

Stage 2: Site Investigation Report (Final)

at

**France Lane Wood Yard, France Lane,
Patching, Worthing, West Sussex BN13 3UP**

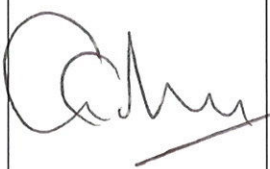
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Constructive Evaluation Limited
Unit 5, Vinnetrow Business Park
Vinnetrow Road
Runcton
Chichester
West Sussex
PO20 1QH
Telephone: 01243 533499
Fax: 01243 531070

E-mail: info@theconstructivegroup.com
Web: www.theconstructivegroup.com

REPORT APPROVAL					
Report prepared by (Project Leader or nominee)			Report approval by (Director or nominee)		
Name:	Signature:	Date:	Name:	Signature:	Date:
Jenny Levitt (Environmental Scientist)		11.3.10	Graham Moore (Director)		11.3.10
Name:	Signature:	Date:			
Charlene Knox (Environmental Scientist)		11.3.10			
REPORT REVISED (response to significant changes in client requirements, methods of work etc).					
Name:	Signature:	Date:	Nature of revision:		
Name:	Signature:	Date:	Nature of revision:		
Name:	Signature:	Date:	Nature of revision:		

SUMMARY

Constructive Evaluation (CE) Limited was appointed by Arun District Council (ADC) (EQ6176, dated 18th November 2009) to undertake a Stage 2: Site Investigation (SI) at France Lane Wood Yard, France Lane, Patching, Worthing, West Sussex BN13 3UP.

The site currently comprises of a small square yard which is occupied by a single caravan and a wooden building, used for general storage and welfare facilities. There are several wooden storage sheds noted on site. The site is covered in a mixture of gravel, wooden decking and disturbed soil.

The planning application for the site is for the stationing of a residential mobile home, and the erection of a high gate and formation crossover. The application relates to the northern section of the wood yard on France Lane, as the site was formerly part of the larger wood yard, which remains to the immediate south of the site.

The SI was undertaken to ascertain the underlying soil, ground gases and groundwater conditions for contamination purposes. This has been completed to determine whether the contaminant Pathways identified within the earlier Stage 1: Desktop Study & Walkover Survey are active and to determine any associated risks.

The investigation completed was undertaken in line with the Stage 1: Report, Site Investigation Proposals. The investigation comprised the sinking of three (3no.) 4.0 metre below ground level (mbgl) deep window sample boreholes (BH), all positions was installed to enable future gas and groundwater monitoring to be completed.

Selected soil samples removed from the three (3no.) BHs were sent to a MCERTS and UKAS accredited laboratory for contamination testing.

Stratigraphic records from the BHs indicate that the site is covered in approximately 0.25m to 0.43mbgl of Made Ground, comprising of dark brown black sandy Gravel/sandy Clay/clayey Sand. Sand is medium to coarse, with gravels noted to be subangular to subrounded fine to medium sized flints, type 1, concrete, brick, ash and slag.

Below the Made Ground soils are considered to be representative of the Head Deposits. These were noted to a maximum depth of 1.5mbgl (BH1) comprising of (soft) orange brown sandy Clay with occasional subangular to subrounded fine to medium sized flints. Beneath, which are soils considered representative of the Lambeth Group, comprising of (firm to stiff) mottled orange, grey and red silty Clay/clayey Silt.

The returned laboratory values indicated the presence of certain inorganic and organic contaminants within the underlying soils. However, all the results returned are below the respective UK Soil Guideline Values (SGVs) and LQM 'CIEH' guidance values for the "residential" land use classification.

Therefore based on the results received there is **LOW** to **NEGLIGIBLE** risk to the end users of the development, with a **LOW** risk to site workers, who are more likely to come into immediate contact with the soils.

One monitoring round has been completed for the site which identified oxygen levels ranging from 20.6% to 21.0%; this is largely consistent with ambient air. Levels of carbon dioxide were noted to range between 0.2% to 0.7%. Based on the results received to date we would characterise the site as being a **LOW** risk.

The proposed mobile home construction will, we suspect, include a void beneath which would mitigate against any potential risk from soil gases by providing adequate ventilation.

No groundwater analysis has been completed. Owing to the hydrogeological setting of the site and the proposed development scheme it is considered the risk to groundwater is **LOW**. The minimal disturbance to the ground is unlikely, to present a risk to "controlled waters".

A watching brief is always recommended. If during the construction of the mobile home, concerns are expressed in relation to exposed soils, we would advise that a suitably qualified Environmental Scientist and the Local Authority be contacted.

Although the results of the contamination testing have identified values below current UK guidance, we would still recommend as part of good working practices that all site workers would be expected to be made aware of the risks associated with the work and the site and be provided with suitable Personnel Protective Equipment (PPE).

We would recommend that the report is forwarded to the relevant Statutory Authorities for their comments and acceptance prior to site works commencing.

Trading Terms

Unless specifically stated within the tender/quotation or unless identified within the introduction to this report it is confirmed that this report has been compiled wholly in accord with Constructive Evaluation Limited's Terms of Engagement.

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The following notes should be read in conjunction with the report. Any variation to the general procedures outlined below are indicated in the text.

Foreword

The recommendations made and opinions expressed in the report are based on the conditions revealed by the site works as indicated on the site record sheets, together with an assessment of the data from the in situ and laboratory testing or in respect of the desktop reports. No responsibility can be accepted for conditions that have not been revealed by the research, for example, due to inaccuracies in the data. While the report may offer opinions, these comments are for guidance only and no liability can be accepted for their accuracy.

Routine Sampling

During the site investigation, soil, water and leachate samples have been taken in accordance with recommendations within BS.5930: 1990, & BS.10175: 2001. All samples have been marked accordingly and stored under suitable conditions to prevent any deterioration of the specimen (e.g. volatilisation of hydrocarbons). All samples have been placed in suitably labelled sealed plastic containers and sampling equipment cleaned between sample locations to prevent possible cross contamination.

During the compilation of desktop studies a number of sources have been contacted in order to provide any relevant information regarding the site in question. The sources contacted provide their own Terms & Conditions with regard to the data provided. As such, each source, e.g. Sitescope, Council Websites, etc. must be considered only in relation to these individual Terms & Conditions. All research has been carried out in accordance with recommendations within BS.10175: 2001.

The method of construction employed to form trial pits is entered on their records. In general, it is not possible to extend machine excavated trial pits to depths significantly below the local water table, especially in predominantly granular soils. Except for manually excavated pits, and unless otherwise stated, the trial pits have not been provided with temporary side support during their construction, hence personnel have not entered them and examined the strata or any construction details so exposed.

Laboratory Testing

Unless stated otherwise within the text, all laboratory tests have been performed in accordance with the requirements detailed in British Standards 1881:1990 or other standards or specifications that may be appropriate.

Regulatory Bodies

After the compilation of desktop study and walkover survey or site investigation works all parties must communicate with regulatory bodies including the Local Authority (both Planning & Environmental Health) and the Environment Agency. It must be accepted that further requirements may develop. It is possible that aspects of the desktop study may need to be altered to conform to the requirements of the regulatory bodies.

Definitions

Reference to the word "contamination" in this report does not relate to the statutory definition of contaminated land under 1990 Environmental Protection Act unless otherwise stated. The definition used in this report is: "Land that contains substances that, when present in sufficient quantities or concentrations, are likely to cause harm, directly or indirectly, to man, to the environment, or on occasion to other targets" (NATO CCMS, 1985).

Walkover Survey

It should be noted that a walkover survey is designed as a brief inspection of the site in question, however every reasonable effort has been made to access all areas of the site, areas where this has not proved possible will be referenced in the text. The site reconnaissance is undertaken with permission of the client after the document search is completed with the aim of recording any further aspects of the site not revealed by the desktop study however this does not in itself guarantee that every possible risk has been seen.

Conceptual Model/Risk Assessment/ Sampling Regime

The conceptual model, Risk assessment and sampling regime has been formulated in accordance with BS10175:2001 and CLR 8 based upon the relevant information gained from the desktop and walkover survey. While the model and assessment offer opinions and interpretations of these guidelines, the comments made are for guidance only and no liability can be accepted for their accuracy.

Restrictions

In some instances a site investigation must be separated into two stages, depending on the access to the sub soils at the time of the initial site attendance. It must also be noted that in many instances the access afforded is restricted due to continuing activity on the site. In such instances all reasonable effort were to achieve maximum sampling coverage. This does not imply a guarantee that inaccessible areas are similar.

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1.0 INTRODUCTION

Constructive Evaluation (CE) Limited was instructed by Arun District Council (ADC) (EQ6176, dated 18th November 2009) to conduct a Stage 2: Site Investigation (SI) on the site currently forming part of France Lane Wood Yard, France Lane, Patching, Worthing, West Sussex BN13 3UP.

A Stage 1: Desktop Study & Walkover Survey (Ref: 10.6174 (Revision 1), dated February 2010) completed by CE has been undertaken to determine the site's historical and current environmental setting. The Stage 1: Report should be read in conjunction with this SI Report.

Prior to the commencement of the SI outlined within, the Stage 1: Report was forwarded to ADC for their comments and approval. Copies of the feedback relating to our report can be reviewed within Appendix A.

Following the feedback from ADC the SI has been completed to ascertain the nature of the underlying soil conditions in relation to the presence, if any, of contamination on site prior to the proposed stationing of a residential mobile home, and the erection of a high gate and formation of a crossover.

The intrusive investigation incorporated the sinking of three (3no.) window sample boreholes (BH) to a maximum depth of 4.0 metres below ground level (mbgl) using a Dando 2000 Terrier Rig, each position was installed with 50mm diameter pipework to enable future gas and groundwater monitoring to be completed.

Selected soil samples retrieved as part of our investigation have been sent to a UKAS and MCERTS accredited laboratory for contamination analyses, the results of which are appended. In addition, gas and groundwater monitoring/sampling has also been completed, as part of the investigation.

The following factual and interpretative report describes the works undertaken and presents copies of the test data obtained.

2.0 SITE CONDITIONS

The site is situated to the west of Worthing and to the south of Patching village, along the A27 by-pass. The site is centred on a National Grid Reference (NGR) 508582, 105821, occupying an area of 0.03499 Hectares (Ha). The area of the proposed development occupies a broadly level and square plot of land.

The site is currently occupied by a residential dwelling comprising of a mobile caravan to the site's eastern boundary and a wooden clad single storey building to the northern elevation, which is occupied by welfare facilities including a toilet, bathroom and lounge. The unit is also used for storage purposes by the site owner, comprising of several fridges, wood, plastic and furniture etc.

The site is generally covered in loose gravel apart from a small area of disturbed ground along the western perimeter and a small area of wooden decking to the eastern boundary.

The site is accessed via France Lane which runs north to south, to the site's western boundary, via some double gates.

Owing to a change in site ownership in the past four (4no.) years the site has been separated from the main wood yard, to the south. It is understood that the site was formerly occupied by the existing wooden clad building for the storage of materials associated with the wood yard (understood not have consisted of chemicals – anecdotal evidence from the site owner).

In addition, we understand from the site owner that part of the site was also used for the storage of an old car; there was no evidence of any vehicular spillages associated with this across the site area.

The site owner also mentioned that until early February 2010 a further mobile caravan was noted to the western boundary, evidence of disturbed ground was noted in this vicinity during the initial Walkover Survey completed in mid February 2010. It is understood the new caravan will also be positioned in the same location. In addition, we understand that the old caravan had been damaged by a small fire.

The surrounding environs largely comprise of agricultural fields and residential dwellings, with a commercial property noted to the east of the site boundary. Further to the completion of the earlier Stage 1: Report, it has been subsequently noted that the property to the north, approximately 25m-50m away, beyond the car park has a small Above Ground Storage Tank (AST). Please note that during the Stage 1: Report we were unable to take any photographic records of the site conditions. However, photographs were taken of the surrounding environs.

In addition, during the Walkover Survey and intrusive investigation the surrounding fields particularly to the east were noted to be significantly saturated.

3.0 PHYSICAL SETTING

Geology - The 1: 50,000 Solid and Drift Geology Map (Sheet 317/332, Chichester & Bognor Regis) indicate the site to be underlain by Head Deposits, which is in turn underlain by the Lambeth Group.

Head Deposits – Comprising of variable deposits of impure Clay, Sands and Silts, locally gravelly.

Lambeth Group – Comprising of mottled Clays, Silts and Sands.

Made Ground - Owing to the site's former use as a timber/wood yard, it is likely that a variable thickness of Made Ground may be encountered across the site.

The BGS borehole records obtained for the site as part of the Stage 1: Report indicated that the local area was underlain by the Reading Formation over the Upper Chalk at depth.

Hydrogeology - The Environment Agency (EA) 1:100,000 scale Groundwater Vulnerability Map (Sheet 45, West Sussex & Surrey) indicates that the site is situated on a Minor Aquifer. The underlying geology creates variability on permeability which may not produce vast quantities of water for abstraction but is important for local supplies and river base flows. The soils are classified as intermediate (I1). The site is not located within a Source Protection Zone (SPZ), however, it is noted to be within close proximity to four (4no.) designated SPZs.

BGS borehole records retrieved as part of the Stage 1: Report identified groundwater levels in the local area between approximately 24m-30m, within the Upper Chalk stratum. However, it was considered that due to the potential Made Ground a perched water table may be identified.

Hydrology – The nearest surface water feature is 250m to the east comprising of Patching Pond. However, several drainage ditches are noted to the immediate east of the site and to the west with the water contained within flowing in a north to south orientation.

Topography – The site is noted to be on an approximate topography of 29 meters Above Ordnance Datum (mAOD). The site is on broadly level ground.

4.0 FIELDWORKS

The following intrusive works were carried out on the 16th February 2010 by a supervising Environmental Scientist from CE. The SI was undertaken in accordance with the scope of works set out within the Stage 1: Desktop Study and Walkover Survey and in relation to statutory guidance including BS10175: 2001 *Investigations into Potentially Contaminated Sites – Code of Practice* and BS5930: 1999 *Code of Practice for Site Investigations. Amendment 1*.

4.1 Soils

- Prior to any excavations taking place a Cable Avoidance Tool (CAT) was used to check for the position of any underlying services. In addition, manhole covers were raised to check the direction of any drains. Prior to the sinking of the window samples boreholes (BH), starter pits were excavated to 1.0m - 1.1mbgl to check for the avoidance of any underlying services. As no obstructions were identified, safe drilling commenced.
- Three (3no.) BH positions were sunk using Dando 2000 Terrier Rig to a maximum depth of 4.0mbgl. Borehole positions were located in areas based on the recommendations of the Stage 1: Report to provide a representative spread of the site. All locations were logged, groundwater conditions noted, visual and olfactory evidence of contamination have also been recorded with representative soil samples removed in accordance with current protocol for contamination parameters.
- Upon completion, all three (3no.) BHs were installed with a 50mm diameter plain and slotted polypropylene standpipe, surrounded by gravel and a bentonite seal in order to facilitate future gas and groundwater monitoring. The positions were completed with a gas tap and lockable cover.

Positions of the exploratory holes are shown on the site layout plan, in Appendix B.

4.2 Gas

The following monitoring regime was undertaken on the 26th February 2010 by an Environmental Scientist from CE. At present only one round has been scheduled for the site, further characterisation may be required. The boreholes were left for approximately 10 days to enable equilibration of the soils and groundwater. Gas monitoring was completed during periods when atmospheric pressure was either falling and/or below 1005 millibars (mb). Gas monitoring was completed in accordance with CIRIA C665 *Assessing risks posed by hazardous ground gases to buildings*.

- All positions installed during the intrusive works were monitored for the presence of Volatile Organic Compounds (VOCs) using a Photo Ionisation Detector (PID) meter (MiniRAE 2000 – 10.6eV), and for the presence of soil gases including methane (CH₄), carbon dioxide (CO₂), hydrogen sulphide (H₂S) and oxygen (O₂). In addition, gas flow rates, downhole pressure and atmospheric pressure were measured using a gas analyser manufactured by Geotechnical Instruments (GA2000+). Gas monitoring was completed over a three minute period recording the steady and peak concentrations of

each gas.

4.3 Groundwater

Subsequent to the gas monitoring, groundwater monitoring was completed which incorporated the determination of groundwater levels across the site, as well as sample retrieval from the installed boreholes. Groundwater monitoring was completed in accordance with *BS6068: 1997 Water Quality. Sampling. Guidance on Sampling of Groundwater*.

- The depth of the water table was determined using a dip meter within each of the boreholes.
- Once the depth of the groundwater level had been determined each hole was adequately purged and samples retrieved.
- Once purging had been completed water levels within the holes were recorded after 30 minutes (mins) and 45mins to see whether any further percolation and/or migration was occurring.
- Prior to gas monitoring being completed (as outlined above) within the three BHs the holes were left for approximately an hour before gas readings were taken to enable equilibration of the soils etc.
- Upon completion of the monitoring BH levels were retrieved to enable determination of the potential groundwater flow direction. The datum (0.00m) was taken from the centre of France Lane, opposite the access gate, on the highest point of the road. The details of the BH levels and the water level within the ditch, to the immediate west of the site can be reviewed within the table below:

Location	Level (m)
Datum	0.00
BH1	-0.24
BH2	-0.15
BH3	-0.12
Ditch Level	-0.29

A site plan indicating the borehole levels can be reviewed within Appendix C. A copy of the gas and groundwater monitoring results can be reviewed within Appendix G.

4.4 Constraints

Whilst every effort has been made in relation to the positioning of the BHs to the locations identified within the Stage 1: Report, marginal amendments have been made owing to the location of several services. In addition, the boreholes have only been singularly installed with 50mm diameter pipework rather than dual installed within 19mm and 35mm as previously recommend owing to the ground conditions encountered.

The water levels encountered within the BHs were noted to be above the gas tap, therefore prior to gas monitoring was completed; the BHs had to be purged of any water. Once emptied gas monitoring was completed, however it should be noted that this has been completed when the soils are heavily saturated.

5.0 GROUND CONDITIONS

5.1 Soils

The following strata conditions were encountered during the intrusive works:

Made Ground – Encountered to a maximum depth of 0.43mbgl in BH1, comprising of dark black brown sandy Gravel. Sand is medium to coarse. Gravels are subangular to subrounded fine to medium sized flints, brick, concrete, coal and slag.

Made Ground – Encountered within BH2 and BH3 between 0.25m to 0.3mbgl, comprising of grey brown gravelly clayey Sand/sandy Clay. Sand is medium to coarse. Gravels are subangular to subrounded fine to medium sized flints.

Head Deposits – Comprising of orange brown sandy Clay/ sandy gravelly Clay to a maximum depth of 1.5mbgl in BH1. Sand is fine to medium. Gravels are subangular to subrounded fine to medium sized flints.

Lambeth Group – Encountered to the full drill depth of 4.0mbgl, comprising of mottled orange, grey and red silty Clay/clayey Silt. Noted within BH1 between 2.7m to 3.0mbgl were occasional gravel sized subangular fine to medium sized siltstone. This stratum is considered representative of the Lambeth Group.

5.2 Groundwater

Groundwater was not encountered during the intrusive works; however BH1 and BH2 were noted to have slightly moist soils between 0.65m to 0.9m (approximately) within the Head Deposits which are noted to overly the Lambeth Group.

Although water was encountered within the BHs during the monitoring round it is considered that this is as a result of incident rainfall which has saturated the overlying Made Ground and has infiltrated the BHs.

5.3 Surface Water

During the intrusive works surface water was noted on site, pooling water was evident around the area of the proposed new mobile home (western perimeter); this was due to the heavy rainfall encountered during drilling.

Surface water present within the nearby drainage ditches was noted to be marginally higher than that encountered during the Walkover Survey. Furthermore, the surface water levels noted in the fields to the east were also of greater proportions, owing to the significant amount of rainfall prior and during the intrusive works.

Surface water conditions noted within the nearby drainage ditches during the subsequent monitoring round has indicated significant water flow as a result of the incident rainfall. The water movement suggests a flow from north to south. In addition to this pooling water was also noted on site, particularly in the vicinity of BH2, this may have been a result of the disturbed ground noted in this location.

We consider that the soils particularly the Made Ground were at saturation point and the surface water was sitting on top of the Lambeth Group, owing to its Clay content. Overall it is considered that the flow through the Made Ground will be good on an average day. However, soils are likely to become saturated during inclement weather.

During the monitoring round water levels were recorded after adequate purging i.e. emptying of the borehole. Levels were recorded after a 30mins and 45mins period indicating water was re-entering the boreholes, further confirming that the soils were heavily saturated. After 30mins water levels were ranging between 2.87m to 3.03m from empty and after 45mins ranged from 2.56m to 2.92m.

Although the Made Ground is reasonable for soak drainage, it will suffer incident rainfall saturation which will inhibit soakage in the short term. Therefore, any soakage tests completed for the site would be highly variable.

The water levels returned we consider are not representative of the groundwater conditions for the site, as we consider that this may be significantly deeper down. However, confirmation of this could be ascertained by completing further monitoring rounds during periods of prolonged dryness.

5.4 Visual and Olfactory Observations

5.4.1 Soils

Visual evidence of anthropogenic materials including bricks, ash, slag, type 1 and coal were noted by way of contamination within the composition of Made Ground identified on site.

A faint organic odour with some black staining was noted in BH1 between 0.43m to 1.5mbgl, soils considered representative of the Head Deposits. BH3 identified a faint organic odour and black staining in the Made Ground and soils considered representative Head Deposits between 0.1m to 0.6mbgl.

5.4.2 Surface Water

Visual appraisal of the surface water noted on site, within the drainage ditches and the water within the fields, were also noted to identify no significant signs of visual/olfactory evidence of contamination during the intrusive works and subsequent monitoring round.

The water retrieved from the BHs during the monitoring round, which is considered to be surface water did not identify any significant visual/olfactory appraisal of contamination.

Details of drilling, with borehole logs showing strata encountered, sampling depths and groundwater levels, can be found in Appendix D. In Appendix E is a copy of the photographs taken during the intrusive works.

6.0 LABORATORY TESTING

6.1 Soils

Samples of the underlying soils (from the 0.1m to 4.0mbgl) within both the Made Ground and natural soils beneath have been analysed by Messrs QTS Environmental in their UKAS and MCERTS accredited laboratory in accordance with laboratory protocol.

The testing completed comprised of a background suite of heavy metals, pH and sulphates. In addition, samples have also been analysed for Banded Total Petroleum Hydrocarbons (TPH – C₁₀ to C₄₀) by Gas Chromatography (GC), and the levels for Speciated Polycyclic Aromatic Hydrocarbons (PAH) including the more carcinogenic benzo(a)pyrene (B(a)P) and naphthalene have also been determined.

Selected samples have also been analysed for Speciated TPH (Aliphatic & Aromatic Split C₅ to C₃₅).

Owing to the site's former use as a wood yard selected soil samples from within the Made Ground have been submitted for asbestos screening. Furthermore, samples have also been analysed due to the potential for timber treatment for phenols and Poly Chlorinated Biphenyls (PCBs Congener – 12).

This analysis has been undertaken to constitute a site specific contamination testing regime in accordance with the initial Conceptual Site Model (CSM), identified within the Stage 1: Desktop Study and Walkover Survey.

The results of this work are presented on the attached laboratory sheets within Appendix F (Soils).

6.2 Groundwater

No groundwater samples were retrieved for analysis from the installed boreholes. However, samples were retrieved from the boreholes to ascertain whether the water contained within was indeed surface water by completing pH, nitrates and phosphate analysis.

The results of the analysis can be reviewed within Appendix F (Surface Water).

7.0 CONTAMINATION RESULTS

7.1 Soils

The results of the aforementioned laboratory testing have been compared to the Environment Agency's (EA) Soil Guideline Values (SGVs) using both the old approach and where created, the revised SGVs have been utilised. Where there are no SGVs the CIEH 'LQM' guideline values (2nd Edition) for inorganic and organic contaminants in soils have been used. Where current UK guidance is not available the Dutch Guidance Values have been used for correlative purposes. However, it should be noted that these are not statutory.

Comparisons have been made on the basis that the proposed development falls into the category of 'residential'. It should be noted that at the time of writing we are not aware of any potential areas of soft landscaping to be incorporated within the final layout design.

A total of fourteen soils samples have been submitted for inorganic and organic analysis. A total of three samples were submitted from the Made Ground, with the rest of the samples from within the natural soils.

Generally, the results that have been returned for inorganic contaminants are below the relevant guideline levels for the particular land use classification utilised.

Whilst concentrations of organic contaminants, specifically TPH have been identified within BH1 (Made Ground) specifically of 23mg/kg (total), which was noted to predominantly elute from within the heavier fractions C₁₆ to C₃₄ (Aliphatic), the concentrations returned are noted to be below the respective UK guidance values for the relevant hydrocarbon fractions based on the Soil Organic Matter (SOM) 2.5% content.

Overall the majority of the results submitted for TPH analysis were below the relevant Limits of Detection (LoD).

Presently there is no current UK guidance for Total PAH, within soils; the former Dutch Guidance Value can be used for correlative purposes, which recommends a value of 40mg/kg. The results returned were all below this guidance value.

In addition, the results of the laboratory testing of individual PAH compounds are noted to be below the relevant LQM 'CIEH' guidance values based on the respective SOM content.

The result returned for TPH from the shallow sample (0.2mbgl – Made Ground) in BH1 may be considered representative of the ground conditions noted during the intrusive works which comprised of coal, slag and ash from an historic bonfire.

Selected samples submitted for BTEX (Benzene, Toluene, Ethyl benzene and Xylene) were all noted to be below their respective LoD of <2mg/kg and <5mg/kg.

The relevant SGV for phenols is 420mg/kg, the selected samples submitted for analysis have returned values below the LoD <2mg/kg.

Samples have been submitted for total cyanide analysis, at present there is no current UK guidance values, so the Dutch Guidance Value of 20mg/kg have been used for correlative purposes. The returned results are noted to be generally below the LoD of <2mg/kg.

Where tested, the results for PCBs were returned at negligible concentrations below the LoD of <8µg/kg and therefore below the relevant SGV of 8µg/kg.

In addition, the samples screened for asbestos fibres indicated that there were no fibres present within the samples submitted.

Samples have also been submitted for water soluble sulphate and pH determination and the results returned are noted to range between <0.01mg/L to 0.12mg/L, with pH values noted between 7.0-8.0.

Subsequently based on the BRE digest "*concrete in aggressive ground*" the results indicate that the design classification for any concrete in ground would be DS-1 for concrete and site ACEC sub classification AC-1 for a Brownfield location.

7.2 Gas

Subsequent to the completion of the SI one monitoring round has been completed, it should be noted as highlighted in section 4.4 that gas monitoring could only be completed once the boreholes had been adequately purged, as water levels were noted at the surface. This may have attributed to the results received owing to the soils being significantly saturated. The results received will at least provide an indication to the potential presence of soil gases.

The levels of methane, hydrogen, hydrogen sulphide and carbon monoxide were all below the LoD.

Levels of oxygen were noted to range from 20.6% to 21.0%, which are synonymous with ambient air.

Trace concentrations of carbon dioxide are noted within all three boreholes ranging from 0.2% in BH1 to 0.7% within BH2. These levels are considered representative of the Made Ground identified within the BHs.

7.3 Water Sample

As a result of the analysis completed levels of phosphate and nitrate were noted below the LoD of each individual constituent indicating that the water has not potentially arisen from run off from the neighbouring fields.

The results of the pH analysis indicate a value of 6.5 which is consistent with rainfall which frequently returns values of 5-6.5, with acid rain returning value of <5.6. Therefore it is considered that the results received are representative of surface water migration through the Made Ground into the boreholes.

8.0 UPDATED CONCEPTUAL SITE MODEL & RISK ASSESSMENT

The Conceptual Site Model (CSM) has been re-formulated in accordance with BS10175:2001 to provide information regarding the possible sources of contamination on site, the pathway in which the contamination can migrate and a vulnerable receptor to the contamination, all of which need to be present for there to be a risk. This is in relation to the change in land use from “commercial/industrial” to “residential”, however it should be noted that the site is already being used in this way now. The following Source – Pathway – Receptor relationships have been identified based on the results received from the Stage 2: Site Investigation:

Source	Pathway	Receptor	Potential Risk
Hydrocarbons (Total Petroleum Hydrocarbons - TPH & Poly Aromatic Hydrocarbons - PAH) from the historical and the existing nearby use of the site as a timber/wood yard. Including oils and lubricants stored on site for the manufacturing of wood based products and machinery historically. Vehicular spillages from on site parking. Potentially from the burning of waste products on site.	Inhalation, ingestion and dermal contact from exposure to contaminated soils.	End users.	Low to negligible risk owing to the results received which have only identified trace concentrations of PAH and TPH within the shallow sub soils. We understand that the site will largely be covered in loose gravel/hard standing and therefore the immediate risk to the end user will be minimal. Furthermore, we are not aware of any proposed soft landscaped areas.
		Site workers.	Low risk owing to the concentrations identified within the shallow sub soils. The immediate risk will be site workers during the construction phase of the project, when excavations are taking place. However, with the use of suitable Personnel Protective Equipment (PPE) will be lowered.
		AONB & ESA.	Negligible risk owing to the results received which are unlikely to have a significant impact on the ecological sensitivity of the site/surroundings, bearing in mind the continued use of the wood yard to the immediate south.
	Impacted soils.	Services.	Based on the results received the risks are considered to be low, however owing to the site's former use it would be precautionary to include suitable potable water supply pipework.
	Volatilisation of hydrocarbons from the underlying soils and groundwater to indoor and/or outdoor air.	Property & end user.	Low to negligible risk owing to the results received and hydrocarbon fractions noted on site, which have generally been noted to fall within the heavier end fractions which have a lower propensity to volatilise.
		Site workers.	

Source	Pathway	Receptor	Potential Risk
Hydrocarbons <i>continued</i>	Leaching of contaminants through soil.	Minor Aquifer.	The water identified within the boreholes we consider not be representative of the underlying Minor Aquifer and indeed surface water run off/percolation through the Made Ground. The results identified within the soils have not identified any significant levels of organic contaminants. Therefore we consider the risk to be low, particularly owing to the proposed development scheme which will not significantly impact upon the existing hydrogeological regime. In addition, the risk to the public/end user is considered low as a result of their being no groundwater abstraction within 500m.
		Patching field and drains ditch.	Low risk, during the completion of the intrusive works and subsequent monitoring rounds no visual evidence of contamination to the nearby drainage ditches etc have been noted. Furthermore, the soil results have not indicated any significant values for organic contaminants which may present a risk from leaching/surface run off.
	Services (existing potable water pipework, electrical cables etc).	End users.	Low to negligible risk owing to the results received which have only identified trace concentrations of PAH and TPH within the shallow sub soils.
		Site workers.	Low risk owing to the results received, this will mainly be contained to the construction part of the project should excavations be involved.
		Minor Aquifer.	During the course of the investigation and the subsequent monitoring round, groundwater was not encountered, although what we consider to be surface water was identified within the boreholes. Therefore, we consider the risk to be low to negligible as a result of the soil results identified. In addition, we consider that the proposed scheme will not significantly impact upon the existing hydrogeological regime etc.

Source	Pathway	Receptor	Potential Risk
Potential Asbestos Containing Materials – potentially from the Made Ground encountered on site.	Ingestion and inhalation of particles during demolition/construction phase.	Site workers. End users.	Low to negligible risk based on the results received from the laboratory analysis completed on selected soils samples. Risks may still exist from existing buildings on site.
Sulphates from Made Ground due to changes in site layout and the underlying natural soils.	Migration via groundwater or soil pore moisture.	Property & end user.	Low to negligible risk owing to the results received in relation to the propensity of sulphates to migrate and react with tricalcium aluminate in cement.
Poly Chlorinated Biphenyls (PCBs) from the historical and existing use of the site.	Leaching of contaminants through the soil. Migration of dissolved phase compounds to the groundwater.	End user.	Negligible risk owing to the results received from the laboratory analysis completed within the Made Ground and natural soils. Furthermore, we understand that the development will largely be covered in loose gravel/hard standing which will minimise the direct exposure pathways.
		Site workers.	Low risk owing to the results received from the laboratory analysis completed.
		Minor Aquifer.	The water identified within the boreholes we consider not be representative of the underlying Minor Aquifer and indeed surface water run off/percolation through the Made Ground. However, the results identified within the soils have not identified any significant levels. Therefore we consider the risk to be low, particularly owing to the proposed development scheme which will not significantly impact upon the existing hydrogeological regime for the site.
		Patching Pond/ field drains and ditch.	Low risk owing to the results received from the soil analysis. In addition, no significant visual signs of contamination were noted to the nearby drainage ditches.

Source	Pathway	Receptor	Potential Risk
Soil gases (including carbon dioxide (CO ₂), methane (CH ₄), hydrogen sulphide (H ₂ S) and Volatile Organic Compounds (VOCs)) from the site's historical and existing use. Including sources such as waste disposal and storage areas. Additionally the potential for varying thickness of Made Ground. Off site risk from historical landfill sites within 500m of the site.	Migration through soil pores and fissures and fractures within the underlying Chalk.	Property.	Low risk as a result of the one monitoring round completed. In, addition, it should be considered that the design of the new mobile home may incorporate a void beneath, providing adequate ventilation beneath. This should however be confirmed.
		End users.	
		Site workers.	Low to negligible risk owing to the results received, furthermore it is unlikely that there will be any significant excavations in which site workers will enter as part of their works, which would heightened the risk potentially.
Heavy metals from the historical and nearby use as a timber/wood yard. Potentially from the burning of waste products on site.	Inhalation, ingestion and dermal contact from exposure to contaminated soils.	End users.	Low to negligible risk owing to the results received from the laboratory analysis and the fact that the site will largely be covered in loose gravel/hard standing, minimising the direct exposure pathways.
		Plant uptake.	We understand that the development will not comprise of any areas of soft landscaping, therefore the risk to plant species is expected to be negligible. Levels of phytotoxic elements such as zinc and copper which are known to affect plant species specifically were all noted to be below relevant guidance.
		Site workers.	Low risk to site workers owing to the results obtained, however a greater risk will be
		AONB & ESA.	Negligible risk owing to the results received which are unlikely to have a significant impact on the ecological sensitivity of the site/surroundings.

Source	Pathway	Receptor	Potential Risk
Heavy metals <i>continued</i>	Leaching of contaminants through soil.	Minor Aquifer.	Low risk owing to the soil results received which have identified relatively low values of most inorganic contaminants. In addition, it is considered the proposed scheme will not significantly impact on the existing hydrogeological regime.
		Pond/ field drains and ditch.	
	Services (existing potable water pipework, electrical cables etc).	End users.	Low to negligible risk based on the laboratory results obtained, in addition, it is our understanding that the site will be covered in either loose gravel and/or concrete therefore reducing the immediate risk to the end user.
		Site workers.	Low risk in relation to the results received, however a greater risk may be present during the construction phase of the project if soils are excavated.
		Minor Aquifer.	Low risk owing to the soil results received which have identified relatively low values of most inorganic contaminants. In addition, it is considered the proposed scheme will not significantly impact on the existing hydrogeological regime.
Phenols from the timber/wood yard as part of the manufacturing and treatment of wood products.	Leaching of contaminants through the soil.	End user.	Low to negligible risk owing to the results received from the laboratory analysis. Furthermore, it is understood that a majority of the site will be covered in hard standing, which provides a barrier between the source and receptor.
		Site workers.	Low to moderate risk owing to the results received, site workers are more likely to come into direct contact of impacted soils.

Source	Pathway	Receptor	Potential Risk
Phenols <i>continued</i>	Migration of dissolved phase compounds to the groundwater.	Minor Aquifer. Pond/ field drains and ditch.	Low risk owing to the results received from the soil analysis. Furthermore the proposed development should not significantly impact upon the existing hydrogeological setting.
Negligible Risk	Defined as the site should be considered suitable for the present or future use and environmental setting. Contaminants unlikely to be present, which might have unacceptable impact on key targets.		
Low Risk	Defined as the site should be considered suitable for the present or future use and environmental setting. Contaminants may be present but unlikely to have unacceptable impact on key targets.		
Moderate Risk	Defined as the site may not be suitable for the present or future use and environmental setting. Contaminants are probably present and might have unacceptable impact on key targets.		
High Risk	Defined as the site is probably or certainly not suitable for the present or future use and environmental setting. Contaminants are probably or certainly present and likely to have unacceptable impact on key targets.		
ESA	Environmentally Sensitive Area.		
AONB	Area of Outstanding Natural Beauty.		

8.1 *Potential Source – Pathway – Receptor Linkages*

An environmental risk is present only if a source of contamination, a viable pathway through which the contamination can migrate, and a receptor that is vulnerable to the contamination are all present.

A Source – Pathway – Receptor Risk Assessment, in accordance with Part IIA of the Environmental Protection Act 1990, has shown that no possible pollution links have been identified at the site based on the results received within the Site Investigation and the proposed end use as being 'residential' based upon the sensitive end users of the site.

As a result, the site is considered to present a **NEGLIGIBLE** to **LOW** risk in general to the end users of the site, with a **LOW** risk to site workers, who are more likely to come into direct contact with the soils during stationing works. In addition, this assessment has been based on their being no proposed landscaped/garden/softscaped areas, with the site area covered in hard standing, in the form of gravel/ concrete/macadam/wooden decking.

Although the results of the laboratory analysis have not identified any elevated values in relation to the SGVs and LQM 'CIEH' trace concentrations of organic and inorganic contaminants have been identified therefore, it may be considered appropriate owing to the site's former use for the Client to adopt a precautionary condition in relation to the inclusion of landscaped areas or indeed the removal of landscaped areas i.e. decking, as these areas can be seen as temporary structures, which can be removed as and when the site owner wants. These areas offer a degree of protection between the end user and any potential contamination, which may exist, particularly outside areas investigated by CE i.e. unidentified areas of contamination. Therefore these areas should not be removed without prior notification to the Council.

In addition, landscaped/softscaped areas etc should not be included without prior consent of the Client (ADC), as these areas are likely to require some form engineering owing to the type of Made Ground identified, which we consider unusable for the growth of plant species, not owing to its chemical properties but due to its physical composition.

The one gas monitoring round completed has identified negligible concentrations, therefore based on the results received to date we consider the risk to be **LOW**, however it should be noted that the results received may have been affected by the ground conditions noted during the monitoring. Furthermore, the proposed development scheme comprises of a mobile home, generally these structures include of a void beneath which will offer a degree of ventilation between any potential source and the receptor. We would recommend that the design of the mobile home be confirmed.

Groundwater analysis has not been completed as part of this investigation as no groundwater was encountered during the monitoring round completed. Water was noted within all three boreholes, however, this is considered representative of potential migration/percolation of surface water through the Made Ground, indicating that the soils were at their saturation point. As a result, of the soil testing completed and the hydrogeological setting in relation to the proposed development scheme/end use we consider the risk to groundwater/surface water features to be **LOW**. Furthermore, the site is not positioned within a SPZ or within 500m of a surface/groundwater abstraction zone.

9.0 CONTAMINATION RECOMMENDATIONS

The following recommendations are based on the plans proposed at the time of writing; these recommendations should be read in conjunction with the previous reports including the Stage 1: Desktop Study and Walkover Survey.

CE has been instructed to provide recommendations for the soil, gas and groundwater/surface water conditions at the site based on the results received to date.

9.1 *Validation Report*

A report confirming that all of the works detailed within these recommendations will be required if the ADC and/or EA require a validation and/or closure report providing documentation/audit trail for the importation/removal/reuse of material on site and any other remedial works completed on site.

A Validation Statement details the works completed with relevant documentation including waste carrier notes, landfill certificates, topsoil certificates and any other documentation relating to the installation of the new services will be required.

Additionally site photographs of the installation of any remedial systems should be provided. The Validation Statement is produced by a qualified Environmental Consultant to provide a statement that the development and any remedial works have been completed to the required standard and that the site is now suitable for the intended use and poses minimal or no risks to the various receptors.

It should be noted that the list of remedial actions below is not exhaustive and may be dependant on additional results, further design details and/or requests of the Statutory Consultees. These recommendations do not constitute a full remediation strategy. You may be requested, by the LA to submit a full, detailed remedial/ validation strategy.

9.2 *Landscaped/Hardscaped Areas*

The proposed plans do not include any areas of soft landscaping/private gardens etc, however should this change we would recommend that a proposal for the design of these areas are submitted to ADC for their approval.

Whilst the soils analysed have not identified any elevated contaminants, we consider the physical properties of the Made Ground in particular to be un-useable for the growth of plant species, particularly if they are to be grown for consumption.

The current planning proposals do not include landscaped areas etc changes in site ownership may result in the modification of the site layout etc, therefore it may be considered prudent for our Client (ADC) to place a condition on the site in relation to the inclusion of landscaped areas or changes in areas of hard standing i.e. decking etc.

Areas of hard standing such as gravel, concrete and decking offer a degree of protection between the source of the contamination and the end user and should these areas be modified then the risks identified within the above CSM may need to be modified/re-adjusted to take this into consideration.

This is considered a precautionary measure owing to the site's former use as a wood yard and the nature of the proposed development at the time of writing, from 'commercial/industrial' to 'residential'.

9.3 Gas Results

To date one gas monitoring has been completed for the site indicating negligible concentrations of soil gases. However, owing to the ground conditions noted during the monitoring which indicated significantly saturated soils, the results returned may have been affected by such conditions.

Therefore, we consider the risk to be low at present, however further characterisation of the site may be warranted to enable an adequate risk assessment to be formulated.

However, it should be considered that the construction of some mobile homes have a void beneath the structure which allow for adequate venting. Confirmation should be sought in relation to the design of the new mobile home.

9.4 Waste Disposal

It is unlikely as part of this development that any significant amounts of soil will be removed off site owing to the nature of the structure involved. However, should any material need to be removed off site it is recommended that a copy of the laboratory results are given to the waste contractors and/or landfill operators involved to discuss the requirements with regards to removal of surplus subsoil's from the site and the acceptance of the waste at the landfill.

All materials must be transported in compliance with the Duty of Care Regulations by authorising movements with Carrier's individually numbered Duty of Care conveyance notes, complete with the appropriate EWC Codes. All relevant dockets will need to be kept to provide evidence of the removal. These will also be required as part of any Validation Report which may need to be completed for the site.

It may be necessary depending upon the specific requirements of the waste carrier and accepting landfill facility to complete further Waste Acceptance Criteria (WAC) testing; it is prudent to ascertain the testing requirements of each prior to the movement of any spoil.

The removal of any soils may need to be validated by a suitable qualified geo-environment consultant, to provide relevant documentation and validation that the removal has taken place, to satisfy the Statutory Authorities.

We would recommend that owing to the identification of several old metal containers and gas canisters etc that these materials are appropriately removed off site in accordance with current guidance and legislation.

9.5 Groundwater

No groundwater was encountered during the course of the intrusive investigations or the monitoring round completed. As a result no groundwater analysis has been completed.

We would consider based on the proposed end development that the risk to “controlled waters” would be low, as the development scheme is unlikely to comprise of significant excavation works.

Owing to the site’s hydrogeological setting we would recommend that the results of the analysis completed be forwarded to the EA for their comments and approval prior to site works commencing.

As a result of our investigations it is unlikely that groundwater will be encountered during any site works, which are likely to only comprise of shallow excavations. However, if groundwater is encountered it should be removed in accordance with good working practices and current legislation.

9.6 Boreholes

It is unlikely based on the results received from the monitoring round that the boreholes will need to remain on site; however confirmation should be sought from the EA and ADC prior to their appropriate decommissioning. Decommissioning must be completed in accordance with the Environment Agency’s guidance document ‘*Decommissioning Redundant Boreholes and Wells*’.

9.7 Surface Water

During the completion of the SI and the monitoring round considerable amounts of surface water have been noted on site and within the nearby drainage ditches, this is as a result of significant rainfall and run off from adjacent fields.

As a result the soils have become heavily saturated resulting in migration of surface water into the boreholes.

We would therefore recommend that careful consideration to the design of any surface water drainage of the site is considered and if required discussed with the EA for review and approval.

However, overall we would imagine that the proposed development scheme will not significantly impact upon the existing surface water conditions.

9.8 Ground Works

Although no elevated values of organic and/or inorganic contaminants have been noted as part of the laboratory analysis completed and there is likely to be minimal excavations involved as part of the development, we would still recommend as part of good working practices and as a precautionary measure that all construction workers should be made aware of any potential risks during a site induction, owing to the sites former use. All site workers would be expected to be protected as part of the standard protocol, by use of the appropriate PPE e.g. gloves, overalls and wash mess facilities.

9.9 Watching Brief

During any ground works an appraisal of the exposed soils should be made. If any material is noted to show visual and/or olfactory sign of contamination this material should be stockpiled separately and tested prior to its appropriate removal of site or re-use where necessary. A suitably qualified environmental specialist should be contacted to advise what further work is required.

If soils on site are to be re-used suitable testing will need to be completed to check that the material can be used elsewhere on site based on the sites proposed end use.

In order to complete the watching brief to the required standard, the on-site manager should maintain a daily log book including logs and general observations by him/herself and development staff. This must include full details of any significantly contaminated material encountered on site and how it is dealt with. If no contamination is encountered, then this should be confirmed within a written statement. A detailed photographic record of the remedial and site works should also be kept.

Should any previously unidentified contamination be identified during the remedial/site works, then it may be necessary to contact CE and the Local Authority to investigate the matter further.

9.10 Services

Whilst the recorded values of hydrocarbons obtained during the Site Investigation are below relevant guideline values we would still recommend that new services in particular potable water supply pipes should be made out of suitable materials.

Certain organic contaminants associated with PAH and TPH have been known to degrade polymeric materials such as plastics and rubber. It would be prudent to replace all existing water supply pipes. Should existing pipework remain the integrity of those pipes must be determined by testing the water for a general suite including Speciated TPH and PAH.

Anecdotal and visual evidence from the site Walkover Survey suggest that new pipework has been recently installed. From initial inspection it would seem that this has been installed by means of suitable pipework, however, confirmation of this would be prudent.

9.11 Asbestos

Although selected samples from the Made Ground have been visually appraised for the presence of asbestos/asbestos fibres and returned negative results, we would recommend that a watching brief be adopted during any excavation works. If any materials are noted during the site works materials should be dealt with in accordance with good working practice and current legislation.

The existing building on site seems to have been constructed relatively recently; in addition there was no immediate evidence of Asbestos Containing Materials (ACMs) within the building. We understand that this building will remain on site as part of the redevelopment; however consideration should be given to the completion of a Type 2 Asbestos Survey.

9.12 Statutory Consultees

We would recommend that this report together with the Stage 1: Desktop Study and Walkover Survey Report be forwarded to the relevant Environmental Consultees including the EA and ADC Environmental Health and Planning Department prior to site works commencing to seek their comments and subsequent acceptance.

10.0 LIMITATIONS

Should the currently proposed layout of the development change, or additional areas of soft landscaping are subsequently included, then the risks will need to be re-assessed and additional investigations, remedial works and/or building design modifications may be required.

The Environment Agency has recently undertaken revision of the Soil Guideline Values (SGVs) which are partially complete. Where standards are available using the “new” approach, these have been utilised for correlative purposes. Where standards have not yet been revised, guidance following the “old” approach has been utilised. Please note that upon release of the remaining guidelines, the standards contained within this report may be subject to change. In addition, the second edition of the LQM CIEH guidance has now been released and will be utilised in favour of previously published guideline values.

Advice and recommendations given in this report are provided for information purposes; they are not conclusive and do not constitute a specification for further investigation / remediation or other works. The advice given in this report with respect to contaminated land, groundwater and gas is based on current guidelines available at the time of writing.

The Client is advised that the conditions observed on site by Constructive Evaluation Limited at the time of the investigation are subject to change. Certain indicators the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance or investigation and they may subsequently have become noticeable.

The Client is advised that although every effort is made to identify suspect areas CE cannot be held responsible if buildings on site contain Asbestos, whilst every effort is made to identify materials which may contain it, access is not always afforded to all areas on site. Additionally Engineers sent on site are not specially trained in this aspect of work; if further determination is required the expertise of a BIOH trained surveyor should be sought.

Comments made relating to soil gas or groundwater conditions are based on observations made at the time of an investigation unless otherwise stated. Soil gas or groundwater conditions may vary as a result of seasonal fluctuations or other effects.

Ground contamination often exists as small discrete areas of contamination and there can be no certainty that any or all such areas have been located, sampled and/or identified. This is particularly significant for an investigation by window sampler as a relatively small sample of soil is extracted, which may not be entirely representative of the surrounding ground conditions.

This assessment is preliminary in its nature and may be subject to amendment in light of additional information becoming available or Statutory Consultee review, including the Environment Agency, Local Council and NHBC etc. The statutory authorities have been contacted by CE, however this does not include the Environment Agency, as the Client has specifically requested that they deal with these liaisons.

The findings and opinions conveyed in this report are based on information obtained from a variety of sources, including that from previous Site Investigations and chemical testing laboratories, and which Constructive Evaluation Limited has assumed that such information is correct. Nevertheless, Constructive Evaluation Limited cannot and does not guarantee the authenticity or reliability of the information it has relied upon. Constructive Evaluation Limited can accept no responsibility for inaccuracies within the data supplied by other parties.

This report is written in the context of an agreed scope of work between Constructive Evaluation Limited and the Client and should not be used in a different context. In light of additional information becoming available, improved practices and changes in legislation amendment or re-interpretation of the assessment or report in whole or part may be necessary after its original submission.

This report is provided for sole use by the Client and is confidential to them. No responsibility whatsoever for the contents of the report will be accepted to anyone other than the Client.

Constructive Evaluation Limited believes that providing information about limitations is essential to help the Client identify and thereby manage risks.

The copyright of written materials supplied shall remain the property of Constructive Evaluation Limited but with a royalty-free perpetual licence, granted to the Client on payment in full of any outstanding monies.

Constructive Evaluation Limited does not provide legal advice and the advice of the Client’s legal advisors may also be required.

An ecological, flood risk assessment, topographical, archaeological or asbestos survey and service search was outside the scope of this report.

11.0 BIBLIOGRAPHY

- BSI (1999) 'BS 5930:1999 – Code of Practice for Site Investigations. Amendment 1'. BSI, London
- BSI (2001) 'BS 10175: 2001 – Investigation into Potentially Contaminated Sites – Code of Practice'. BSI, London
- BSI (2001) 'BS 6068-6.18: 2001 Water Quality Sampling: Part 18 – Guidance on Sampling of Groundwater at Contaminated Sites'. BSI, London
- BSI (2007) 'BS 3882: 2007 – Specification for Topsoil and Requirements for Use'. BSI, London
- Card, G.B. (1996) 'Protecting Development from Methane'. CIRIA, London
- Environment Agency (1994) 'Sampling Strategies for Contaminated Land'. Environment Agency, Bristol
- Environment Agency (n.d.) 'Decommissioning Redundant Boreholes and Wells'. Environment Agency, Bristol
- Nathanail, P. *et al.* (2009) 2nd Edition 'LQM CIEH Generic Assessment Criteria for Human Health Risk Assessment'. Land Quality Press, Nottingham
- ODPM (2004) 'Planning Policy Statement 23'. HMSO, London
- Raybould, J.G. *et al.* (1995) 'Methane Investigation Strategies: R150'. CIRIA, London
- Wilson, S. *et al.* (2007) 'Assessing risks posed by hazardous ground gases to buildings - C665'. CIRIA, London

APPENDICES

Their contents are listed below:

Appendix A – Copy of Correspondence (ADC)

Appendix B – Site Plans

Appendix C – Borehole Level Plan

Appendix D – Borehole Logs

Appendix E – Site Investigation Photographs

Appendix F – Laboratory Certificates (Soils & Surface Water)

Appendix G – Gas & Groundwater Monitoring Results

Appendix A

Copy of Correspondence (ADC)

Jenny Levitt

From: Matthew Kennett [Matthew.Kennett@arun.gov.uk]
Sent: 10 February 2010 15:21
To: Jenny Levitt
Cc: John Green
Subject: RE: France Lane, Patching

Dear Jenny,

Thanks for the Stage 1 Report (10.6174 Feb 2010), please proceed with the intrusive investigation as mentioned in section 5.0 Proposed Site Investigation and as quoted for. Ill contact my colleagues at the EA and Planning when necessary.

thanks

Matthew Kennett
Environmental Health
01903 737696

From: Jenny Levitt [mailto:jenny@theconstructivegroup.com]
Sent: 10 February 2010 15:08
To: John Green
Cc: Matthew Kennett
Subject: France Lane, Patching

Dear John

Please find attached a copy of the plans which indicate the information obtained from the Walkover Survey as well as the photographs which we were able to take. Furthermore, I have attached a copy of the proposed SI scope for your information. Unfortunately, due to the size of all the appendices I am unable to forward all the information, however a paper copy and CD version will be in the post tonight.

If you have any questions please do not hesitate to call.

Regards

Jenny Levitt
Environmental Scientist



Constructive Evaluation Limited
Unit 5 (Top Floor)
Vinnetrow Business Park
Vinnetrow Road
Runcton
Chichester
West Sussex
PO20 1QH

Tel: 01243 533499
Fax: 01243 531070
Mob: 07793 652632
Email: jenny.levitt@theconstructivegroup.com

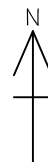
APPENDIX B

Site Plans

NOTES

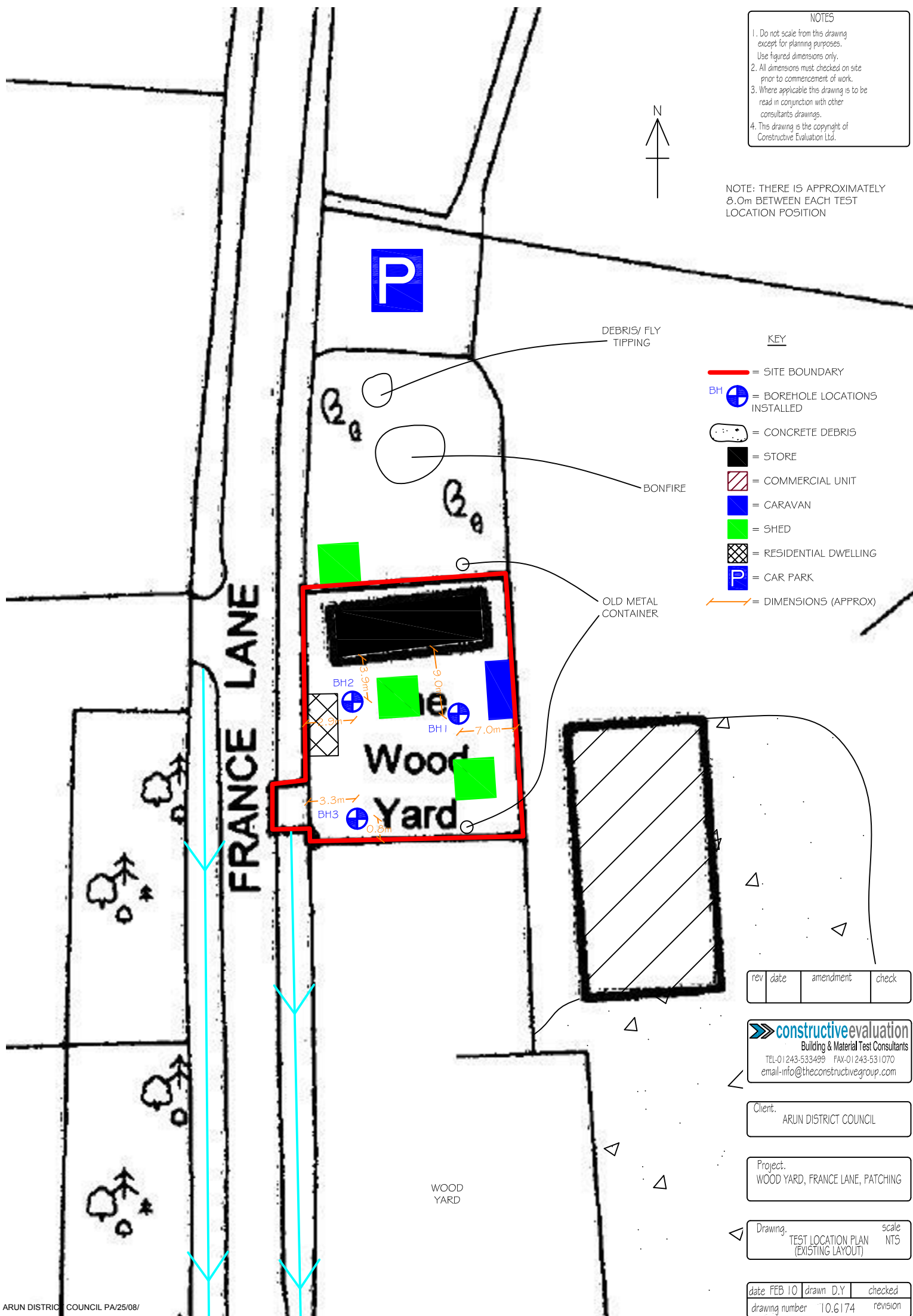
1. Do not scale from this drawing except for planning purposes. Use figured dimensions only.
2. All dimensions must be checked on site prior to commencement of work.
3. Where applicable this drawing is to be read in conjunction with other consultants drawings.
4. This drawing is the copyright of Constructive Evaluation Ltd.

NOTE: THERE IS APPROXIMATELY 8.0m BETWEEN EACH TEST LOCATION POSITION



KEY

- = SITE BOUNDARY
- BH = BOREHOLE LOCATIONS INSTALLED
- = CONCRETE DEBRIS
- = STORE
- = COMMERCIAL UNIT
- = CARAVAN
- = SHED
- = RESIDENTIAL DWELLING
- = CAR PARK
- = DIMENSIONS (APPROX)



rev	date	amendment	check

constructiveevaluation
Building & Material Test Consultants
TEL-01 243-533499 FAX-01 243-531070
email-info@theconstructivegroup.com

Client.
ARUN DISTRICT COUNCIL

Project.
WOOD YARD, FRANCE LANE, PATCHING

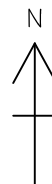
Drawing.
TEST LOCATION PLAN
(EXISTING LAYOUT)

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date FEB 10 | drawn D.Y | checked
drawing number 10.6174 | revision

NOTES

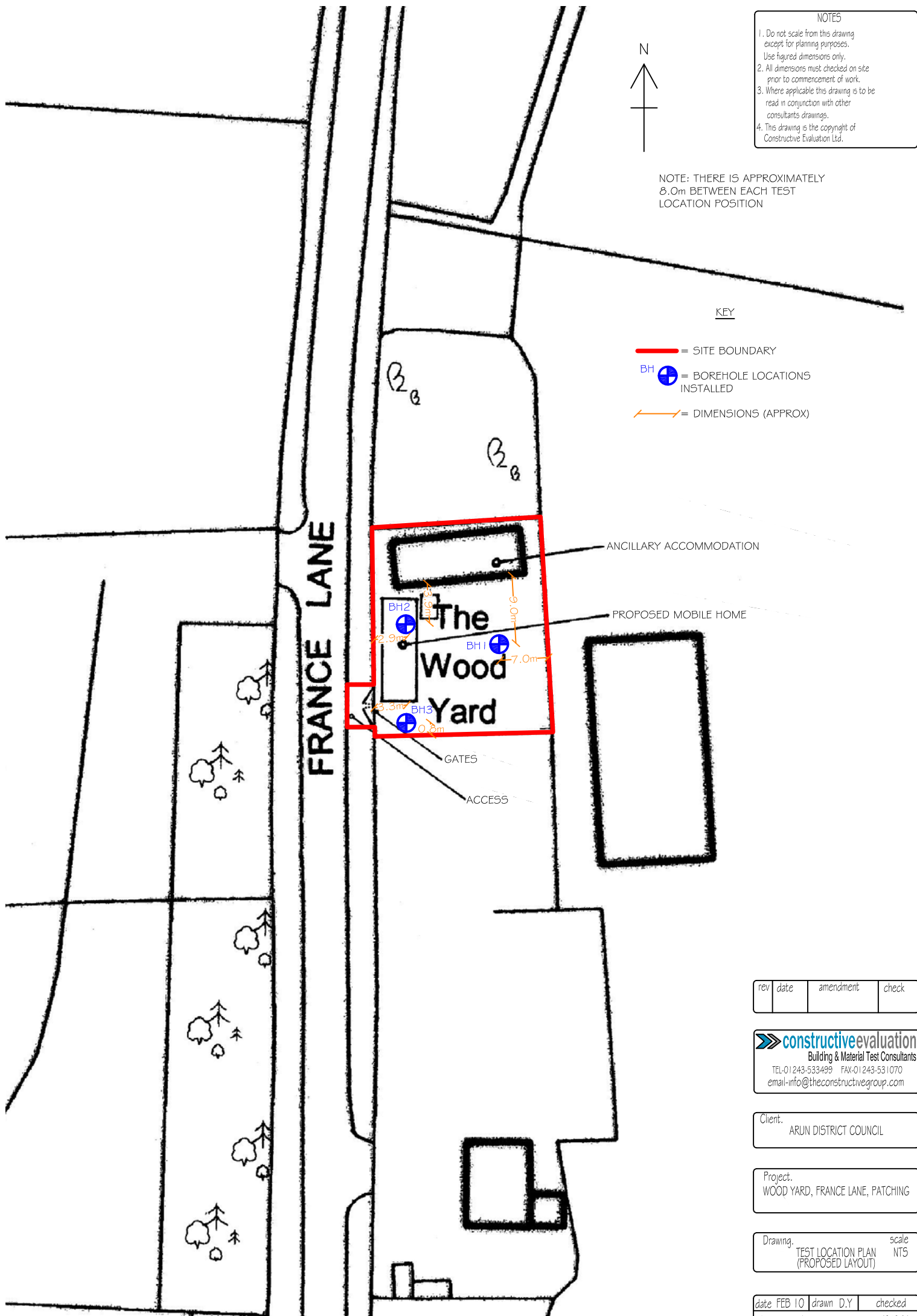
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2. All dimensions must be checked on site prior to commencement of work.
3. Where applicable this drawing is to be read in conjunction with other consultants drawings.
4. This drawing is the copyright of Constructive Evaluation Ltd.



NOTE: THERE IS APPROXIMATELY 8.0m BETWEEN EACH TEST LOCATION POSITION

KEY

- = SITE BOUNDARY
- BH + = BOREHOLE LOCATIONS INSTALLED
- = DIMENSIONS (APPROX)



rev	date	amendment	check
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constructiveevaluation
Building & Material Test Consultants
TEL-01243-533499 FAX-01243-531070
email-info@theconstructivegroup.com

Client.
ARUN DISTRICT COUNCIL

Project.
WOOD YARD, FRANCE LANE, PATCHING

Drawing.
TEST LOCATION PLAN
(PROPOSED LAYOUT)

scale
NTS

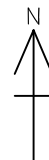
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drawing number 10.6174 | revision

APPENDIX C

Borehole Level Plan

NOTES

1. Do not scale from this drawing except for planning purposes. Use figured dimensions only.
2. All dimensions must be checked on site prior to commencement of work.
3. Where applicable this drawing is to be read in conjunction with other consultants drawings.
4. This drawing is the copyright of Constructive Evaluation Ltd.



P

DEBRIS/ FLY TIPPING

KEY

- = SITE BOUNDARY
- BH = INSTALLED BOREHOLE LOCATION LEVELS
- = CONCRETE DEBRIS
- = STORE
- = COMMERCIAL UNIT
- = CARAVAN
- = SHED
- = RESIDENTIAL DWELLING
- = CAR PARK
- = DATUM

OLD METAL CONTAINER

FRANCE LANE

Wood Yard

BH2
-0.15m

BH1
-0.24m

BH3
-0.12m

DATUM
0.00m

rev	date	amendment	check

constructiveevaluation
Building & Material Test Consultants
TEL: 01243-533499 FAX: 01243-531070
email: info@theconstructivegroup.com

Client. ARUN DISTRICT COUNCIL

Project. WOOD YARD, FRANCE LANE, PATCHING

Drawing. BOREHOLE LEVELS (EXISTING LAYOUT) scale NTS

date FEB 10	drawn D.Y	checked
drawing number 10.6174	revision	

APPENDIX D

Borehole Logs

BOREHOLE LOG

Project France Lane Wood Yard, France Lane, Patching				BOREHOLE No BH1	
Job No 10.6174	Date 16-02-10 16-02-10	Ground Level (m -) -0.24	Co-Ordinates ()		
Contractor Constructive Evaluation Limited				Sheet 1 of 1	

SAMPLES & TESTS			Water	STRATA			Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)		
0.20	ES			-0.67		(0.43) 0.43	Gravel over (loose) dark black brown sandy Gravel. Sand is medium to coarse. Gravels are subangular to subrounded fine to medium sized flints, brick, concrete, coal and slag. Some ash noted (owing to nearby container used for bonfire).	
0.50	ES			-0.99		(0.32) 0.75	(MADE GROUND) 0.30 - 0.40 Concrete obstruction noted.	
0.90	ES			-1.14		0.90	(Soft) light grey semi blue silty sandy CLAY. Sand is fine to medium. Occasional subangular to subrounded fine to meduim sized flints. Slight organic odour and some black staining.	
1.30	ES			-1.74		(0.60) 1.50	(HEAD DEPOSITS) (Soft) orange slightly grey partially sandy CLAY. Sand is fine to medium. Occasional subangular to subrounded fine to medium flints. Faint organic odour and some black staining.	
1.60	ES						(HEAD DEPOSITS) (Soft to firm) orange brown sandy gravelly CLAY. Sand is fine to medium. Gravels are subangular to subrounded fine to medium sized flints. Some iron staining. Occasional fine roots and rootlets. Occasional grey partings.	
2.10	ES			-2.94		2.70	(LAMBETH GROUP) 1.10 Becoming more gravelly with depth.	
2.70-3.00	ES			-3.24		(0.30) 3.00	(Firm to stiff) mottled orange grey partially red silty CLAY. Occasional black speckles. Rare subangular fine to medium sized siltstone gravels.	
3.10-3.50	ES					(1.00)	(LAMBETH GROUP) 2.30 Becoming orange/red at depth.	
3.60-4.00	ES			-4.24		4.00	(Stiff) grey partially orange clayey SILT/silty CLAY. (LAMBETH GROUP) (Stiff) red orange grey silty CLAY/clayey SILT.	
							(LAMBETH GROUP) 3.00 Becoming more silty with depth. 3.30 - 3.50 Becoming grey at depth. 3.60 - 4.00 Becoming red/orange at depth. End of BH1 @ 4.0mbgl	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Starter pit excavated to 1.1mbgl. Borehole installed with 50mm diameter pipework. No groundwater encountered however soils moist between 0.75m - 0.9m.
All dimensions in metres Scale 1:37.5			Client Arun District Council (ADC)			Method/ Plant Used Dando 2000 Terrier Rig			Logged By JL		

AGS3 UK BH GINT LOG TEMPLATE.GPJ AGS3 ALL GDT 3/2/10

BOREHOLE LOG

Project France Lane Wood Yard, France Lane, Patching				BOREHOLE No BH2
Job No 10.6174	Date 16-02-10 16-02-10	Ground Level (m -) -0.15	Co-Ordinates ()	
Contractor Constructive Evaluation Limited				Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA			Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
0.10	ES			-0.40		0.25		
0.35	ES					(0.40)		
0.70-0.90	ES			-0.80		0.65		
1.00	ES			-1.05		0.90		
1.50	ES					(1.40)		
2.00	ES							
2.50	ES			-2.45		2.30		
3.00	ES					(1.20)		
3.50-4.00	ES			-3.65		3.50		
						(0.50)		
				-4.15		4.00		
End of BH2 @ 4.0mbgl								

AGS3 UK BH GINT LOG TEMPLATE.GPJ AGS3 ALL GDT 3/2/10

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Starter pit excavated to 1.1mbgl. Borehole installed with 50mm diameter pipework. No groundwater encountered however soils moist between 0.65m - 0.9m.
All dimensions in metres Scale 1:37.5			Client Arun District Council (ADC)			Method/ Plant Used Dando 2000 Terrier Rig			Logged By JL		

BOREHOLE LOG

Project France Lane Wood Yard, France Lane, Patching				BOREHOLE No BH3
Job No 10.6174	Date 16-02-10 16-02-10	Ground Level (m -) -0.12	Co-Ordinates ()	
Contractor Constructive Evaluation Limited				Sheet 1 of 1

SAMPLES & TESTS			Water	STRATA			Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
0.20				-0.22		0.10		
				-0.42		0.30		
0.50				-0.72		(0.30) 0.60		
1.00				-1.32		(0.60) 1.20		
1.30								
1.70-2.00						(1.50)		
2.50				-2.82		2.70		
3.00								
3.50-4.00						(1.30)		
				-4.12		4.00		
				End of BH3 @ 4.0mbgl				

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Starter pit excavated to 1.0mbgl. Borehole installed with 50mm diameter pipework. No groundwater encountered.

All dimensions in metres Scale 1:37.5	Client Arun District Council (ADC)	Method/ Plant Used Dando 2000 Terrier Rig	Logged By JL
--	---------------------------------------	---	-----------------

AGS3 UK BH GINT LOG TEMPLATE.GPJ AGS3 ALL GDT 3/2/10

APPENDIX E

Site Investigation Photographs



1. Borehole 1



2. Arisings from BH1



3. Starter pit BH1



4. View of starter pit



5. Arisings from BH1



6. BH1 1-2.0m



7. BH1 2-3.0m



8. BH1 3-4.0m



9. BH1 @ 3.5m



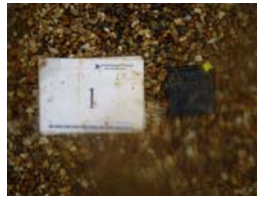
10. BH1 @ 3.0m



11. BH1 arisings



12. BH1 Arisings



13. BH1 Made Good & installed



14. Borehole 2



15. BH2 Starter pit



16. BH2 Starter pit



17. BH2 arisings



18. BH2 arisings



19. BH2 1-2.0m



20. BH2 @ 1.5m



21. BH2 2-3.0m



22. BH2 @ 3.0m



23. BH2 3-4.0m



24. BH2 Made Good & installed



25. Borehole 3



26. BH3 arisings



27. BH3 arisings



28. BH3 starter pit



29. BH3 view of starter pit



30. BH3 1-2.0m



31. BH3 1.5-2.0m



32. BH3 @ 1.5m



33. BH3 @ 2.0m



34. BH3 2-3.0m



35. BH3 3-4.0m



36. BH3 @ 4.0m



37. BH3 Made Good & installed



38. Site (bonfire) to north



39. Entrance to site via France Lane



40. AST noted to property approx 50m north

APPENDIX F

Laboratory Certificates (Soils & Surface Water)

Soils



Jenny Levitt
Constructive Evaluation Ltd
Unit 5
Vinnetrow Business Park
Vinnetrow Road
Runcton
Chichester
West Sussex PO20 1QH



QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 851105
admin@qtsenvironmental.com

QTS Environmental Report No: 2206

Site Reference: France Lane Wood Yard, France Lane, Patching

Project / Job Ref: 10.6174

Order No: 10.6174.1

Sample Receipt Date: 18/02/10

Sample Scheduled Date: 18/02/10

Report Issue Number: 2

Reporting Date: 03/03/2010

Authorised by:

Russell Jarvis
Director

On behalf of QTS Environmental Ltd

Authorised by:

Kevin Old
Director

On behalf of QTS Environmental Ltd



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 851105



Soil Analysis Certificate

QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10	16/02/10	16/02/10	16/02/10
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH1	BH1	BH1	BH1	BH2
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 10.6174.1	Depth (m)	0.20	0.90	1.60	2.70 - 3.00	0.10
Reporting Date: 03/03/2010	QTSE Sample No	7468	7469	7470	7471	7472

Determinand	Unit	MDL	Accreditation					
Stone Content	%	<0.1	NONE	38.6	50.1	<0.1	<0.1	35.8
Moisture Content	%	<0.1	NONE	6.2	8.7	13.1	10.9	9.4
Asbestos Screen	Positive / Negative	N/a	NONE	Negative				Negative

General Inorganics	Unit	MDL	Accreditation					
pH	pH Units	+ / - 0.1	MCERTS	8.0	7.4	7.5	7.7	7.3
Total Cyanide	mg/kg	<2	NONE	<2	<2			
W/S Sulphate as SO ₄ (2:1)	g/l	<0.01	NONE	0.04	0.01	0.03	0.05	0.12
Organic Matter	%	<0.1	NONE	2	0.9	0.2	0.1	1.6
Total Phenols (monohydric)	mg/kg	<2	NONE	<2	<2			

Metals	Unit	MDL	Accreditation					
Arsenic (As)	mg/kg	<2	MCERTS	4	2	<2	<2	3
Cadmium (Cd)	mg/kg	<0.5	MCERTS	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium (Cr)	mg/kg	<2	MCERTS	31	13	12	22	7
Copper (Cu)	mg/kg	<4	MCERTS	13	16	11	15	9
Lead (Pb)	mg/kg	<3	MCERTS	29	13	14	15	45
Mercury (Hg)	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Nickel (Ni)	mg/kg	<3	MCERTS	18	7	10	21	5
Selenium (Se)	mg/kg	<3	NONE	<3	<3	<3	<3	<3
Zinc (Zn)	mg/kg	<3	MCERTS	56	42	13	50	41

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C

Analysis carried out on the dried sample is corrected for the stone content

Screening data for asbestos provided only refers to the health & safety issues associated with the safe handling of samples & is not conclusive as to the presence or otherwise of asbestos in any test sample



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 851105



Soil Analysis Certificate

QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10	16/02/10	16/02/10	16/02/10
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH2	BH2	BH2	BH2	BH3
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 10.6174.1	Depth (m)	0.70 - 0.90	1.50	2.50	3.50 - 4.00	0.20
Reporting Date: 03/03/2010	QTSE Sample No	7473	7474	7475	7476	7477

Determinand	Unit	MDL	Accreditation					
Stone Content	%	<0.1	NONE	55.6	<0.1	<0.1	<0.1	<0.1
Moisture Content	%	<0.1	NONE	7.7	10.7	9.6	7.9	9.8
Asbestos Screen	Positive / Negative	N/a	NONE					Negative

General Inorganics	Unit	MDL	Accreditation					
pH	pH Units	+ / - 0.1	MCERTS	7.4	7.6	7.7	7.7	7.0
Total Cyanide	mg/kg	<2	NONE					<2
W/S Sulphate as SO ₄ (2:1)	g/l	<0.01	NONE	0.02	0.02	0.03	0.02	0.03
Organic Matter	%	<0.1	NONE	0.4	0.2	0.2	0.2	5
Total Phenols (monohydric)	mg/kg	<2	NONE					<2

Metals	Unit	MDL	Accreditation					
Arsenic (As)	mg/kg	<2	MCERTS	3	<2	<2	<2	5
Cadmium (Cd)	mg/kg	<0.5	MCERTS	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium (Cr)	mg/kg	<2	MCERTS	13	25	7	10	21
Copper (Cu)	mg/kg	<4	MCERTS	8	14	<4	6	18
Lead (Pb)	mg/kg	<3	MCERTS	11	13	8	8	142
Mercury (Hg)	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Nickel (Ni)	mg/kg	<3	MCERTS	6	19	5	8	11
Selenium (Se)	mg/kg	<3	NONE	<3	<3	<3	<3	<3
Zinc (Zn)	mg/kg	<3	MCERTS	17	17	12	18	163

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C

Analysis carried out on the dried sample is corrected for the stone content

Screening data for asbestos provided only refers to the health & safety issues associated with the safe handling of samples & is not conclusive as to the presence or otherwise of asbestos in any test sample



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Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 851105



Soil Analysis Certificate						
QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10	16/02/10	16/02/10	
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH3	BH3	BH3	BH3	
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: 10.6174.1	Depth (m)	0.50	1.30	2.50	3.50 - 4.00	
Reporting Date: 03/03/2010	QTSE Sample No	7478	7479	7480	7481	

Determinand	Unit	MDL	Accreditation				
Stone Content	%	<0.1	NONE	30.7	<0.1	<0.1	<0.1
Moisture Content	%	<0.1	NONE	10.8	12.7	12	10.9
Asbestos Screen	Positive / Negative	N/a	NONE				

General Inorganics	Unit	MDL	Accreditation				
pH	pH Units	+ / - 0.1	MCERTS	7.2	7.5	7.7	7.7
Total Cyanide	mg/kg	<2	NONE	<2	<2		
W/S Sulphate as SO ₄ (2:1)	g/l	<0.01	NONE	<0.01	0.03	0.01	0.05
Organic Matter	%	<0.1	NONE	1	0.2	0.2	0.2
Total Phenols (monohydric)	mg/kg	<2	NONE	<2	<2		

Metals	Unit	MDL	Accreditation				
Arsenic (As)	mg/kg	<2	MCERTS	3	<2	<2	<2
Cadmium (Cd)	mg/kg	<0.5	MCERTS	<0.5	<0.5	<0.5	<0.5
Chromium (Cr)	mg/kg	<2	MCERTS	18	22	7	22
Copper (Cu)	mg/kg	<4	MCERTS	8	53	8	17
Lead (Pb)	mg/kg	<3	MCERTS	22	19	12	19
Mercury (Hg)	mg/kg	<1	NONE	<1	<1	<1	<1
Nickel (Ni)	mg/kg	<3	MCERTS	8	15	5	22
Selenium (Se)	mg/kg	<3	NONE	<3	<3	<3	<3
Zinc (Zn)	mg/kg	<3	MCERTS	33	17	12	51

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C

Analysis carried out on the dried sample is corrected for the stone content

Screening data for asbestos provided only refers to the health & safety issues associated with the safe handling of samples & is not conclusive as to the presence or otherwise of asbestos in any test sample



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 851105



Soil Analysis Certificate - Speciated PAHs

QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10	16/02/10	16/02/10	16/02/10
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH1	BH1	BH1	BH1	BH2
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 10.6174.1	Depth (m)	0.20	0.90	1.60	2.70 - 3.00	0.10
Reporting Date: 03/03/2010	QTSE Sample No	7468	7469	7470	7471	7472

Determinand	Unit	MDL	Accreditation					
Naphthalene	mg/kg	<0.1	ISO17025	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	NONE	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	MCERTS	0.12	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	NONE	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	MCERTS	0.15	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	MCERTS	0.14	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	MCERTS	0.21	<0.1	<0.1	<0.1	0.18
Chrysene	mg/kg	<0.1	MCERTS	0.22	<0.1	<0.1	<0.1	0.20
Benzo(b)fluoranthene	mg/kg	<0.1	MCERTS	0.30	<0.1	<0.1	<0.1	0.27
Benzo(k)fluoranthene	mg/kg	<0.1	MCERTS	0.18	<0.1	<0.1	<0.1	0.15
Benzo(a)pyrene	mg/kg	<0.1	NONE	0.30	<0.1	<0.1	<0.1	0.25
Indeno(1,2,3-cd)pyrene	mg/kg	<0.1	MCERTS	0.16	<0.1	<0.1	<0.1	0.13
Dibenz(a,h)anthracene	mg/kg	<0.1	MCERTS	0.13	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	<0.1	MCERTS	0.15	<0.1	<0.1	<0.1	<0.1
Total EPA-16 PAHs	mg/kg	<1.6	MCERTS	2.05	<1.6	<1.6	<1.6	<1.6

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 851105



Soil Analysis Certificate - Speciated PAHs

QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10	16/02/10	16/02/10	16/02/10
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH2	BH2	BH2	BH2	BH3
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 10.6174.1	Depth (m)	0.70 - 0.90	1.50	2.50	3.50 - 4.00	0.20
Reporting Date: 03/03/2010	QTSE Sample No	7473	7474	7475	7476	7477

Determinand	Unit	MDL	Accreditation					
Naphthalene	mg/kg	<0.1	ISO17025	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	NONE	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	NONE	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	0.15
Chrysene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	0.15
Benzo(b)fluoranthene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	0.23
Benzo(k)fluoranthene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	0.12
Benzo(a)pyrene	mg/kg	<0.1	NONE	<0.1	<0.1	<0.1	<0.1	0.22
Indeno(1,2,3-cd)pyrene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	<0.1
Total EPA-16 PAHs	mg/kg	<1.6	MCERTS	<1.6	<1.6	<1.6	<1.6	<1.6

Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



QTS Environmental Ltd
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Rose Lane
Lenham Heath
Maidstone
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Tel : 01622 851105



Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10	16/02/10	16/02/10	
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH3	BH3	BH3	BH3	
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: 10.6174.1	Depth (m)	0.50	1.30	2.50	3.50 - 4.00	
Reporting Date: 03/03/2010	QTSE Sample No	7478	7479	7480	7481	

Determinand	Unit	MDL	Accreditation					
Naphthalene	mg/kg	<0.1	ISO17025	<0.1	<0.1	<0.1	<0.1	
Acenaphthylene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	
Acenaphthene	mg/kg	<0.1	NONE	<0.1	<0.1	<0.1	<0.1	
Fluorene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	
Phenanthrene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	
Anthracene	mg/kg	<0.1	NONE	<0.1	<0.1	<0.1	<0.1	
Fluoranthene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	
Pyrene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	
Benzo(a)anthracene	mg/kg	<0.1	MCERTS	0.16	<0.1	<0.1	<0.1	
Chrysene	mg/kg	<0.1	MCERTS	0.16	<0.1	<0.1	<0.1	
Benzo(b)fluoranthene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	
Benzo(k)fluoranthene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	
Benzo(a)pyrene	mg/kg	<0.1	NONE	<0.1	<0.1	<0.1	<0.1	
Indeno(1,2,3-cd)pyrene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	
Dibenz(a,h)anthracene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	
Benzo(ghi)perylene	mg/kg	<0.1	MCERTS	<0.1	<0.1	<0.1	<0.1	

Total EPA-16 PAHs	mg/kg	<1.6	MCERTS	<1.6	<1.6	<1.6	<1.6	
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Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



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Soil Analysis Certificate - EPH Texas Banded					
QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10	16/02/10	16/02/10
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH1	BH1	BH2	BH2
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 10.6174.1	Depth (m)	1.60	2.70 - 3.00	0.10	0.70 - 0.90
Reporting Date: 03/03/2010	QTSE Sample No	7470	7471	7472	7473

Determinand	Unit	MDL	Accreditation					
EPH Texas (C6 - C8)	mg/kg	<0.05	NONE	<0.05	<0.05	<0.05	<0.05	<0.05
EPH Texas (>C8 - C10)	mg/kg	<1	MCERTS	<1	<1	<1	<1	<1
EPH Texas (>C10 - C12)	mg/kg	<1	MCERTS	<1	<1	<1	<1	<1
EPH Texas (>C12 - C16)	mg/kg	<1	MCERTS	<1	<1	<1	<1	<1
EPH Texas (>C16 - C21)	mg/kg	<1	MCERTS	<1	<1	<1	<1	<1
EPH Texas (>C21 - C40)	mg/kg	<6	MCERTS	<6	<6	<6	<6	<6

EPH Texas (C6 - C40)	mg/kg	<6	NONE	<6	<6	<6	<6	<6
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Soil Analysis Certificate - EPH Texas Banded						
QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10	16/02/10	16/02/10	
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH2	BH2	BH3	BH3	
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: 10.6174.1	Depth (m)	2.50	3.50 - 4.00	2.50	3.50 - 4.00	
Reporting Date: 03/03/2010	QTSE Sample No	7475	7476	7480	7481	

Determinand	Unit	MDL	Accreditation					
EPH Texas (C6 - C8)	mg/kg	<0.05	NONE	<0.05	<0.05	<0.05	<0.05	
EPH Texas (>C8 - C10)	mg/kg	<1	MCERTS	<1	<1	<1	<1	
EPH Texas (>C10 - C12)	mg/kg	<1	MCERTS	<1	<1	<1	<1	
EPH Texas (>C12 - C16)	mg/kg	<1	MCERTS	<1	<1	<1	<1	
EPH Texas (>C16 - C21)	mg/kg	<1	MCERTS	<1	<1	<1	<1	
EPH Texas (>C21 - C40)	mg/kg	<6	MCERTS	<6	<6	<6	<6	

EPH Texas (C6 - C40)	mg/kg	<6	NONE	<6	<6	<6	<6	
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Soil Analysis Certificate - TPH CWG Banded						
QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10	16/02/10	16/02/10	16/02/10
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH1	BH1	BH3	BH3	BH3
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 10.6174.1	Depth (m)	0.20	0.90	0.20	0.50	1.30
Reporting Date: 03/03/2010	QTSE Sample No	7468	7469	7477	7478	7479

Determinand	Unit	MDL	Accreditation					
Aliphatic >C5 - C6	mg/kg	<0.01	NONE	<0.01	<0.01	<0.01	<0.01	<0.01
Aliphatic >C6 - C8	mg/kg	<0.05	NONE	<0.05	<0.05	<0.05	<0.05	<0.05
Aliphatic >C8 - C10	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Aliphatic >C10 - C12	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Aliphatic >C12 - C16	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Aliphatic >C16 - C21	mg/kg	<1	NONE	11	<1	<1	<1	<1
Aliphatic >C21 - C34	mg/kg	<6	NONE	13	<6	<6	<6	<6

Aliphatic (C5 - C34)	mg/kg	<6	NONE	23	<6	<6	<6	<6
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Aromatic >C5 - C7	mg/kg	<0.01	NONE	<0.01	<0.01	<0.01	<0.01	<0.01
Aromatic >C7 - C8	mg/kg	<0.05	NONE	<0.05	<0.05	<0.05	<0.05	<0.05
Aromatic >C8 - C10	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Aromatic >C10 - C12	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Aromatic >C12 - C16	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Aromatic >C16 - C21	mg/kg	<1	NONE	<1	<1	<1	<1	<1
Aromatic >C21 - C35	mg/kg	<6	NONE	<6	<6	<6	<6	<6

Aromatic (C5 - C35)	mg/kg	<6	NONE	<6	<6	<6	<6	<6
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Soil Analysis Certificate - BTEX & MTBE						
QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10	16/02/10	16/02/10	16/02/10
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH1	BH1	BH3	BH3	BH3
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 10.6174.1	Depth (m)	0.20	0.90	0.20	0.50	1.30
Reporting Date: 03/03/2010	QTSE Sample No	7468	7469	7477	7478	7479

Determinand	Unit	MDL	Accreditation					
Benzene	µg/kg	<2	MCERTS	<2	<2	<2	<2	<2
Toluene	µg/kg	<5	MCERTS	<5	<5	<5	<5	<5
Ethylbenzene	µg/kg	<2	MCERTS	<2	<2	<2	<2	<2
p & m-xylene	µg/kg	<2	MCERTS	<2	<2	<2	<2	<2
o-xylene	µg/kg	<2	MCERTS	<2	<2	<2	<2	<2
MTBE	µg/kg	<5	MCERTS	<5	<5	<5	<5	<5

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Soil Analysis Certificate - PCB (12 Congeners)						
QTS Environmental Report No: 2206	Date Sampled	16/02/10	16/02/10			
Constructive Evaluation Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH1	BH2			
Project / Job Ref: 10.6174	Additional Refs	None Supplied	None Supplied			
Order No: 10.6174.1	Depth (m)	0.20	0.70 - 0.90			
Reporting Date: 03/03/2010	QTSE Sample No	7468	7473			

Determinand	Unit	MDL	Accreditation					
PCB Congener 77	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 81	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 105	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 114	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 118	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 123	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 126	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 156	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 157	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 167	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 169	mg/kg	<0.008	NONE	<0.008	<0.008			
PCB Congener 189	mg/kg	<0.008	NONE	<0.008	<0.008			

Total PCB (12 Congeners)	mg/kg	<0.1	NONE	<0.1	<0.1			
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Analytical results are expressed on a dry weight basis where samples are dried at less than 30°C



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
QTS Environmental Report No: 2206	
Constructive Evaluation Ltd	
Site Reference: France Lane Wood Yard, France Lane, Patching	
Project / Job Ref: 10.6174	
Order No: 10.6174.1	
Reporting Date: 03/03/2010	

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	AR	Asbestos Screening	Visual screening of samples for fibrous material	E024
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water followed by titration using silver nitrate	E021
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by turbidimeter	E020
Soil	D	Fluoride - Water Soluble	Test Kit	E023
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E011
Soil	D	Loss on Ignition @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	D	Phosphorus	Determination of phosphorus by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Sulphate (as SO ₄) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	D	Sulphate (as SO ₄) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	AR	Sulphide	Determination of sulphide by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia, potassium iodide/iodate followed by ICP-OES	E002
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E011
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E009
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E009
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E010
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E009
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	VPH (C6 - C10)	Determination of hydrocarbons C6-C10 by headspace GC-MS	E001
Soil	AR	EPH TEXAS	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	TPH CWG	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	TPH LQM	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	EPH (with florasil cleanup)	Determination of acetone/hexane extractable hydrocarbons with florasil cleanup step by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001

Key

D Dried
AR As Received

Surface Water



Jenny Levitt
Constructive Evaluation Ltd
Unit 5
Vinnetrow Business Park
Vinnetrow Road
Runcton
Chichester
West Sussex PO20 1QH

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 851105
admin@qtsenvironmental.com

QTS Environmental Report No: 2271

Site Reference: France Lane Wood Yard, France Lane, Patching

Project / Job Ref: 10.6174

Order No: 10.6174.2

Sample Receipt Date: 02/03/10

Sample Scheduled Date: 02/03/10

Report Issue Number: 1

Reporting Date: 08/03/2010

Authorised by:

Russell Jarvis
Director

On behalf of QTS Environmental Ltd

Authorised by:

Kevin Old
Director

On behalf of QTS Environmental Ltd



QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 851105

Water Analysis Certificate						
QTS Environmental Report No: 2271	Date Sampled	26/02/10				
Constructive Evaluation Ltd	Time Sampled	None Supplied				
Site Reference: France Lane Wood Yard, France Lane, Patching	TP / BH No	BH1				
Project / Job Ref: 10.6174	Additional Refs	None Supplied				
Order No: 10.6174.2	Depth (m)	GL				
Reporting Date: 08/03/2010	QTSE Sample No	7827				

Determinand	Unit	MDL	Accreditation				
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General Inorganics	Unit	MDL	Accreditation				
pH	pH Units	+ / - 0.1	NONE	6.7			
Phosphate as P*	µg/l	<3	NONE	<3			
Nitrate as N*	mg/l	<0.5	NONE	<0.5			

*Subcontracted analysis

APPENDIX G

Gas & Groundwater Monitoring Results

Project No:	10.6174	Project Name:	France Lane, Wood Yard, Patching
Date:	26.2.2010	Personnel:	JL
Weather:	2/8 Cloud cover, dry, sunny and windy.	Ground Conditions:	Wet, with some waterlogging of the site.

Well Information

Well No.	BH1	BH2	BH3
Location:	To the eastern elevation near caravan	To the northwestern elevation near shed and main building	To the southwestern elevation near gate and fence.
Borehole Diameter (mm):	50	50	50
Ground Level (m)	-0.24*	-0.15*	-0.12*
Time Monitored	12.45	13.00	13.15

Gas Monitoring

ATM P (mb)		986	986	986
Downhole Pressure (mb)		-0.10	-0.10	-0.10
Flow Rate (l/hr)		+1.4	+1.2	+1.0
Methane (%)	Peak	0.0	0.0	0.0
	Steady	0.0	0.0	0.0
LEL (%)	Peak	000	000	000
	Steady	000	000	000
Carbon Dioxide (%)	Peak	0.3	0.7	0.6
	Steady	0.2	0.4	0.2
Oxygen (%)	Peak	21.0	20.9	20.9
	Steady	20.9	20.6	20.7
VOC's (ppm)		0.0	0.0	0.0
H₂S (ppm)		0000	0000	0000
H₂ (ppm)		Low	Low	Low
CO (ppm)		0000	0000	0000

* Datum used was 0.00m – this is located within the centre of France Lane Road.

Project No:	10.6174	Project Name:	France Lane, Wood Yard, Patching
Date:	26.2.2010	Personnel:	JL
Weather:	2/8 Cloud cover, dry, sunny and windy.	Ground Conditions:	Wet, with some waterlogging of the site.

Groundwater Monitoring

Well No.	BH1	BH2	BH3
Water Level (m)	Initial Reading - Ground Level 2 nd reading 30mins – 3.0 3 rd reading 45mins – 2.80#	Initial Reading - Ground Level 2 nd reading 30mins – 2.87 3 rd reading 45mins – 2.56#	Initial Reading - Ground Level 2 nd reading 30mins – 3.03 3 rd reading 45mins – 2.92#
Depth of Borehole (m)	3.76	3.75	3.70
Product Thickness (m)	None	None	None
Volume Purged (l)	10	10	10
Recharge Rate	Poor	Poor	Poor
Sampled (Yes/No)	Yes	Yes	Yes
Water Appearance	Orange brown and silty.	Orange brown and silty.	Orange brown and silty.
Hydrocarbon Sheen	No	No	No
Odour	No	No	No
Headspace Reading (ppm)	0.0	0.0	0.0

Diameter (mm)	35mm	50mm	75mm	100mm
Volume to be purged (L/m)	3	6	14	24

Remarks: Gas monitoring conducted over an approximate 3 minute period.

Gas Analyser (GA2000+) – Calibration/service certificates can be provided on request.

Photoionisation Detector (PID – Minirae 2000 lamp 10.6eV) – Calibration/service certificates can be provided on request. A Solinst two phased dip meter has been used to determine product thickness whilst water levels have been determined by a Geotechnical Instruments dip meter.

Key: ↓ Decreasing ↑ Increasing – Fluctuating NA – Non Applicable

Please note that whilst undertaking monitoring boreholes were firstly purged owing to the high water table, then left for approximately 30-45mins before completing the gas monitoring. The water levels were re-dipped to determine the levels on completion of the gas monitoring. # These water levels are considered not to be representative of the groundwater levels for the site, but potentially surface water percolation owing to the saturation of the overlying soils.