

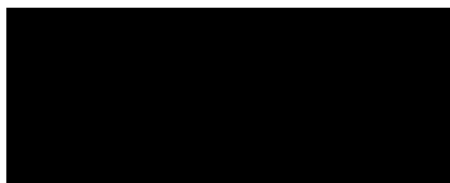
**South Bersted Garage,
Bognor Regis**

SUBADRA
Environmental - Geotechnical - Laboratory - Foundations
13 Triangle Business Park, Stoke Mandeville, HP22 5BL

Outline Remedial and Verification Sampling Strategy

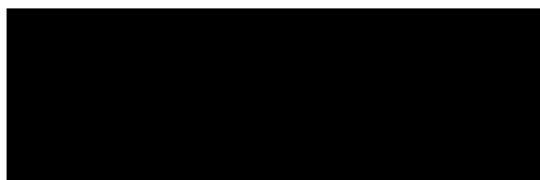


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List of Attachments

Attachment One: Notice to Interested Parties

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1 Introduction

1.1 The Purpose of This Document

Enterprise Rent-a-Car Ltd (Enterprise) propose to lease the former South Bersted Garage site in Bognor Regis and redevelop it for future use as a car rental depot. The site comprises a former petrol filling station, although all below fuel tanks are understood to have been concrete filled in the past, and has most recently been used for vehicle hire and repair.

We were commissioned by Enterprise to complete an initial Phase I environmental assessment for the site during November 2017. Given the past petrol station use, we subsequently completed an environmental site investigation at the site during January 2018. Hydrocarbon impact of underlying soils and shallow groundwater was encountered under the former forecourt areas of the site and we completed a Detailed Quantitative Risk Assessment in order to determine whether the site posed a potential risk to identified receptors.

We concluded that the dissolved phase hydrocarbon concentrations we identified in underlying groundwater did pose a potential risk to a theoretical environmental receptor 150m from the site. We calculated outline remedial targets for the site, but recommended additional groundwater monitoring be completed in order to verify the initial investigation data. Due to access issues, we were unable to complete this monitoring work until June 2018. We have subsequently revised our risk assessment modelling, using the additional site data obtained.

On the basis of our site investigation data and revised risk assessment, we do not consider potential risks exist to future site workers, or neighbouring residents. However, we consider the residual contamination present does pose a potential risk to a theoretical environmental receptor located 150m from the site and have recommended remedial works be undertaken to reduce hydrocarbon concentrations in underlying groundwater.

Conditional planning permission for the proposed works has been granted by Arun District Council (Planning ref. BR18/18/PL). A number of planning conditions relate to potential contamination issues at the site. In summary:

- Condition 3 - Requires the submission of a remedial strategy for the site including the findings of a preliminary risk assessment, site investigation, detailed risk assessment and verification plan;
- Condition 5 - Addresses the potential for unforeseen contamination to be encountered during the redevelopment works and requires the submission of amendments to the remedial statement to address any unsuspected contamination issues; and,
- Condition 6 - Requires the submission of a verification report that details completion of the approved remedial strategy and sets out any requirements for long-term monitoring at the site.

The purpose of this document is to set out our proposed outline remedial strategy and our methodology for the verification sampling to be undertaken during, and after, the redevelopment works. This, in conjunction with our previous site investigation and risk assessment reports, is designed to satisfy the requirements of Planning Condition 3 and set out an initial strategy to satisfy the requirements of Condition 5.

All the activities comprising this assessment were carried out in accordance with the procedures set out in our Quality Manual. Your attention is drawn to the Notice to Interested Parties included as Attachment One.

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1.2 Previous Reports Relating to the Site

As part of the design of this remedial and verification sampling strategy we have reviewed the reports listed in the following table.

Our Ref.	Report Title	Prepared By	Prepared on Behalf of	Date of Issue	Report Reference
Ref.1	Phase I Environmental Desk Study Report	Subadra Consulting Ltd	Enterprise Rent-a-Car Ltd	November 2017	In17597 CL 001
Ref.2	Environmental Investigation Report			February 2018	In17597 CL 002
Ref.3	Detailed Quantitative Risk Assessment			March 2018	In17597 CL 003
Ref.4	Revised Detailed Quantitative Risk Assessment			July 2018	In17597 CL 004

This document should be read in conjunction with the documents listed in this table.

Table One: Previous Environmental Reports Relating to the Site

1.3 Proposed Development Plans

Proposed Developments	Enterprise propose to redevelop the site for future use as a car rental depot. The redevelopment scheme comprises the demolition of existing workshop buildings and construction of a small modular office building and covered wash bay in the centre of the site. The existing overhead canopy is to be retained, with new signs and cladding, and the remainder of the site will be covered with hard standing to be used for car parking. Conditional planning permission for the proposed works has been granted by Arun District Council (Planning ref. BR18/18/PL). Summary details of the proposed redevelopment layout are provided as the figure below.
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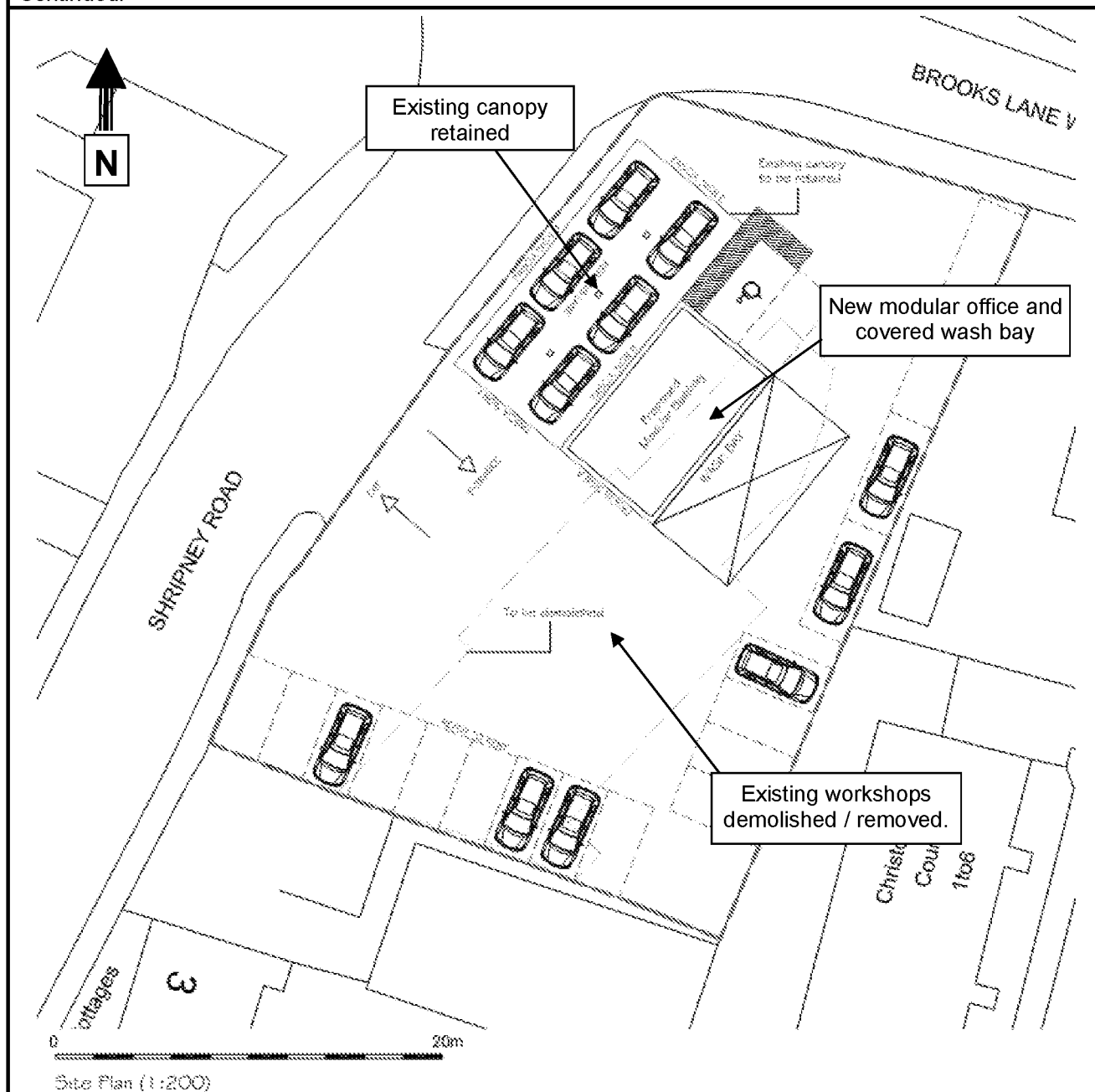


Table Two: Proposed Development Plans

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2 Remedial Strategy

We consider the following remedial works, completed during the site redevelopment, will result in the removal of the residual contaminant source from the site and result in rapid improvements in underlying groundwater quality.

2.1 Remedial Strategy: Removal of Existing Petroleum Installation

The proposed development works include the excavation and removal of the known five former fuel tanks located under the forecourt, as shown on the site plans we obtained from the Petroleum Officer.

Decommissioning the existing petroleum installation will include:

- Excavation and removal of: 3no. 3,000gallon (~13,500litre), 1no. (split compartment) 8,000gallon (~35,500litre) and 1no. 6,000gallon (~26,500litre) tanks from under the forecourt; and
- Excavation and removal of associated underground fuel supply lines.

We consider the excavation and removal of the former petroleum installation from under the forecourt will result in the removal of the primary potential historical contaminant source from the site.

2.2 Remedial Strategy: Removal of Historical/Abandoned Petroleum Infrastructure

As with any petrol filling station site, we consider it possible that abandoned tanks could remain present under the forecourt and these may be encountered during the redevelopment works.

We have recommended that any previously unknown former petroleum infrastructure encountered be excavated and removed during the site decommissioning. It is our understanding that, unless unsafe to do so, any abandoned tanks that are identified will be excavated and we will undertake verification sampling of surrounding soils.

2.3 Remedial Strategy: Residual Contamination

As part of our remedial strategy, we propose to undertake additional investigation of underlying soils across the forecourt area during the site decommissioning works. Trial pits will be constructed and verification sampling of underlying soils undertaken (see Section 3 for details). If impacted soils are encountered we propose limited remedial excavation, where possible, of these to remove residual source material from the site.

2.4 Remedial Strategy: Unforeseen Contamination

Additional localised soil impact could potentially be present in the immediate vicinity of the current petroleum installation as no boreholes have been constructed in the location of existing tanks or lines for health and safety reasons.

During the excavation and removal of the former tanks we propose that any grossly impacted shallow soils or groundwater associated with the underlying tank foundation cradles (i.e. free phase hydrocarbons) will be excavated and removed from the site to ensure this potential contaminant source is removed. In the event that free phase hydrocarbons are encountered on underlying shallow groundwater, this will be removed from site using a combination of hydrocarbon absorbent materials and/or vacuum tanker.

The results of our verification sampling will be used to determine whether any further excavation of impacted soils encountered at the site will be required.

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2.5 Engineering Control Measures

2.5.1 Protection of Buried Water Supply Pipes

Hydrocarbons present in shallow soils can permeate standard PVC water supply pipework and leach into drinking water leading to tainting and in extreme cases can pose a risk to human health.

We recommended that all new water supply pipework that is installed during the forthcoming development works be constructed from a hydrocarbon impervious material (e.g. ductile steel or plastic/aluminium composite). Pipework should be laid within a bed (minimum 100mm) of sand or other granular material (with no sharps) to prevent damage to the pipework and the trench backfilled with a clean inert material.

2.5.2 Gas Protection Measures

We recommend that some form of gas protection measure should be included in the new office building design to mitigate any potential long-term risks to site workers from any residual hydrocarbons in shallow soils. The purpose of the recommended engineering control is to break the potential migration pathway for vapours to indoor air.

Engineering controls could include the installation of a suitable hydrocarbon vapour barrier membrane in the floor slab of the building, or construction of underfloor ventilation under the floor slab to ensure no accumulation of vapours under the building.

2.5.3 Site Pavement

The proposed sealed pavement at the site will prevent potential future leaching and mobilisation of residual contaminants in shallow groundwater.

3 **Proposed Verification Sampling Methodology**

3.1 Purpose of Validation Soil Sampling

We have been commissioned by Enterprise to carry out validation soil sampling during the proposed redevelopment works. This process involves the collection of soil samples from open excavations created as the old below ground fuel infrastructure is removed.

The purpose of the sampling is to verify the quality of soil in these areas and assess whether further remedial excavation of soils should occur. This information is intended to augment any existing environmental data that has been obtained as part of our pre-commencement borehole investigation.

3.2 Recovery of Samples

We will attend site, where possible within 48 hours of notification, to carry out verification sampling. A suitably qualified and experienced environmental engineer will carry out all verification sampling. We anticipate visiting site during the removal of the below ground fuel tanks in order to sample soils from the accessible faces and base of the tank excavations.

Typically we will attempt to obtain soil samples every three to five linear metres from the side-walls and bases of the tank excavations. We also propose obtaining at least one soil sample per five linear metres from the various pipe work excavation trenches. When requested we can also obtain soil samples of any spoil produced during the excavation works to assist with any subsequent waste classification process.

Soil samples will be recovered either manually or using an excavator, subject to health and safety constraints relating to the depth and slope stability of the excavation. (Note the excavator is to be driven by a competent person provided by the Contractor or specialist Sub-contractor).

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The frequency and number of samples retrieved will depend on the physical evidence of hydrocarbon impact encountered and the extent of the excavation works completed. Where concrete cradles are left in for reasons of ground stability it may not be possible to obtain samples. We will record the location of excavations and sampling locations.

If hydrocarbon impact of soils is identified we may request that the contractor construct additional trial pits at various locations across the site. The purpose of these trial pits will be to provide preliminary data on the extent of the contamination, although we cannot guarantee that the contamination will be fully delineated or that additional areas of impact do not exist at the site. Samples will be recovered from any trial pits constructed.

3.3 Transportation, Storage and Analysis of Samples

All samples will be collected using a trowel and protective gloves and then preserved in glass jars and stored in cool boxes during transportation to a UKAS accredited laboratory.

Selected samples will be analysed for a range of compounds indicative of hydrocarbon fuels, likely to include total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), benzene, toluene, ethylbenzene and xylenes (the BTEX compounds), selected inorganic contaminants and compounds included within the Subadra Waste Acceptance Classification (WAC) suite. All samples will be analysed in suitably accredited laboratories.

Where necessary analysis will be carried out on an accelerated basis to allow us to review data and make informed decisions about any remedial excavation works that might be required, thereby minimising disruption to on-going decommissioning works. There is a surcharge for reduced turnaround on any analysis completed, which will be passed on to the client.

3.4 Reporting of Data

We will issue chemical analysis reports for spoil samples direct to the Principal Contractor and/or Client as required to assist with the classification and disposal of waste materials.

We will prepare a report summarising the sampling works that we carried out during the decommissioning of the petroleum infrastructure, which will include the location of excavations and samples obtained and analytical results. This document will also detail soil samples, if any, that exceed Generic Acceptance Criteria for commercial end use and report on any additional remedial works completed.

3.5 Additional Remedial Excavation Works

Where hydrocarbon-impacted soil is identified that we consider could exceed Generic Acceptance Criteria for commercial end use, we will advise that further soil excavation/removal works may be required. As a minimum requirement we will instruct the excavation of any soil considered impacted with free-phase hydrocarbons and will assume that the Client supports this course of action unless instructed otherwise.

Initially, and in the absence of chemical analysis data, our judgement will be based solely upon visual and olfactory observations and/or volatile organic gas measurements taken (using a photo ionisation detector (PID) for example). These methods only provide semi-quantitative results, at best, and we cannot therefore guarantee the accuracy of this initial determination.

Please note that this process may have to be repeated, depending on the extent of any contamination encountered. We always try to minimise disruption to the main decommissioning works program, however, we must be permitted to carry out our verification sampling before excavations can be back-filled to avoid potential data gaps and uncertainties in the final verification reporting.

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3.6 Additional Responsibilities

Segregating Inert from Contaminated Waste Streams

The segregation of contaminated/inert soils on-site can be considered as a 'pre-treatment' of waste, which is required by the Environment Agency (as specified by Landfill (England and Wales) Regulations 2002). In the majority of cases segregation is also likely to reduce waste disposal costs.

If requested we can provide an initial judgement on whether soils are likely to be considered inert or contaminated, again based solely upon visual and olfactory observations and/or any volatile organic gas measurements. We will then take soil samples from each stockpile and carry out waste classification analysis. The analysis results from these samples can usually be made available within four working days.

In the event that contaminated material is encountered and requires stockpiling in advance of offsite disposal, the Principal Contractor will provide suitable containment facilities to ensure cross contamination of underlying clean soils does not occur. We will provide advice and support in the design and installation of suitable containment measures.

Analysis of Imported Materials

If requested by the Client we will recover samples of any bulk materials imported to site for subsequent chemical and/or geotechnical analysis. The purpose of this analysis is to confirm the material is suitable for its intended use on-site.

The Client must specify prior to our attendance at site whether we are required to assess the suitability of the material being used and against what parameters. We are also able to monitor the back-fill process and confirm suitable compaction has been undertaken, again if specified prior to attending site.

Issues relating to the importation of suitable inert granular material currently remain the responsibility of the Principal Contractor. If requested, we will audit the arrangements made and ensure sufficient verification of the quality of imported material has been completed.

Analysis of Wastewater

If required by the contractor we are able to recover samples of any groundwater that is being pumped from excavations for analysis. Based upon the results of this analysis we can advise whether treatment maybe required prior to discharge, with respect to concentrations specified by any relevant discharge consents in place for the site. Samples can also be taken post-treatment if this is required.

Notifying the Client of Significant Unforeseen / Previously Unidentified Contamination

Where requested to do so, we will notify the client of the presence of any significant unforeseen or previously unidentified hydrocarbon contamination that becomes evident during the development of the site. Subject to project-specific planning conditions, it may be necessary for the client to forward this information to the Local Planning Authority.

In this event, we will need to complete a suitable risk assessment to derive remedial targets for the site. The findings of the risk assessment and remedial strategy proposed will require to be submitted to the Local Planning Authority for approval, before any suggested works are undertaken.

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4 Proposed Long Term Verification Monitoring

We anticipate significant improvements in underlying groundwater quality at the site following the removal of the former petroleum installation and/or remedial excavation of shallow impacted soils associated with the former tanks. We recommend that a network of permanent groundwater monitoring wells are installed at the site during the redevelopment process to allow long-term verification monitoring of groundwater quality under the site. Wells should be installed along the north and western site boundaries.

We recommend that, following the completion of the redevelopment and associated remedial works, groundwater verification monitoring be completed using the well network on a quarterly basis, for a period of one year following the redevelopment. The results of this monitoring will be compared against the site specific target levels calculated during our risk assessment modelling. Depending on the findings of this assessment we will recommend whether a program of longer term groundwater monitoring, or additional remedial treatment, is required.

In the event that residual dissolved phase hydrocarbon concentrations do remain in excess of the risk based site specific target levels for the site, a remedial options appraisal and revised remedial strategy will be prepared for the site. Based on our current understanding of site conditions, we consider most likely remedial options would include limited additional treatment of underlying groundwater using either chemical oxidants or oxygen release compounds to enhance natural degradation of dissolved hydrocarbons.

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