary gas resistant membrane and ventilated or positively pressurised underfloor sub-space, oversite capping and in ground venting layer and in ground venting wells or barriers	3 to 4	Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft). All joins and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space with monitoring facility. In ground venting wells or barriers.
6	**Very high risk**	**5**	Not suitable unless gas regime is reduced first and quantitative risk assessment carried out to assess design of protection	4 to 5	Reinforced concrete cast in-situ floor slab (suspended, non-suspended or raft). All joints and penetration sealed. Proprietary gas resistant

CS*	Risk Classification	Residential building (not those subject to NHBC Classification Method		Office/commercial/industrial development	
		No. of levels of protection	Typical scope of protective measures	No. of levels of protection	Typical scope of protective measures
			measures in conjunction with foundation design.		membrane and actively ventilated or positively pressurised underfloor sub-space with monitoring facility, with monitoring. In ground venting wells and reduction of gas regime.

Notes:

1) Typical scope of protective measures may be rationalised for specific developments on the basis of quantitative risk assessments.
2) Note, the type of protection is given for illustrative purposes only. Information on the detailing and construction of passive protection measures is given in BR414 [Ref: 16]. Individual site specific designs should provide the same number of separate protective methods for any given characteristic situation.
3) In all cases there should be minimum penetration of ground slabs by services and minimum number of confined spaces such as cupboards above the ground slab. Any confined spaces should be ventilated.
4) Foundation design must minimise differential settlement particularly between structural elements and ground baring slabs.
5) Floor slabs should provide an acceptable formation on which to lay the gas membrane. If a block beam floor is used it should be well detailed so it has no voids in it that membranes have to span and all holes for service penetrations should be filled. The minimum density of the blocks should be 600kg/m^3 and the top surface should have a 4:1 sand cement grout brushed into all joints before placing any membranes (this is also good practice to stabilise the floor and should be carried out regardless of the need for gas membranes).
6) The gas resistant membrane can also act as the damp proof membrane.
7) DPM = Damp Proof Membrane

Situation B – For Low Rise Housing with a ventilated underfloor void (min 150mm)

Situation B should be used for low-rise residential housing with gardens and sub-floor void. Where a sub-space void is not proposed, the development should be assessed using the situation A classification system above.

For situation B, the National House Building Council's (NHBC) Traffic Light classification system is used. This system attributes a colour to a site/zone depending upon the calculated GSV. As with the Wilson and Card system, in addition to the GSV, additional factors including the maximum recorded gas concentration and the maximum recorded gas flow rate must be taken into account when determining the Traffic Light classification. The Table below, outlines the Traffic Light classification system, based on the calculated GSV's and additional factors which must be taken into account.

NHBC traffic light system for 150mm void

Traffic Light	Methane		Carbon Dioxide	
	Typical Maximum Concentration (% v/v)	Gas Screening Value (GSV) l/hr	Typical Maximum Concentration (% v/v)	Gas Screening Value (GSV) l/hr
Green				
Amber 1	1	0.16	5	0.78
Amber 2	5	0.63	10	1.56
Red	20	1.56	30	3.13

Notes:-

- The worst gas regime identified at the site, either methane or carbon dioxide, recorded from monitoring in the worst temporal conditions, will be the decider as to what Traffic Light and GSV is allocated.
- Generic GSVs are based on guidance contained within latest revision of Department of the Environment and the Welsh Office (2004 edition) "The Building Regulations: Approved Document C" [Ref:17] and used a sub-floor void of 150mm thickness.
- This assessment is based on a small room e.g. downstairs toilet with dimensions of 1.5 x 2.5m, with a soil pipe passing into the sub-floor void.
- The GSV, in litres per hour, is as defined as the bore hole flow rate multiplied by the concentration of the particular gas being considered.
- The typical maximum concentrations can be exceeded in certain circumstances should the conceptual site model indicate it is safe to do so. This is where professional judgement will be required based on a thorough understanding of the gas regime identified at the site where monitoring in the worst case temporal conditions has occurred.
- The GSV threshold should not generally be exceeded without completion of a detailed gas risk assessment taking into account site specific conditions.

Once the Traffic Light classification has been determined, the requirements and scope of gas protection / mitigation measures can also be determined based on the Table below (based on guidance provided within CIRIA C665):

Gas Protection Measures for Low-Rise Housing Development Based Upon Allocation NHBC Traffic Light (Boyle and Witherington, 2006)

Traffic Light Classification	Protection Measures Required
Green	Negligible gas regime identified and gas protection measures are not considered necessary.
Amber 1.	Low to intermediate gas regime identified, which requires low-level gas protection measures, comprising a membrane and ventilated sub-floor void to create a permeability contrast to limit the ingress into buildings. Gas protection measures should be as prescribed in BRE Report 414 (Johnson 2001). Ventilation of sub-floor void should facilitate a minimum of one complete volume change per 24 hours.
Amber 2.	Intermediate to high gas regime identified, which requires high level gas protection measures, comprising a membrane and ventilated sub-floor void to create a permeability contrast to prevent the ingress of gas into buildings. Gas protection measures should be as prescribed in BRE Report 414. Membranes should always be fitted by a specialist contractor. As with Amber 1, ventilation of the sub-floor void should facilitate a minimum of one complete volume change per 24 hours. Certification that these passive protection measures have been installed correctly should be provided.
Red	High gas regime identified. It is considered that standard residential housing would not normally be acceptable without a further Gas Risk Assessment and / or possible remedial mitigation measures to reduce and / or remove the source of gas.

Volatile Organic Compounds

The Building Regulations 2000 Approved Document C (2004 Edition) also refers to volatile organic carbons (VOCs). These are primarily assessed by examination of the VOC content of site soils. Further guidance on VOCs is provided in *"The VOCs Handbook; Investigating, assessing and managing risks from inhalation of VOCs at land affected by contamination"*, CIRIA Report C682, 2009.

For former landfill sites the risk from a wider range of trace gases are considered on a site specific basis when appropriate.

UK and Ireland Office Locations

