

**Petrol Coedpoeth, High Street,
Coedpoeth**

SUBADRA
Environmental - Geotechnical - Laboratory - Foundations

13 Triangle Business Park, Stoke Mandeville, HP22 5BL
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Outline Remedial and Verification Sampling Strategy



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Client: The Co-Operative Group Ltd

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

The site is located on High Street, Coedpoeth and currently comprises a petrol filling station with a small shop. The Cooperative Group Ltd (The Coop) propose to redevelop the existing filling station site and neighbouring residential property for continued use as a petrol station with a larger Coop convenience store.

We completed an environmental investigation at the site during February 2017 that did not identify any significant hydrocarbon impact of underlying soils. Only inconsistent perched groundwater was encountered under the site. We completed a Generic Quantitative Risk Assessment for the site, concluding that the site was suitable for continued commercial use.

Our environmental investigation report was submitted in support of the planning application and reviewed by the Environmental Health Officer at Wrexham County Council. Additional information relating to potential contamination issues was requested in a memo issued by the EHO on the 22nd June 2018 (Ref. HB/P/2018/0463). It was highlighted that our site investigation was limited by the presence of the petroleum installation and further site assessment and/or characterisation of potential contamination was requested. A number of planning conditions were recommended in order to ensure any contamination present be assessed and remedial works completed, if required.

Conditional planning permission for the proposed redevelopment was subsequently granted by Wrexham County Borough on the 5th October 2018 (Planning application ref. P/2018/0463). Condition 7 related to contamination issues and required the completion of a phased site investigation, risk assessment, remedial strategy to address any contamination and a verification plan, providing details of the data to be collected to demonstrate the remedial works have been completed.

The purpose of this document is to set out our proposed outline remedial strategy for the site and methodology for the verification sampling to be undertaken during the redevelopment to allow us to completed our assessment of any contamination present as a result of the past filling station use. This is designed to provide additional detail regarding the verification process to be completed during the works and address the requirements of Condition 7.

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.

1.2 Previous Reports Relating to the Site

As part of our environmental assessment 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	Environmental Assessment Report	Subadra Consulting Ltd	The Cooperative Group Ltd	March 2017	CP17129 CL 001
Ref.2	Coal Mining Risk Assessment			August 2018	CP17129 CL 003
Ref. 3	Additional Site Investigation Completion Report			March 2019	CP17129 CL 004

Our summary review of these documents is provided in Table Two overleaf and we have used information from these documents, where relevant, in other sections of this report.

Table One: Previous Environmental Reports Relating to the Site

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Our Ref.	Summary of Results and Conclusions of Previous Works
Ref.1	This report details the findings of an environmental site assessment we completed for the site during February 2017. This comprises a desk based review of the sites environmental sensitivity and history and an intrusive investigation comprising the construction of five boreholes to a maximum depth of 7.2m, analysis of soil and groundwater samples and completion of a Generic Quantitative Risk Assessment. Our environmental assessment concluded: ➤ The site is located in an area of low to moderate environmental sensitivity with respect to underlying groundwater and nearby surface water receptors. The underlying geology comprises Glacial Till (Unproductive Strata) overlying Lower Pennine Coal Measures unit (Secondary A Aquifer). There is River Clywedog ~230m to the south west. There are residential properties to the immediate south, east and west. ➤ The site has been used as a petrol station and/or garage since at least the early 1960s and possibly from as early as the 1930s. We understand that the site was last redeveloped during 1988, although the current tanks may pre-date this development. ➤ We proved the underlying geology to comprise a layer of Made Ground material to a maximum depth of 1.3m, generally overlying a thin layer of stiff grey brown mottled clay with frequent fine gravel that we interpreted to comprise Glacial Till. Underlying the Till we recorded more friable clay or highly weathered grey brown mudstone with occasional coal fragments and/or thin coal layers, encountered at various depths, that we interpreted as units of the Lower Pennine Coal Measures. This was proved to a maximum depth of 7.2m. ➤ We encountered groundwater in three of our boreholes at variable depths, ranging between 1.8m and 4.0m. Two boreholes were dry on completion. Resting groundwater levels were recorded between 2.7m and 5.9m depths. We considered the groundwater encountered to comprise water perched within more sandy or gravelly horizons in the underlying clay, with no continuous groundwater table under the site at shallow depths. ➤ We identified low concentrations of petrol range hydrocarbons in shallow Made Ground and underlying shallow soils in BH3. No detectable hydrocarbons were identified in deeper soil samples from BH3, however. Low concentrations of waste oil range hydrocarbons were identified in a single soil sample from BH4. Elevated concentrations of lead were identified in samples of shallow Made Ground. We did not detect asbestos fibres in any of the shallow soil (predominantly Made Ground) samples that were screened. ➤ Concentrations of hydrocarbons, consistent with waste oil and possibly weathered diesel, were identified in the groundwater sample collected from BH4. No detectable hydrocarbons were identified in the other groundwater samples obtained (BH5 and MW1). ➤ The results of our Generic Quantitative Risk Assessment indicated that the concentrations of hydrocarbons identified in underlying soils and groundwater did not pose a potential long-term risk to future commercial site users and no active migration pathway from the site, to environmental receptors, was identified. We concluded the site is suitable for on-going commercial use.
Ref.2	This report comprises a Coal Mining Risk Assessment, comprising a desk-based review of all available information on the coal mining issues which are relevant to the site. This was designed to assess potential risks posed to the redevelopment.
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Our Ref.	Summary of Results and Conclusions of Previous Works
Ref.2	We reviewed a Non-Residential Coal Mining Report for the site, sourced from The Coal Authority (Ref. 51001373122001). The Coal Authority does not consider the site to be in a surface area at risk from underground past or present mining activity, however the property is in an area where coal could be at or close to the surface. This coal may have been worked at some time in the past. The site does not lie within a defined 'development high risk area' and there are no historical mine shafts within 20m of the site boundary. There have not been any claims made to the Coal Authority relating to mining related ground subsidence. We reviewed historical maps for the site location and borehole archives held by the British Geological Survey (BGS). There are a number of mining shafts located to the north, north west and south of the site. The closest of these is located ~150m to the north. The BGS archive does not hold any detailed logs for these shafts. The available evidence indicated that the shallowest coal seam is likely to be between 9m and 13m depth. There is no evidence of this coal seam having ever been worked, however the Coal Authority noted that their records are not comprehensive. The shallowest coal seam is shown overlain by layers of clay, sandstone and mudstone. The deepest borehole drilled on the site (Ref.1) extended to 7.2m and confirmed the shallow geology to comprise stiff clay to 4.0m overlying mudstone to the base of the borehole. The site has been a garage/filling station since 1964, and possibly since 1938. The surrounding area has been extensively developed with residential housing since at least 1964. We are not aware of any subsidence having taken place at or near the site. Based on the depth to the shallowest coal seam, the nature of the overlying soil/rock (clay / weathered mudstone recorded to at least 7.2m under the site) and the site's history, we considered the risk of unrecorded former mine workings affecting the proposed development to be negligible.
Ref. 3	This report details the findings of additional site investigation work that we completed at the site in order to support of the discharge of Condition 9 of the planning permission granted for the redevelopment. This was requested by the Coal Authority and required additional assessment of deeper ground conditions in order to establish 'potential risks posed the development by past coal mining activity'. We completed additional site investigation work under a Coal Authority 'Permit to Enter or Disturb Coal Authority Mining Interests' (Permit Ref. 17185) during March 2019. Two additional boreholes (BH101 and BH102) were constructed to ~20m depths. In summary: ➤ We confirmed the underlying geology at the site location to comprise a thin layer of Made Ground, overlying a variable thickness of Glacial Till and then Lower Pennine Coal Measures. Coal seams were encountered in both of the boreholes we constructed. ➤ BH101 was constructed in the southern corner of the site. We encountered Glacial Till (clay) to 2.8m depths, and then a thin layer of coal from 2.8m to 3.6m depths. This shallow coal could form part of the Glacial Till deposits and not be consistent across the site (not recorded in our BH5, constructed in 2017 to the immediate south west). The underlying geology then comprised Lower Pennine Coal Measures, consisting of weathered mudstone to borehole termination depth of 20.3m, with coal seams encountered 5.6 - 6.3m and 16 - 17.3m depths. Resting groundwater was recorded at ~17m depths.
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Our Ref.	Summary of Results and Conclusions of Previous Works
Ref. 3 (cont)	➤ BH102 was constructed in the north western corner of the site, in the front garden of the adjacent residential property and location of the proposed new shop building. Here we encountered Glacial Till (clay) to 7.6m depths. We then encountered the Lower Pennine Coal Measures, comprising weathered mudstone with coal seams recorded 9.1 - 10.4m and 17 - 19.70m depths. Resting groundwater was recorded at 8.37m depth. ➤ We did not record any detectable concentrations of hazardous ground gases during the construction of either of our deep boreholes. We understand that the new shop building will be constructed with a gas impermeable membrane / vented floor slab, which will break any potential pathway for hazardous ground gas migration into the new building and mitigate any potential risk to future site workers. ➤ We have not encountered any evidence of historic coal mining activity under the site. On the basis of our site investigation data we considered the conclusions of our previous coal mining risk assessment to remain valid. We concluded that the proposed development was not at risk from coal mining activities. The Coal Authority confirmed their acceptance of the conclusions of our site investigation works during May 2019. We understand that Condition 9 has been discharged.

Table Two: Review of Previous Environmental Works at the Site

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2 Remedial Strategy - Scope of Proposed Remedial Works

2.1 Remedial Objectives

Our remedial objectives are as follows:

Action	Key Objective
Removal of Contaminant Source	To mitigate future risk of contamination to shallow soils by removing the existing below ground petroleum infrastructure and any associated significantly hydrocarbon impacted soils.
Verification Soil Sampling	To complete additional soil sampling during the removal of the petroleum infrastructure to verify no previously unidentified hydrocarbon contamination is present surrounding the existing below ground petroleum infrastructure.
Contingency Procedures	If additional contamination is encountered, to carry out the necessary risk assessment and, if necessary, revisions to our Remedial Strategy, such that all human and controlled water receptors are appropriately protected against significant impact.
Implementation and verification of Engineering Controls	To ensure that appropriate engineering controls are implemented (and verified) as part of the development to ensure that the risks posed to future site users from any residual hydrocarbons in shallow soils are mitigated.
Preparation of a Verification Report	To provide a verification report that contains sufficient verification data to demonstrate all risks to humans and controlled waters have been effectively managed, and hence, to permit the discharge of planning conditions relating to ground contamination.

Table Four: Review of Remedial Objectives

Further details of our proposed remedial strategy is provided below.

2.1.1 Removal of Contaminant Source

Item	Details
Decommissioning of the Former Petroleum Infrastructure	To be carried out by specialists contractor in accordance with in accordance with guidelines set out in the Association for Petroleum and Explosives Administration (APEA) and the Service Station Panel of the Energy Institute (EI) "Design, Construction, Modification, Maintenance and Decommissioning of Filling Stations" 4th Edition, April 2018. Useful information can also be found within the Environment Agency Pollution Prevention Guidance PPG23 "Installation, Decommissioning and Removal of Underground Storage Tanks" (Note: although this has formally been withdrawn, digital copies can be found in The National Archives).

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Item	Details
Removal of Former Petroleum Infrastructure	The proposed redevelopment includes the excavation and removal of the existing fuel tanks and installation of two new double skin steel (with interstitial monitoring), below ground, 55,000litre fuel tanks under the southern corner of the main forecourt, replacement of the fuel supply lines, pump islands and forecourt hard standing. The forecourt drainage will be upgraded and a new Class 1 forecourt interceptor installed. We consider the proposed replacement of the petroleum installation at the site will result in the removal of the primary potential historical contaminant source from the site. Decommissioning the existing petroleum installation will include: ➤ Excavation and removal of five known underground fuel tanks located under the southern boundary of the current forecourt; ➤ Excavation and removal of underground fuel supply lines; and, ➤ Excavation and removal of existing surface water gullies and forecourt interceptor.
Removal of Historical / Abandoned Petroleum Infrastructure	The site has been used as a petrol station and/or garage since at least the early 1960s and possibly from as early as the 1930s. We understand that the site was last redeveloped during 1988, although the current tanks may pre-date this development. As with any long standing petrol station site, we consider it possible that abandoned tanks could be encountered under the forecourt during the redevelopment works. We recommend that any former petroleum infrastructure encountered at the site be excavated and removed during the site decommissioning. It is our understanding that, unless unsafe to do so, any former tanks will be excavated and we will undertake verification sampling of surrounding soils.
Excavation of Impacted Soils / 'Hot Spots'	We have not previously identified any areas of hydrocarbon contamination that specifically requires remedial excavation. However, if the results of our verification soil sampling (see Section Three) indicate grossly impacted soils are present, then these should, where practicable, be excavated and/or removed from site. If it is not possible to remove the soils (e.g. Due to excessive depth and/or proximity to existing structures), other remedial options may need to be employed.
Removal of free-phase Hydrocarbons	No requirement identified or anticipated.

Table Five: Removal of Contaminant Source

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2.1.2 Engineering Control Measures

Item	Details
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. As a precautionary measure we recommend that water supply pipework be constructed from a hydrocarbon impervious material (e.g. ductile steel or plastic/aluminium composite) and installed within clean fill material as precautionary measure and to protect from possible future impact.
Prevention of gas / vapour infiltration to buildings	We understand that the design of the new shop building includes installation of a hydrocarbon impermeable membrane in the floor slab as a standard feature. Whilst the results of our site investigation works indicate no direct risk of impact is posed by either hydrocarbon or natural ground gases, this conservative measure will ensure no potential risk can be posed to future site workers.

Table Six: Engineering Controls

2.1.3 Unforeseen Contamination

We have not identified any significant or widespread impact of underlying soils and/or groundwater under the site during the two phases of site investigation completed to date (Ref. 1 / 3). No additional site investigation is proposed *prior* to the commencement of works.

The proposed verification sampling works will allow additional assessment of underlying soil conditions at the site and result in a more detailed characterisation of soils from all areas of the site, including those areas we have been unable to access for sampling to date. At this stage, no remedial excavation of soils is anticipated, although this will be confirmed following our verification sampling works.

As with any petrol filling station additional areas of hydrocarbon impacted soil may be encountered during redevelopment works. In particular these include areas we have been unable to investigate due to the restrictions of investigation an operation filling station (i.e. site buildings, petroleum installation and services).

In addition to the completion of our verification soil sampling, we therefore recommend that a discovery strategy/watching brief be implemented for any unforeseen be established at the site during the excavation of foundations for new buildings and trenches for new services.

Due to the site's historical use as a retail filling station we also recommend that the contractor is made aware of the potential for there to be historical/abandoned below ground fuel tanks.

If any potential contamination (staining, odours etc) of underlying soils and/or groundwater are identified (or even suspected), we should be notified and verification sampling completed.

The results of this verification can then be used to revise our conceptual site model and complete a suitable risk assessment to determine what further action, if any, is required.

Table Seven: Unforeseen Contamination

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2.2 Construction Issues

Item	Details
Protection of construction workers	Construction and maintenance workers, particularly those working on below ground utilities, should be made aware of the potential for hydrocarbons to be encountered in soil. Strict hygiene practices should be followed during any below ground works. To minimise potential exposure of workers to potential hydrocarbon contaminants, site clothing should be removed after each working period. A clean area should be made available with washing facilities for use after each shift. Changing and washing areas should be positioned to ensure that no field equipment enters the clean area. Eating, drinking and smoking should be restricted to the clean area.
Waste classification	We recommend that we classify all potentially impacted soils prior to disposal. All waste soils and fill materials must be disposed of at an appropriately licensed disposal site. A registered waste haulage contractor must transport all waste soils. It is the responsibility of the site owner to ensure that wastes are safely transported and disposed of correctly.
Potentially Polluting Operations During Construction	The use of plant equipment on site during construction can result in the accidental release of contaminants to ground, such as fuels, oils, coolants and lubricants. To avoid such incidents all construction machines should be maintained to a safe and efficient working condition at all times and any oils or fuels stored should be contained in accordance with The Control of Pollution (Oil Storage) Regulations 2001. We understand that an Environmental Site Management Plan has been submitted to the Local Planning Authority by the Principal Contractor for the site, Williams Southern. This has been accepted.

Table Eight: Additional Considerations

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3 Proposed Verification Sampling Methodology

3.1 Verification of Soil Quality

We have been commissioned by Coop 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 (tanks and fuel lines) are removed.

The purpose of the sampling is to verify the quality soil in these areas and confirm contamination is not present. This information is intended to augment the existing environmental data that we obtained as part of our pre-commencement borehole investigation. A summary of the proposed soil sampling is provided below.

Item	Details		
Verification Sampling Remit and Procedure	Soil samples to be collected from ground surrounding / beneath existing:	Old / new Fuel tank excavations	Yes
		Fuel pumps / lines	Yes
		Forecourt interceptor	Yes
	Additional sampling required?	In the event of historical petroleum infrastructure / abandoned tanks being encountered.	
		Construction of trial pits and further sampling of shallow soils in the event hydrocarbon impact is identified that requires delineation.	
	A suitably qualified environmental engineer will attend site, generally within 48 hours of notification, to carry out verification sampling. Where possible we will obtain soil samples from sides and bases of all excavations constructed during the removal of the below ground petroleum infrastructure. When requested we will obtain samples of spoil produced during excavation works to assist with waste classification. 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 Sub-contractor). 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. The nature of the geology present at the site may limit sampling, particularly for base of excavation. Where concrete cradles are left <i>in situ</i> or sheet piling is installed for reasons of ground stability it may not be possible to obtain samples. We will record the location of excavations and sampling locations with respect to temporary site benchmarks for all the trial pits and excavations that we sampling during our visit.		
Chemical Analysis Strategy	The majority of soil samples collected will be analysed for the following contaminants of concern in order to better characterise potential contamination issues at the site: ➤ Total petroleum hydrocarbons (banded or speciated); ➤ BTEX compounds.		

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Item	Details
Chemical Analysis Strategy (cont)	Selected samples will also be analysed for a range of compounds to assist with waste classification of soils excavated from the site. These are likely to include Polycyclic Aromatic Hydrocarbons (PAHs), selected metals, asbestos screening and compounds included within the Subadra Waste Acceptance Classification (WAC) suite. All samples will be analysed in suitably accredited laboratories. Where hydrocarbon impacted soil at the base and/or walls of excavations is identified that exceeds our remedial targets we will inform the contractor 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. 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. Where necessary analysis will be carried out on an accelerated basis to minimise 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.
Environmental Risk Assessment	We will compare the results of the chemical analysis with our Generic Acceptance Criteria (GAC), details of which can be found within our Environmental Investigation Report (ref.1).
Repeat Sampling	In the event that contamination is identified that requires removal, the verification sampling process may have to be repeated, depending on the extent of any contamination encountered. Whilst we always try to minimise disruption to the main decommissioning works program, 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.

Table Nine: Verification of Soil Quality

3.2 Contingency Actions

Where hydrocarbon impacted soil at the base and/or walls of excavations is identified that exceeds our screening criteria we will recommend to the client that further works are undertaken, such that all human and controlled water receptors are appropriately protected against significant impact.

In the first instance we will advise the contractor to cease works in the relevant area, until we have completed our re-appraisal of site conditions and made and necessary revisions to our remedial strategy. We will also notify the local planning authority of the presence of the unexpected contamination issues.

In the event that significant unforeseen contamination is encountered, we will contact the Environmental Health Officer at Wrexham County Borough and discuss available options. A site meeting could be requested to discuss the findings of the sampling works and review the situation.

The scope of any additional works will be dictated by the severity, extent and distribution of the identified contamination. However, various possible contingency actions are highlighted in the following table.

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Potential Contamination	Proposed Contingency Action
Hydrocarbon contaminated soils surrounding fuel supply lines	➤ Excavate hydrocarbon impacted soils where concentrations exceed our risk based screening levels (protective of human health). ➤ Construct trial pits and collect additional soil samples for analysis, in order to delineate the lateral and vertical extent of any hydrocarbon impact identified. ➤ Carry out additional soil verification sampling to demonstrate remaining soils are not significantly impacted with hydrocarbons.
Hydrocarbon contaminated soils surrounding fuel tanks	➤ Excavate hydrocarbon impacted soils where practicable. ➤ Where soil excavation is restricted by depth or the presence of other below ground structures (e.g. Neighbouring properties) further investigation, risk assessment and potentially alternative remedial technologies may need to be considered. ➤ If grossly hydrocarbon impacted soils are encountered, at depth, it may be necessary to install monitoring wells, to allow an assessment of groundwater quality.

Table Ten: Contingency Actions

3.3 Verification of Engineering Control Measures

Item	Details
Waste Disposal	A summary of the volume and waste classification of all exported material will be collated and issued. Copies of all waste consignment notes should be made available to the relevant regulators (upon request).
Vapour Barrier Membrane	Verification to comprise details of the specification of membrane used and independent testing certificate (smoke test or similar tracer test) to verify correct installation.
Water Supply Pipeworks	Verification to comprise photos of pipework, ideally <i>in situ</i> , to verify the correct specification has been adhered to.

Table Eleven: Verification of Engineering Controls

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3.4 Potential Additional Responsibilities

Item	Details
Segregating inert from contaminated waste streams	The segregation of contaminated/inert soils on-site can be considered as a 'pre-treatment' of waste and 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.
Verification of Soil Quality	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 may be 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.

Table Twelve: Additional Responsibilities

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3.5 Long Term Verification Monitoring

We have not identified a continuous groundwater table under the site (monitoring data from 2017 and 2019).

During the 2017 works, we encountered groundwater strikes in three of our boreholes at variable depths, ranging between 1.8m and 4.0m. Two boreholes were dry on completion. Resting groundwater levels were recorded between 2.7m and 5.9m depths. During the 2019 investigation works, resting groundwater levels were subsequently recorded in the underlying Lower Pennine Coal Measures at ~17m depths in BH101 (located in the southern corner of the site) and at ~8.37m depths in BH102 (located in the northern end of the site).

We consider the groundwater we encountered to comprise water perched within more sandy or gravelly horizons in the underlying Glacial Till or Lower Pennine Coal Measures units.

No significant hydrocarbon impact of the limited groundwater encountered has been proved and we do not consider the site to pose a potential long-term risk to identified receptors. The proposed redevelopment works will remove potential contamination sources from the site and significantly reduce the potential for hydrocarbon impact in the future.

We do not, therefore, consider long-term verification monitoring to be required at this site. Other than the two permanent monitoring wells proposed to be installed as part of the new tank farm installation, we do not propose to install any additional monitoring wells at the site following the tank replacement works at this stage. Final decisions regarding the requirement for any long-term monitoring will be made once we have verified no unforeseen contamination is present at the site.

3.6 Verification Report

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 exceeded either the relevant proposed remedial targets for the site, or Generic Acceptance Criteria assuming ongoing commercial use and report on any additional site investigation, risk assessment and/or remedial works completed.

The purpose of the verification report is to provide sufficient data to demonstrate all risks to humans and controlled waters have been effectively managed, and hence, to permit the discharge of planning conditions relating to ground contamination. We aim to issue our report within four weeks of the completion of our final site visit.

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Petrol Coedpoeth, Coedpoeth

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**ATTACHMENT ONE:
NOTICE TO INTERESTED PARTIES**

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NOTICE TO INTERESTED PARTIES

The purpose of our site assessment is to provide general information on the environmental and/or geotechnical conditions existing at the site and related to soil and/or groundwater. The Client or others specified the scope of the investigation and the validity of our conclusions is limited by the scope of work specified. We are not responsible for any such limitations or omissions.

Where stated in this report, we have used information supplied by third parties. While we have evaluated as far as possible the validity of this information, we cannot guarantee its accuracy in any way whatsoever.

No investigation technique is capable of completely identifying all of the contaminants that might be present in the soil or groundwater under a site. Where specified in our report, we have examined the ground by constructing a number of boreholes and/or trial pits. We recovered samples of soil and/or groundwater from available exposures.

The depth and spacing of our Sampling locations were selected to ensure with a reasonable probability that they would be representative of the actual conditions across the whole site. However, safety considerations relating to existing site infrastructure may have restricted our ability to investigate all potential contaminant sources. Specifically, we were unable to investigate the soil and groundwater condition immediately adjacent to the underground structures and/or buried services. These limitations must be borne in mind when considering the conclusions reached in this report.

Soil is intrinsically variable and the spread of contaminants within the soil is therefore subject to a degree of non-uniformity. For these reasons no sampling technique can completely eliminate the possibility of obtaining samples that are not representative of the actual conditions. Our sampling techniques are intended to reduce the possibility to an acceptable level, within the limits imposed by the scope of the investigation.

Groundwater levels and soil vapour levels that we report were accurate at the time of the investigation. Groundwater and soil vapour levels are variable. Long term monitoring may be required to ensure that the levels recorded during our investigation are representative of long term and possible 'worst case' conditions. In accepting our recommendations and/or conclusions the Client acknowledges that further, more detailed investigation would allow a more accurate assessment of site conditions to be made and that this would reduce any consequential risk to the Client.

This investigation was carried out to assess the significance of contamination resulting from use of the site as identified in this report. Unless we have indicated otherwise, no assessment of the potential impact of any other previous uses has been made. No investigation was carried out to determine whether or not any deleterious or hazardous materials (such as asbestos) have been used in the construction of the buildings present on the site. Unless otherwise stated no investigation or assessment has been made of the presence or otherwise of invasive plant species including but not limited to Japanese Knotweed.

We do not accept any responsibility for the cost of remedial works or other costs incurred in whatever way whatsoever as a result of any omissions, errors or other shortcomings in this report unless we have been given reasonable opportunity to verify ourselves that such faults exist and we have been given a reasonable opportunity to carry out works to remedy such faults ourselves using the most practicable means available to us. We do not accept liability for any consequential losses incurred by you while either we or others carry out any remedial works we deem necessary.

This report has been prepared for the Client, as specified on the cover page of this report. In accepting our recommendations and/or conclusions the Client accepts that the terms of our appointment were as detailed in the Proposal, or Proposals, that we provided to the Client before being appointed and that these terms supersede any other terms and/or conditions set out in any contracts agreed between ourselves and the Client, regardless of when such terms and/or conditions were agreed and/or signed.

Use of, and reliance on, this report by other third parties will be at such third parties own risk, and we are unable to accept any liability or responsibility to third parties.

Neither the whole nor any part of this report, or any reference to it, may be included in any published document circular or statement or published in any way without our prior written approval.

This report and its contents, together with any supporting correspondence or other documentation, remain the property of Subadra Consulting Limited until paid for in full.

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