

Specification for Ground Investigation Works

Hawley Primary School

July 2014

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Hawley Primary School

Client Name: Stanley Sidings Limited
Document Reference: EED14664-100_S_1.2.1_PDS
Project Number: EED14664

Quality Assurance – Approval Status

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

Issue	Date	Prepared by	Checked by	Approved by
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1.2.1	July 2014	Paul Shelley	Carl Slater	Paul Shelley

Comments

1.1.1	Issued DRAFT for team comment
1.2.1	First Issue

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1. Introduction

1.1 Planning Context

The works as described within this specification are intended further evaluate the potential pollutant linkages identified within Waterman's Preliminary Environmental Risk Assessment (PERA) (ref: EED30222-104_R_1.2.3_ME dated September 2011) and to address planning condition 20(a) of permission 2012/4640/P.

Planning condition 20 is associated with the school application and is reproduced below:

20. No development shall take place until assessment of site contamination has been provided:

a) A detailed scheme of assessment consisting of site reconnaissance, conceptual model, risk assessment and schedule of investigation must be submitted to the planning authority. The scheme of assessment must be sufficient to assess the scale and nature of potential contamination risks on the site and shall include details of the number of sample points, the sampling methodology and the type and quantity of analyses proposed. The scheme of assessment must be approved by the LPA and the documentation submitted must comply with the standards of the Environment Agency's Model Procedures for the Management of Contamination (CLR11).

b) Before development commences, a site investigations shall be undertaken in accordance with the agreed scheme of assessment and the results provided to the planning authority for their approval. Laboratory results must be provided as numeric values in a formatted electronic spread sheet. Before development commences a remediation scheme shall be agreed in writing with the planning authority and the scheme as approved shall be implemented before any part of the development hereby permitted is occupied.

In the event that additional significant contamination is found at any time when carrying out the approved development it must be reported in writing immediately to the Local Planning Authority. An investigation and risk assessment must be undertaken in accordance with the requirements of CLR11, and where mitigation is necessary a scheme of remediation must be designed and implemented to the satisfaction of the local planning authority before any part of the development hereby permitted is occupied.

Further information on the investigation rationale is presented within section 3.3.

On completion of proposed investigation works a Generic Quantitative environmental Risk Assessment (GQRA) will be produced in accordance with CLR11. This will further refine the potential pollutant linkages identified within the PERA and detail any residual potential pollutant linkages that warrant further assessment.

Where warranted a remediation strategy will be produced detailing the remedial measures proposed to address the outstanding potential pollutant linkages.

1.2 Formal Contract Agreement

The Employer will be Stanley Sidings Limited.

The Engineer will be Waterman Energy, Environment & Design Limited.

It is envisaged that the appointed ground investigation contractor will act as principal contractor and tender returns shall be on this basis.

Works are to be completed in accordance with the ICE Conditions of Contract, Ground Investigation Version, 2nd Edition (November 2003) as amended.

The Contractor shall have the opportunity to, and be deemed to have, inspected the Site and to have taken into account and allowed for all matters affecting the quotation and of any possible restrictions regarding access and/or drilling. No claim will be entertained as a result of his failure to do so.

The Contractor shall, whenever required, provide for the Employer (or the Engineer) within 48 hours, written confirmation of such insurance in the form of certificates, renewal notes and/or receipts as required.

The Contractor shall, within two weeks of the completion of the Works or at other times as requested by the Employer (or the Engineer), at no additional cost, render a detailed account up to the date of the request, to the Employer (or the Engineer) for payment by the Employer.

The Contractor shall not include for Value Added Tax in his Tender. Any Value Added Tax applicable will be paid to the Contractor as a separate item.

The Contractor shall not sub-let the whole of the Works. The Contractor shall not sub-let any part of the Works without the written consent of the Employer (or the Engineer) and such consent, if given, shall not relieve the Contractor from any liability or obligation under the Contract.

The Contractor shall provide collateral warranties from subcontractors.

The Contractor shall allow for assignment of their report to the Employer.

Beneficiaries on the warranties are Stanley Sidings Limited.

The Site Location plan and provisional investigation plan is presented Figure 1, Appendix A. The Works Area is shown as the red line boundary on the above figure and will be referred to as the "Site".

1.3 CDM Regulations

Intrusive ground investigation works fall under the Construction (Design & Management) Regulations (2007); however, based on the above scope, it is considered that the works are not notifiable.

2. Specification for Ground Investigation

For the purpose of this Contract, the Specification will be the Specification for Ground Investigation with Bill of Quantities (1999) published by Thomas Telford, amended as indicated herein.

- Schedule 1: Contract Information
- Schedule 2: Exploratory Holes
- Schedule 3: Engineers Facilities - not used
- Schedule 4: Specification Amendments
- Schedule 5: Specification Additions - not used

3. Schedule 1

3.1 Name of Contract

Hawley Primary School.

3.2 Description of Site

The Site is bounded by Hawley Road to the north and terraced housing on Kentish Town Road to the east. A railway line which is earmarked as part of High Speed 2 is located to the south of the Site with 'Area B' of the proposed Camden Lock Village (outline consent 2012/4628/P) located to the west of the Site.

Consent is granted for the construction of the school as detailed within 2012/4640/P.

The Site consists of residential properties many of which have been subdivided into flats. These properties front onto Hawley Road. There are residential properties which front onto Torbay Street. A car park and carwash is present on western side of Torbay Street and a car repair garage is present on eastern side of Torbay Street. Kentish Town Road is connected to Torbay Street via a lane, running adjacent to the northern side of the Northwest-East Viaduct.

3.3 Main works proposed and purpose of contract

The context of the work is set out by the reports previously prepared for the site as shown in Table 1 below. This report focused on a wider area than the current red line boundary and investigation.

Table 1: Previous Reports

Title	Company	Date & Reference
Preliminary Environmental Risk Assessment	Waterman EED	EED30222-104_R_1.2.3_ME dated September 2011.
Explosive Ordnance Threat Assessment of Camden Lock Village (Hawley Wharf)	BACTEC	9195TA Dated 23/01/2007

A review of the above reports concluded that in order to address the potentially unacceptable risks identified at the Site and to reduce the overall risk rating for the Site to low, an intrusive Site Investigation should be undertaken.

Therefore based on this recommendation, the purpose of the contract is set out in the following bullet points;

- To assess the contamination status of soils, groundwater and the ground gas regime;
- Develop a comprehensive Conceptual Site Model of the Site;
- To assess the risks posed by identified contamination to current and future receptors; and

It is proposed that this is achieved by undertaking deep exploratory holes using cable percussion or similar (assume a maximum of No. 6). Site Investigation (SI) locations are located to provide a spread of information across the site and to target potential contamination associated with former land uses. Access is however restricted and the positions identified are constrained by existing buildings and operations. A provisional schedule of SI locations to be completed by the Contractor is provided in Schedule 2 of this specification document.

It is intended that 3No. of the exploratory holes will be excavated/drilled to a maximum depth of 20 metres below ground level (mbgl) and 3No. will be excavated/drilled to a maximum depth of 10 metres below ground level (mbgl). If buried obstructions are encountered, confirmation will be sought from the Engineer as to how to progress. This may include terminating or relocating the borehole. Single installations are anticipated within all of the boreholes with the installation design to be confirmed on completion of drilling. Installation design will be influenced by geological sequence and type of material encountered.

SI locations are to be confirmed. All locations are required to be surveyed into position prior to the intrusive works taking place. The SI location can be changed by the Engineer during the contract.

3.4 Unexploded Ordnance

The BACTEC report detailed within Table 1 was undertaken to determine the potential for unexploded ordnance to be present on the Site.

The report concluded that the Site presented a high risk of encountering explosive ordnance during any redevelopment work. This conclusion is based on the fact that the London borough of St Pancras suffered high levels of bombing during WWII and the confirmation of at least one bomb strike on the Site which is confirmed by missing buildings in post war maps. Moreover, the Site of railway line on the Site and the presence of a railway yard close to the Site made the area a target of Luftwaffe bombing.

The report recommends the following measures be undertaken with respect to any intrusive work carried out on the Site.

- Site Safety Instructions covering generic site safety regarding unexploded ordnance in the UK, including a hard copy and electronic format of the instructions;
- Explosive Ordnance Safety and Awareness Briefings to all personnel conducting intrusive works;
- Explosive Ordnance Disposal (EOD) Engineer Presence on Site to supervise all open excavations; and
- Down-hole Intrusive Magnetometer Survey of all borehole/pile locations and any excavations undertaken as part of the construction.

The contractor shall comply with all the recommendations detailed within the above report.

3.5 Scope of Investigation

In consideration of the objectives of the Works, the following scope of investigation is proposed, to be completed by the nominated Contractor:

1. Prepare method statements and appropriate risk assessments for the Works to be undertaken. These will require to be agreed with the client and engineer prior to commencement.
2. The Principal Contractor is to be confirmed and shall act in accordance with the CDM Regulations where required for the duration of the works.
3. Provide details and relevant documentation of key members of staff intended to be involved in works.
4. Survey in the location of each SI location prior to beginning intrusive SI work.
5. Complete UXO clearance for each borehole as directed by the ordnance engineer.
6. Clear each SI location to include an area of 10m radius from the borehole location, for buried services prior to commencing works to facilitate relocation of SI location without the requirement for a repeated buried services scan.

7. Core-out and/or break up hardstanding as required to complete SI locations
8. Drilling of 3 No. of deep boreholes to a depth of 20mbgl, to be referred to as BH01, BH02, BH03
9. Drilling of 3 No. of deep boreholes to a depth of 10mbgl, to be referred to as BH04, BH05, BH06.
10. Installation of boreholes as required by the Engineer.
11. Backfill and re-instatement of all SI locations to existing surface material. Removal of all excess spoil from site.
12. The Works to be supervised by suitably qualified Ground Specialist and all exploratory holes to be logged to Eurocode 7.
13. Carrying out in-situ testing as required by the Engineer.
14. Collection of samples of arisings from exploratory locations according to specification.
15. Surveying of each exploratory location to OS datum and National Grid coordinates (X, Y, Z) following completion of the Works.
16. Adequate storage of sample and dispatch of samples to MCERT accredited laboratory within 24hrs of recovering samples.
17. Production of factual report detailing the investigation work to include but not be limited to detail of work undertaken, SI logs, results of chemical and geotechnical testing undertaken. All relevant data shall also be provided in AGS format.

3.6 Geology and Ground Conditions

3.6.1 Geology

The 2011 Preliminary Environmental risk Assessment has identified the following site geology.

The geology beneath the Site has been established from the British Geological Survey (BGS) 1: 50,000 scale Geological Map, Sheet 256 North London Edition.

A summary of the geology is provided in Table 2.

Table 2: Site Geology

Stratum	Area Covered	Estimated Thickness	Typical Description
Made Ground.	Whole Site.	Unknown.	Concrete/tarmac hardstanding underlain by soil fill materials of unknown composition.
London Clay	Whole Site.	71 to 110m	Clay, silty in part.
Lambeth Group (Woolwich and Reading Beds)	Whole Site	8 to 23m	Mottled clay with sand and pebble beds.
Thanet Sands.	Whole Site.	0 to 16m.	Fine grained sand.
Chalk.	Whole Site.	190 to 220m.	Micritic limestone with flint nodules, and interbedded calcareous mudstone in lower part.

3.6.2 Ground Stability

The Site is in an area of moderate risk with respect to swelling or shrinking clays.

The Site is not in an area affected by coal mining activity.

3.6.3 Ground Gas

The Site is situated in an area where less than 1% of homes are above the Radon Action Level. Consequently, no radon protective measures are necessary in the construction of new dwellings or extensions.

3.6.4 Surface Waters

The nearest surface water body, the Grand Union Canal is located immediately to the south of the Site. The River Thames is located approximately 2 km to the south and east of the Site.

'The Lost Rivers of London'¹ indicates that a tributary of the River Fleet either passes through the eastern section or is within very close proximity, to the eastern boundary of the Site, before converging with another tributary approximately 70m to 80m to the southeast of the Site.

The Site is not in an area deemed at risk from flooding. According to the Environment Agency's flood zone map the Site lies within Flood Zone 1. Land within Flood Zone 1 is classified by Planning Policy Statement (PPS) 25 as having a low flood risk, with an annual probability of flooding of <0.1% (less than 1 in 1000 annual probability) from rivers or the sea².

¹ N.J Barton, 1994, 'The Lost Rivers of London, Historical Publication Ltd, London.

². Environment Agency (EA) *Groundwater Vulnerability Map*, Sheet 39, West London.

3.6.5 Groundwaters

According to the Environment Agency groundwater vulnerability map, Sheet 39 (West London)³ the London Clay Formation is classed as an Unproductive Stratum (Non-Aquifer); the Lambeth Group and Thanet Sands are classified as a Secondary (Minor) Aquifer; and the Upper Chalk, at depth, is classified as a Primary (Major) Aquifer. An assessment of the hydrogeological properties of main geological units underlying the Site is shown in Table 3.

Table 3: Summary of Hydrogeological Properties of the Main Geological Strata

Stratum	Hydrogeological Significance	Environment Agency Classification
Made Ground.	May contain small quantities of perched water.	Unproductive Stratum.
London Clay	Contains insignificant quantities of water for abstraction.	Unproductive Stratum.
Lambeth Group (Woolwich and Reading Beds)	Important for local supplies and maintaining river base-flow.	Secondary Aquifer.
Thanet Sands.	Important for local supplies and maintaining river base-flow.	Secondary Aquifer
Chalk.	Highly permeable strata, contains large quantities of groundwater for abstraction.	Principal Aquifer.

The London Clay formation is considered to act as an aquiclude preventing any contamination present in the superficial Made Ground from migrating vertically into the underlying Lambeth Group (Secondary Aquifer), Thanet Sands (Secondary Aquifer) and Upper Chalk (Principal Aquifer).

Based on available information, it is anticipated that groundwater flow will be generally in a southern direction.

The Site not located within a groundwater Source Protection Zone (SPZ).

The Landmark Information Group records four surface water abstractions within 1km of the Site. All permits are held by the British Waterways Board and the closest is operated approximately 250m to the southwest of the Site, with water being abstracted from unspecified surface water for irrigational purposes.

Furthermore, three groundwater abstractions are recorded within 1km of the Site. The closest is a Commercial/Industrial/Public Services abstraction (Drinking; Cooking; Sanitary; Washing; Small Garden) operated by LBC approximately 440m to the north of the Site. Although details concerning the stratum from which the groundwater is abstracted are not provided, it is likely that such an abstraction would be from the Chalk at depth.

3.7 Schedule of Drawings and Documents

Table 4: Schedule of documents and drawings

Appendix	Title	Reference
A	Provisional Exploratory Hole Location Plan	Figure 1
B	Utilities Information	TBC

3.8 Exploratory Hole Locations

The Contractor shall advance the exploratory holes detailed in Schedule 2 and at locations presented in Figure 1. Exploratory holes shall be advanced to the depth as defined in Schedule 2 unless otherwise instructed by the Engineer. Where below ground obstructions are encountered the Engineer shall be consulted as to how to proceed.

3.9 Works Programme

The Contractor will be operating within an operational area, consequently, a works programme is to be coordinated and agreed with the client so that he can inform existing tenants. Please note that access to all proposed exploratory hole locations may not be possible at the same time. The Contractor should allow for at least 2 visits to site.

3.10 Health and Safety Measures

The Contractor shall comply with the requirements of the CDM Regulations and Health & Safety at Work Act 1974 and the other relevant publications such as those prepared by the ICE, BSI and BDA. The Principal Contractor will operate in accordance with the CDM Regulations.

The Site is to be classified as "yellow" under the BDA classification and the Contractor shall ensure that appropriate PPE is worn at all times by all Site workers. The Contractor shall clear all exploratory hole locations for the presence of underground services. A copy of recent utility plans is provided in Appendix B.

The Contractor should be aware that given the history of the Site contaminants including asbestos, hydrocarbons and heavy metals may be encountered during the SI. Contractor staff should be briefed with respect to the contaminants that may be encountered and relevant procedures.

3.11 Service Clearance

The Contractor shall satisfy themselves that necessary evaluation has been undertaken to prevent damaging services.

It shall be the contractors responsibility to promptly rectify any damage.

As a minimum the Contractor shall scan each location for services prior to drilling. Hand pits to depth of 1.2m shall be excavated at each window sample borehole location without exception prior to commencing drilling.

Details of available service plans have been requested from the client and will be forwarded where available.

3.12 Documentation

The Contractor shall provide CVs of all personnel to be employed in respect of the Works, as part of the tender return document.

As a guide, the Ground Specialist shall be a qualified Engineering Geologist or Geotechnical Engineer with a minimum of five years' experience logging to BS5930/Eurocode 7. Drillers shall hold approved qualifications proving their competence in their respective drilling technique. This information shall be submitted with the tender return documents.

All members of staff, including sub-contractors, shall be registered under the Construction Skills Certification Scheme or equivalent. CSCS cards (or equivalent) shall be made available for copying at the outset of the works.

All method statements and risk assessments with respect to works, including works carried out by sub-contractors, shall be included as part of the tender return document.

Aspects of the works to be covered by the method statements shall include but are not be limited to the following:

- methodology of the drilling rig/s intended to be used;
- avoidance of services;
- aquifer protection;
- isolation of the works from the general public and all people using the Site;
- reinstatement and removal of spoil;
- methodology of drilling through contaminated ground, if required;
- methodology of cleaning casing and equipment between holes and;
- methodology for protection of surface water drains.

3.13 Exploratory Hole Works

The method of drilling shall be appropriate to facilitate the following:

- the collection of discrete environmental samples;
- the accurate logging to Eurocode 7 of all strata encountered during the drilling works;
- the installation of monitoring wells in all boreholes;
- prevention of vertical migration of contamination into the groundwater; and
- where concrete is located at surface, the location should be cored.

Costs incurred due to delays and/or standing time due to a lack of a functioning core barrel shall not be entertained during the Works.

All exploratory holes shall be terminated at a depth instructed by the Engineer.

3.13.1 Installation Requirements

All of the drilled exploratory holes shall be installed with 50mm ID UPVC standpipes for groundwater and gas monitoring. The design of the installation shall be confirmed with the Engineer prior to installation.

The installations shall normally comprise a section of slotted screen, above which plain casing is used to the surface.

The filter material consisting of 10mm pea gravel shall surround the slotted screen section.

A geo sock or equivalent shall be used on sections of slotted pipe work to prevent/reduce the potential build-up of silt within the standpipe.

A bentonite pellet seal of a minimum thickness of 1.0m shall be required above the filter pack.

Thick cement (sulphate reducing cement mixed 1:1) shall be placed in the annular space above the bentonite seal and into which the borehole cover should be set.

A rubber bung with valve should be fitted to the top of installation on completion.

All boreholes shall be finished with a steel protective well cover rated BS 124 set in concrete. The cover shall be bolted shut and should be able to close without being forced against the top of the valve.

3.13.2 Backfill Requirements

Trial pits shall be backfilled with arisings as they were encountered and compacted.

Soils where visual and/or olfactory contamination is evident shall not be used for reinstatement and should be disposed of in a skip to be arranged by the contractor. The contractor shall arrange for waste soils to be disposed of appropriately under a duty of care.

3.14 Soil Sampling

The Contractor will be responsible for logging and the collection of environmental and geotechnical samples from all exploratory holes. The contractor will be responsible for the daily collection of samples from Site.

3.14.1 Environmental Sampling

The following scope of sampling will be used for the environmental soil sampling:

- In Made Ground soil samples shall be collected at a depth of 0.5m bgl and at 0.5m intervals and change of strata and from material with evidence of visual or olfactory contamination;
- In superficial deposits samples should be collected at 1.0m intervals and/or where visual or olfactory contamination is observed;
- In solid geology samples should be taken at every change in strata and/or where visual or olfactory contamination is observed;
- Each soil sample taken shall consist of 3kg of soils placed in plastic tubs along with a 200ml glass jar and a 40ml glass vial. Two plastic tubs shall be filled for each sample of Made Ground along with one glass jar and one glass vial; and
- Head space analysis to monitor for volatile organic compounds (VOC) shall be carried out on all samples collected.

All sampling containers shall be labelled as follows:

Client: **

Site: **

Trial pit/Borehole location number: TPx//BHx

Depth: **m

Date: **/**/14

(**to be inserted)

All samples which have been obtained during the Site works shall be listed on a chain of custody sheet.

All samples shall be logged in general accordance with BS 5930 / Eurocode 7, with care taken to ensure any visual or olfactory evidence of contamination is noted. Samples shall be stored and transported in accordance with BS10175.

3.14.2 Geotechnical Sampling

The contractor will be required to:

- Undertake Standard Penetration Tests and take undisturbed U100 samples at alternating 1m intervals in each of the 6No. boreholes;
- Bulk samples in boreholes and trial pits as per the Waterman engineer's instructions; and
- Standard BRE:SD1 suite testing on selected soil samples.

A factual report detailing the works and results will be required.

The contractor shall provide geotechnical testing rates for their preferred laboratory.

The Contractor shall undertake the geotechnical testing as directed by Waterman.

3.15 Soil Laboratory Analysis Scheduling and Reporting

The Contractor shall provide the Engineer with exploratory hole logs including confirmation of environmental samples taken and the Engineer will then specify the chemical test requirements.

The Contractor shall arrange for the samples to be dispatched to the nominated laboratories.

3.16 Site Constraints

The site is currently understood to be operational.

Access will be arranged through the client.

3.17 Reporting Requirements

The Contractor shall supply at least one full time Ground Specialist, who has no less than five years of experience of both geotechnical and environmental Site investigation to supervise the Works. The Ground Specialist shall ensure that the works are undertaken in accordance with the scope of works defined within this document and ensure that the Engineer is contacted should any abnormal Site conditions arise, including encountering visual or olfactory signs of contamination.

The Ground Specialist shall contact the Engineer at the end of each day to advise on progress and request confirmation of any required information. The Ground Specialist shall also ensure that the SI Logs are sufficiently detailed and accurate, with the following information provided:

1. Site location;
2. SI position location;
3. Number of exploratory hole within contract (Numbering as per Figure 2, Appendix A and Schedule 2);
4. Date and time of SI position;
5. Method of excavation and size/diameter;
6. Depth of hole/excavation and daily progress;
7. Type, length and diameter of plain casing;
8. Type, length and diameter of slotted well screen;
9. Thickness and type of annulus and seal;
10. Groundwater strike levels;
11. Description of encountered strata and contamination;

12. Depth below ground of lithology change;
13. Sample depth, type and characteristic; and
14. Other information - visual and olfactory observations, etc;
15. Details of buried obstructions encountered.

The Ground Specialist shall contact the Engineer to confirm the construction of all borehole installations.

A preliminary printed log shall be made available for each borehole no later than 5 days after the completion of the excavation.

3.18 Factual Report

The Contractor shall provide a full factual report detailing the works that were carried out as part of the contract and the report shall include, but not be limited to the following;

- a description of work carried out as part of the Works;
- a description of visual contamination encountered;
- details of buried services encountered;
- the final logs for all SI locations on the Site;
- details regarding excavation/borehole abandonment and/or borehole/excavation relocation;
- an as-built plan of all SI locations (also to be provided in dwg format);
- a list of X, Y, Z coordinates of all SI locations and encountered obstructions.
- All data, including borehole logs and testing information, should be supplied in AGS format.

A draft version of the factual report shall be provided no later than three weeks following completion of Works, defined as installation of the final window sample borehole.

A final version of the factual report should be provided no later than two weeks following completion of site works, defined as the final gas and groundwater monitoring visit.

Three printed copies of the final report are required, along with a digital copy of the final report.

3.19 Area of Works

The Contractor shall liaise with the client and engineer with regard to the requirement for fencing and warning signs/notices where appropriate.

The Contractor shall ensure that all soil arisings are placed on plastic sheeting and not on natural ground, in order to prevent contamination of clean areas.

The Site shall be maintained in a tidy and safe condition throughout the duration of the Works and on completion, all wastes and other deposits shall be promptly removed and disposed of by the Contractor.

3.20 Contractor's Workforce

The Contractor shall ensure that all employees on the Works are suitably trained and experienced in the duties he wishes them to carry out. Employees shall be registered with the Construction Skills Certification Scheme or equivalent and have their cards ready for inspection prior to works commencing on Site.

All of the Contractor's staff shall undertake a safety induction on first arriving at the Site.

3.21 Plant

All mobile plant shall be suitable for the type of works being carried out and shall be maintained in accordance with the manufacturer's instructions. Under no circumstances shall any plant or equipment be taken off Site without fully removing the risk of carrying contaminated soils or other materials away from the Site.

The Contractor shall provide specification details of all plant and material to be used to complete the works for the Principal Contractor's approval prior to the works commencing.

3.22 Waste Disposal

The Contractor shall be responsible for removing excess spoil from site.

Any materials removed from Site for recovery or disposal elsewhere shall be appropriately tested where necessary, and classified before leaving the Site.

3.23 Adjoining Properties

The Contractor shall take appropriate steps to mitigate the effects of the Works regarding all adjacent properties.

3.24 Engineer's Approval

Where the approval of the Engineer is required in this Schedule, such approval shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

3.25 Contractor's Superintendence

The Contractor shall provide all necessary superintendence during the execution of the Works. At least one competent and authorised Ground Specialist shall be on Site full time during the works and give his whole time to the superintendence of the same. The Ground Specialist shall act as an agent of the Contractor and shall receive directions and instructions from the Engineer and the Principal Contractor as necessary.

3.26 Working Hours

Working hours are assumed to be 8am to 6pm, Monday to Friday.

3.27 Emergency Arrangements

The Contractor shall provide first-aid cover and equipment for his employees. Designated first aiders shall be provided by the Contractor and at least one such first aider shall be present on Site at all times during work operations.

3.28 Security

The Site shall be left in a safe and secure condition at the end of each working day.

The Contractor shall be responsible for the security of all plant and equipment for the duration of the works.

The Employer will not accept liability for security of plant and equipment during the works and the Contractor shall be responsible for providing security for their plant equipment and other material required to carry out the works.

4. Schedule 2

Exploratory hole Designation	Proposed depth below ground level
BH01	10mbgl (or 10m into the Mudstone)
BH02	20mbgl (or 10m into the Mudstone)
BH03	10mbgl (or 10m into the Mudstone)
BH04	20mbgl (or 10m into the Mudstone)
BH05	10mbgl (or 10m into the Mudstone)
BH06	20mbgl (or 10m into the Mudstone)

5. Schedule 3 Engineers Facilities – Not Used

6. Schedule 4 Specification Amendments

See attached Schedule of Amendments to ICE Ground Conditions

7. Schedule 5 Specification Additions – Not Used

8. Bill of quantities

The bill of quantities shall be deemed to have been prepared and measurements shall be made according to the procedure as set out in the bill of quantities for Ground Investigation as included in the "Site Investigation in Construction Book 3 Specification for Ground Investigation (1999)"

Preamble

1. In this Bill of Quantities the sub-headings and item description identify the work covered by the respective items. The exact nature and extent of the work to be performed shall be ascertained by reference to the Conditions of Contract, the Specification and the Schedules and Appendices to the Specification as appropriate. The rates and prices entered in the Bill of Quantities shall be deemed to be the full inclusive value of the work covered by the several items, including the following unless stated otherwise.
 - a) Supervision, labour and all costs in connection therewith.
 - b) The supply of materials, goods, storage, facilities and services, and all costs in connection therewith, including wastage and delivery to Site.
 - c) Plant and all costs in connection therewith.
 - d) Fixing, erecting and installing or placing of materials and goods in position.
 - e) All temporary works.
 - f) All general obligations, requirements, liabilities and risks involved in the execution of the investigation, as set forth or implied in the documents on which the tender is based.
 - g) Establishment charges, overheads and profit.
 - h) Bringing plant and sampling and insitu testing equipment to the Site of each exploratory hole; erecting dismantling and removing on completion.
 - i) Removal of all equipment and services from Site on completion.
 - j) Reinstatement.
2. The Contractor is required to complete the bill of Quantities as they see fit to enable them to complete the Works. Do not delete any items from the Bill of Quantities.
3. Where rates are not priced, they shall have £0.00 placed against them and it will be assumed that the Contractor does not required this item to complete the Works.
4. Any item not included in the Bill of Quantities that the contractor requires to price show be included in the Bill of Quantities with a brief explanation
5. Professional attendance associated with the description of cores and samples, the logging of pits and boreholes and other duties as required by the Contract shall be included in the appropriate rates.

6. The item for photograph shall allow for the standing time of associated plant.
7. Rates for moving plant and equipment to the Site of each exploratory hole shall allow for the formation of access routes, and making good access routes and working areas on completion, as required by the Contract
8. Payment for forming exploratory holes shall be based on:
 - a) full thickness of strata investigated and described in accordance with the Specification
 - b) depths measured from ground level
 - c) depth measured from original ground level where an inspection pit has been excavated that part of a drill hole below the bottom of a borehole where a drill hole has been ordered to continue from the bottom of a borehole
 - d) core recovery of at least 90% in any core run, unless the Engineer is satisfied it cannot be achieved
 - e) volume calculated as measured length x measured depth x specified width for trial and observation trenches
9. Rates for forming exploratory holes shall allow for:
 - a) casing installation where necessary, and removal and for any casing not recovered, including that necessary to prevent cross contamination.
 - b) dealing with surface water and formation of temporary plugs
 - c) backfilling with cement bentonite grout
 - d) supply of daily report and preliminary log
 - e) additional Site supervision of non-accredited driller
 - f) disposal off Site of excavated material not required for reuse but excluding material regarded as hazardous or special waste
 - g) washing down of equipment as specified
 - h) measures to prevent cross-contamination between strata
10. Standing time shall be measured as the duration of time which plant, equipment and personnel are standing on the instruction of the Engineer or in accordance with the Contract.
11. Standing time shall be paid for interruption of the formation of exploratory holes to record groundwater entry in accordance with Clause 9.1.1. The rates for standing time shall allow for:
 - a) plant equipment and personnel
 - b) consequential costs
 - c) changes in the programme of working
 - d) recording information and preparing daily report
12. The rates for hourly provision of pitting crews and equipment at locations as directed by the Engineer shall allow for compliance with the requirements of the Contract, including preparation of records.
13. The rates for sampling and in-situ testing shall allow for the standing time of associated plant.
14. The rates for installation of instruments shall allow for:
 - a) clearing and keeping hole free of unwanted materials

- b) all costs associated with equipment, installation, specified seals, surround, backfill materials excluding backfill below the instrument and surface terminal if appropriate.
- c) Proving correct functioning
- d) Delays due to installation

15. The rates for recording of water level or gas measurement shall allow for notices of re-entry to the Engineer, owners or occupiers affected by the location or access route.

Units of measurement

16. The following abbreviations shall be used for the units of measurements:

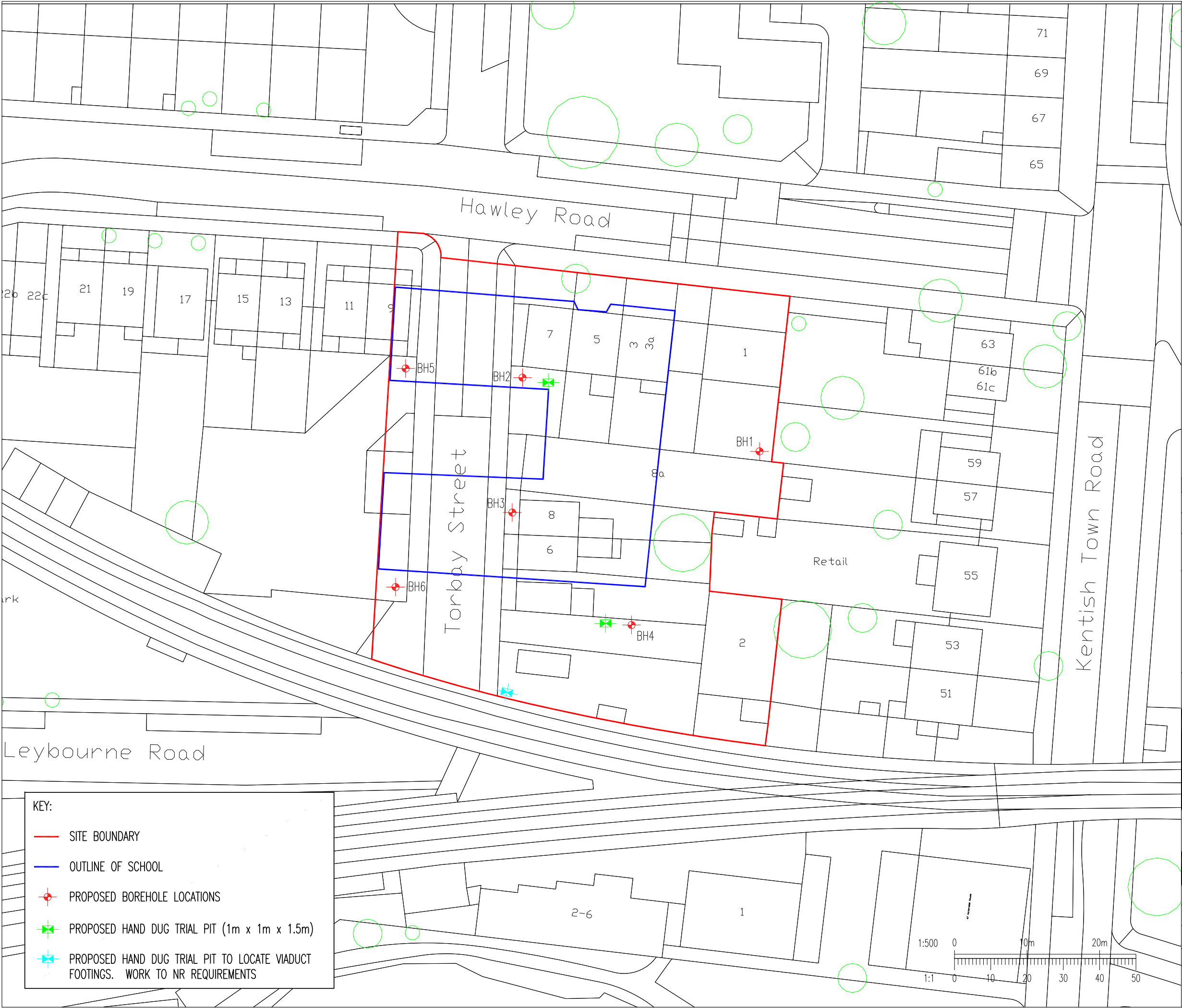
Millimetres	:	mm
Metre	:	m
Kilometre	:	km
Square millimetres	:	mm ²
Square metre	:	m ²
Cubic metre	:	m ³
Square metre per day	:	m ² /day
Kilogramme	:	Kg
Tonne	:	t
Sum	:	sum
Number	:	nr
Hour	:	h
Week	:	wk
Vehicle week	:	v.wk
Item	:	item
Day	:	Day
Specimen day	:	sp.day

- 17. The rates for all pits and trenches shall allow for the excavator, driver and technical assistant to log the pit and trench, take samples and carry out tests.
- 17. The rates for performing laboratory tests of long duration shall include for all costs incurred whilst working outside normal hours.
- 18. This document will be forwarded as a PDF by e-mail, together with all listed appendices and inclusions, to the tendering Contractors.
- 19. An Excel spreadsheet of the Bill of Quantities will be forwarded as an additional attachment in the e-mail. A hard copy of the Bill of Quantities is presented in Appendix D. The Contractor shall fill in the appropriate items on the Bill of Quantities and return the spreadsheet in an electronic format with the Tender documents.



APPENDICES

Appendix A. Figures



GENERAL NOTES

1. THIS DRAWING IS COPYRIGHT AND THE PROPERTY OF WATERMAN ENERGY, ENVIRONMENT & DESIGN AND IS NOT TO BE COPIED IN WHOLE OR IN PART EXCEPT UNDER A WRITTEN AGREEMENT.
2. DO NOT SCALE THIS DRAWING. ANY DISCREPANCY IS TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEER'S, ARCHITECT'S OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
4. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.
5. THE CONTRACTOR MUST ENSURE AND WILL BE HELD RESPONSIBLE FOR THE OVERALL STABILITY OF THE BUILDING/STRUCTURE/EXCAVATION AT ALL STAGES OF THE WORK.
6. ALL WORK BY THE CONTRACTOR MUST BE CARRIED OUT IN SUCH A WAY THAT ALL REQUIREMENTS UNDER THE HEALTH AND SAFETY AT WORK ACT ARE SATISFIED.
7. ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.

A01	22:07:14	PRELIMINARY ISSUE	DC
Rev	Date	Description	By

Amendments

Project	HAWLEY SCHOOL SITE
Title	PROPOSED SITE INVESTIGATION PLAN
Client	STANLEY SIDINGS LTD



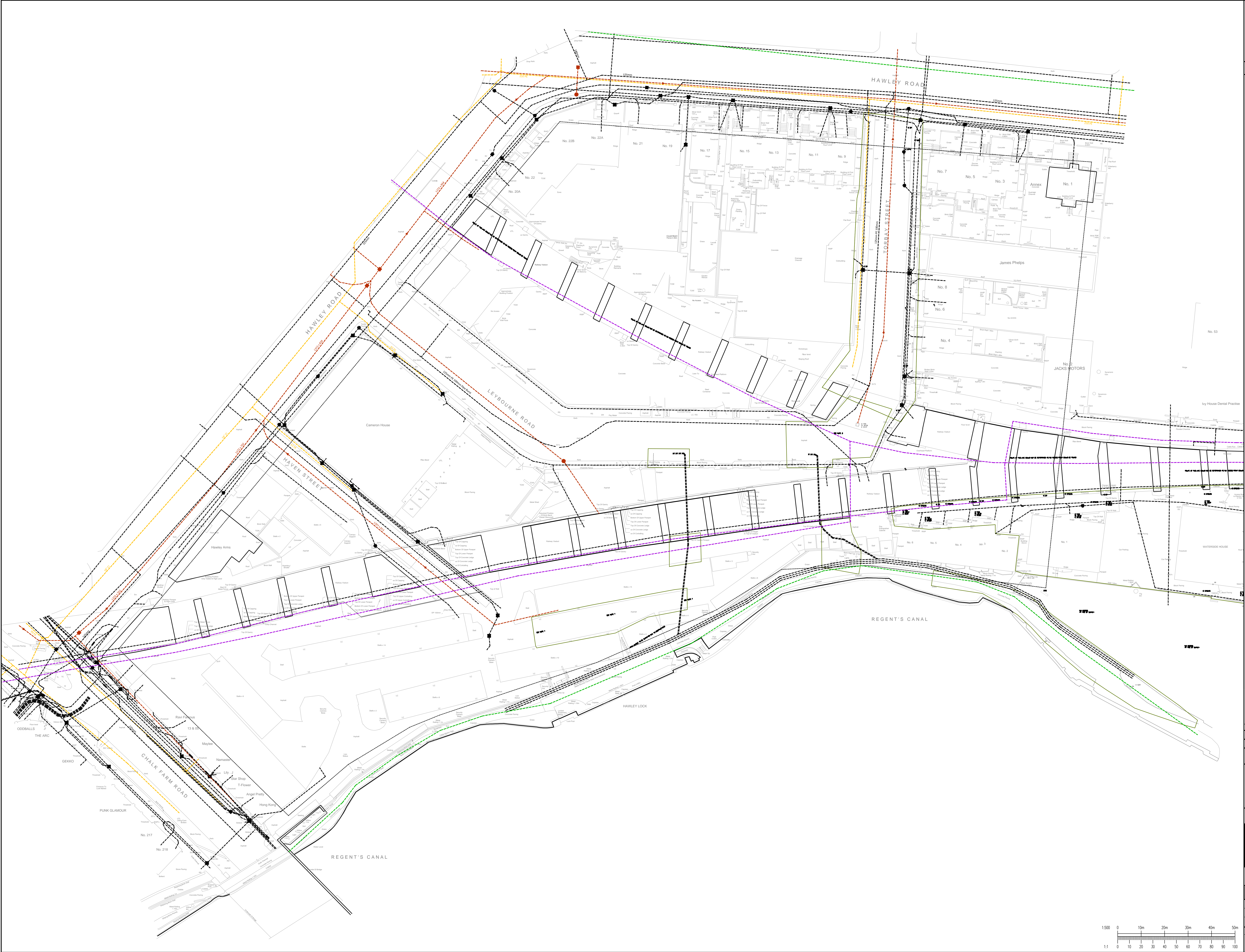
Pickfords Wharf Clink Street London SE1 9DG
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Drawing Status				
PRELIMINARY				
Designed by	PDS	Checked by	PDS	Project No
Drawn by	DC	Date	JULY 2014	EED14664-100
Scales @ A3		1:500		Computer File No
work to figured dimensions only				EED14664-100ESA800001.dwg
Publisher	Zone	Category	Number	Revision
EED	SA	80	0001	A01



Appendix B. Utility information

- BSD11341_WBS-96-SA-U001



This drawing is for engineering services only and is to be read in conjunction with all relevant architectural, structural, Waterman Building Services drawings and the contract specification.

THIS IS NOT AN INSTALLATION DRAWING

All service routes and equipment locations are indicative, actual location to be determined from site dimensions.

To whom it may concern: The requirements of the Health & Safety at Work etc. Act 1974 & subsequent amendments therein are brought to the attention of all those who design, install or maintain the plant and equipment shown on these drawings or who are required to enter the areas shown on these drawings.

DO NOT SCALE FROM THIS DRAWING

GENERAL NOTES

LEGEND

----- STATUTORY RECORD SEARCH AREA

ELECTRICITY

- HIGH VOLTAGE ELECTRICITY
- LOW VOLTAGE ELECTRICITY

GAS

- NATIONAL GRID GAS LP MAIN

SEWER

- THAMES WATER COMBINED

TELECOM

- BRITISH TELECOM
- VIRGIN MEDIA
- VODAFONE (EX-CABLE&WIRELESS)
- VODAFONE (NETWORK RAIL)
- VODAFONE (EX-ENERGIS NETWORK)
- FIBRE OPTIC (GLO, GC&F)

WATER

- THAMES WATER MAIN

OTHER

- OIL PIPE

Rev	Date	Description	By
A01	02.06.14	ISSUED FOR INFORMATION	P.T.

Project

HAWLEY SCHOOL

Title

EXISTING UTILITIES LAYOUT

Client

STANLEY SIDINGS

waterman

Building Services

Pickfords Wharf, Chisle Street, London, SE1 9QQ

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Drawing Status

PRELIMINARY

Designer	V.P.	Checked by	P.T.	Project No.
Drawn by	K.C.	Date	JUNE '14	BSD11341
Scale @ A0	1:250			Company File No.
work is subject to approval only				
Author	Zone	Category	Number	Revision
WBS	96	SA	U001	A01

Appendix C. Chemical Analysis details

Table G1, Core Suite 1 Dry Soils

Determinant	Maximum Allowable Limit of Detection	Units
pH	0.01	pH units
Total Organic Carbon	0.1	% w/w
Moisture content	0.1	%
Antimony	1	mg/kg
Cadmium	0.5	mg/kg
Chromium	10	mg/kg
Hexavalent Chromium (if total Cr > 25 mg/kg)	5	mg/kg
Lead	10	mg/kg
Mercury	0.6	mg/kg
Nickel	4	mg/kg
Vanadium	3	mg/kg
Arsenic	3	mg/kg
Beryllium	0.5	mg/kg
Selenium	2.5	mg/kg
Barium	10	mg/kg
Copper	5	mg/kg
Zinc	10	mg/kg
Boron (water soluble)	0.3	mg/kg
Nitrate	2.2	mg/kg
Ammoniacal Nitrogen	0.5	mg/kg
Exchangeable Ammonium	40	mg/kg
Sulphate (water soluble SO ₄)	0.02	mg/l
Sulphide	10	mg/kg
Sulphur (Elemental)	100	mg/kg
Total Sulphate	0.01	%
Cyanide (free)	1	mg/kg
Total Cyanide	1	mg/kg
Thiocyanate	1	mg/kg
Asbestos identification and quantification	n/a	
TPH Total by GCFID	5	mg/kg
TPH CWG to include BTEX and MBTE	0.1 - 5	mg/kg
TPH GRO C6 – C10	0.1	mg/kg
TPH DRO C10 – C25	0.1 - 5	mg/kg

PAH (16 USEPA speciated plus coronene and benzo[j]fluoranthene)	0.2	mg/kg
Phenols - Speciated HPLC	0.1	mg/kg
Loss on ignition	0.1	%
Calorific Value	0.1	MJ/kg

Table G2: Chemical Waste Acceptance Criteria (WAC) Test Regime for Soils

Parameter determined on the waste	Full Waste suite
Total Organic Carbon (w/w%)	Y
Loss on ignition	Y
BTEX (mg/kg)	Y
PCBs (7 congeners) (mg/kg)	Y
Mineral Oil C ₁₀ -C ₄₀ (mg/kg)	Y
pH	Y
Acid Neutralisation Capacity (ANC)	Y
	2 batch suite BS12457-3
As	Y
Ba	Y
Cd	Y
Cr	Y
Cu	Y
Hg	Y
Mo	Y
Ni	Y
Pb	Y
Sb	Y
Se	Y
Zn	Y
Cl	Y
F	Y
SO ₄	Y
Total dissolved Solids (TDS) ⁺	Y
Phenol Index	Y
Dissolved organic Carbon at own pH or pH7.5-8.0 [@]	Y

Table G3: Geotechnical testing

Determinant
Standard BRE:SD1 suite

