

LAINDON SERVICE STATION

Remedial Method Statement and Sampling & Analysis Plan

Prepared for: Motor Fuel Group Ltd



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1.0 Introduction

1.1 Appointment

SLR Consulting Limited (SLR) was commissioned by Motor Fuel Group (MFG) to produce a Remedial Method Statement and Sampling and Analysis Plan (RMSSAP) for Laindon Service Station, Southend Arterial Road, Basildon, Essex, SS15 6DP (the site) in connection with a proposed redevelopment. The site location is shown on Drawing 1.

Re-development proposals for the site comprise the demolition of the existing forecourt, canopy and shop building. A new shop building, four new pump islands and new canopy are to be constructed. The existing fuel tanks are to be retained but the tank vents and offset tank fills will be relocated. The disused car wash interceptor (in the southwest of the site) will be removed. A new vacuum/air and water bay will also be constructed, as well as two EV charging bays and additional car parking. A proposed development drawing is included at Appendix 01.

1.2 Objectives

SLR has been provided with a copy of Basildon Borough Council planning decision notice 21/01744/VAR which grants planning permission for the proposed redevelopment scheme subject to a number of planning conditions pertaining to contaminated land which are reproduced below:

3. Land Contamination (Site Investigation): If identified as being required following the completion of the desk-top, a site investigation shall be carried out prior to commencement of development to fully and effectively characterise the nature and extent of any land contamination and/or pollution of controlled waters. It shall specifically include a risk assessment that adopts the Source-Pathway-Receptor principle, in order that any potential risks are adequately assessed, taking into account the sites existing status and proposed new use. Two copies of the site investigation and findings shall be forwarded to the LPA without delay, upon completion.

4. Land Contamination (Submission of Remediation Scheme): A written method statement detailing the remediation requirements for land contamination and/or pollution of controlled waters affecting the site, shall be submitted to and approved in writing by the Local Planning Authority prior to commencement of development and all requirements shall be implemented and completed to the satisfaction of the Local Planning Authority. No deviation shall be made from this scheme without the express written agreement of the Local Planning Authority. If during redevelopment contamination not previously considered is identified, then the Local Planning Authority shall be notified immediately and no further work shall be carried out until a method statement detailing a scheme for dealing with the suspected contamination has been submitted to and approved in writing with the Local Planning Authority.

5. Land Contamination (Implementation of Approved Remediation Scheme): Following completion of measures identified in the remediation scheme, two copies of a full closure report shall be submitted to and approved in writing by the Local Planning Authority. The report shall provide verification that the required works regarding contamination have been carried out in accordance with the approved Method Statement(s). Post remediation sampling and monitoring results shall be included in the closure report to demonstrate that the required remediation has been fully met. The closure report shall include a completed certificate, signed by the developer, confirming that the required works regarding contamination have been carried out in accordance with the approved written method statement. A sample of the certificate to be completed is available in Appendix 2 of Land Affected by Contamination: Technical Guidance for Applicants and Developers.

A Phase One environmental assessment prepared by SLR in February 2022¹ (the findings of which are discussed in Sections 2.0 and 3.0 of this report) identified potentially complete contaminant linkages and concluded that further assessment is required to characterise the environmental condition of the underlying soils and groundwater.

The Remedial Method Statement (RMS) detailed herein has therefore been prepared to provide a strategy for further investigation and assessment during site clearance as well as providing assessment procedures for any encountered hydrocarbon impacted soils and the associated measures required if unacceptable impact is identified. The RMS also includes details of validation works required to confirm that, post development, no residual risks to human health or controlled waters remain. This document is thus designed to address conditions 3 and 4 of planning decision notice 21/01744/VAR. A validation/closure report will be prepared, post implementation of the RMS, to address condition 5.

1.3 Scope of Work

SLR's scope of work is outlined below:

- preparation of a remedial method statement identifying soil and groundwater validation thresholds and soil field screening criteria;
- preparation of a plan setting out infrastructure excavation requirements and areas of proposed validation sample collection and analysis during the development groundworks; and
- establishing a sampling and analysis plan for all imported fill materials.

¹ Laindon Service Station, Phase One Environmental Assessment, prepared for Motor Fuel Group Ltd by SLR Consulting Ltd, SLR ref. 427.02082.00272, February 2022

2.0 Environmental Setting

2.1 Site Details

Table 2-1 provides a summary of the site details, location and environmental setting from the Phase One Environmental Assessment:

Table 2-1: Site Details

Detail	Description	
Location	The site is located at the following address: Laindon Service Station, Southend Arterial Road, Basildon, Essex, SS15 6DT National Grid Reference 567813, 190035 (Drawing 01).	
Site Description and Use	SLR undertook a site walkover on 10 th February 2022. The site is an operational petrol filling station with six pump islands located centrally. The shop is located in the west of the site with the six operational underground storage tanks located in the east and northeast of the site. A three-stage oil/water interceptor is located in the northeast, located at the site's ingress. A second three-stage oil/water interceptor is located in the southwest of the site, behind the shop, which was previously associated with the now removed car wash.	
Drainage	Site drainage is via gullies and channel drains located at the offset fill point, in the southwest of the site and at the site ingress and egress. These drain into the forecourt interceptor located in the northeast of the site and also into the car wash interceptor in the southwest, both appear to discharge to the main sewer located in the Southend Arterial Road (A127).	
Surrounding Land Use	North	Directly north is the A127 dual carriageway with residential properties beyond. A car hire business is located approximately 45m to the northwest and is located on a former petrol filling station site.
	East	A car sales and repair business is immediately adjacent to the site with commercial and industrial land beyond.
	South	Commercial and industrial land with residential properties approximately 200m from the site.
	West	Commercial and industrial land with residential properties approximately 250m from the site.
Geography and Hydrology	Topography and gradient	The general topographic setting of the site is relatively flat and level, falling slightly towards the east at a gradient of 0.02 (2%).
	Elevation	Approximately 33m above Ordnance Datum.
	Surface waters	There are 18 records of surface water features located within 500m of the site. The closest of which is located 240m to the east, where it is culverted beneath the A127. This surface water feature is a tributary of the River Crouch, which is located approximately 1km to the northeast.
	Surface water abstractions	There are no active surface water abstractions recorded within 2km of the site. Two historical abstractions are recorded, approximately 1,140m to the northwest and 1,250m to the northeast.

Detail	Description	
Published Geology and Hydrogeology	Superficial drift geology	Head Deposits - clay, silt, sand and gravel.
	Solid geology	London Clay Formation – clay.
	Aquifer Status	The superficial deposits are classed as a secondary undifferentiated aquifer – assigned where it is not possible to attribute either a secondary A or secondary B classification to a rock type. The solid geology is classed as an unproductive strata.
	Groundwater abstractions	There are no groundwater abstractions located within 2km of the site.
	Source protection zones (SPZ)	The site is not located within a groundwater source protection (SPZ).

2.2 Fuel Infrastructure Details

Information obtained during the site walkover, from previous assessment work at the site and from a report obtained from the local Petroleum Licensing Authority (Essex County Council) in February 2022 is combined in Table 2-2. The locations of the various tanks are shown on Drawing 02.

Table 2-2: Tank Summary

Tank No	Capacity (litres)	Contents	Construction	Age of Installation
1	22,020	Supreme Unleaded Petrol	Double skin steel	1987
2	22,022	Diesel	Double skin steel	1987
3	17,450	Supreme Diesel	Double skin steel	1987
4	26,380	Diesel	Double skin steel	1987
5	44,030	Unleaded Petrol	Double skin steel	1987
6	27,200	Diesel	Single skin steel	1979

Fairbanks Environmental Ltd operate the site’s wet stock management and use a real time continuous wet stock and leak detection statistical inventory reconciliation (SIR) system accredited to 9 litres per day. Fairbanks has confirmed that they have been monitoring the site since August 2008 on behalf of MFG. During this period, they have not recorded any evidence of a release of product to the ground.

3.0 Previous Assessment Work

Reports for previous phases of assessment of the site are listed at Table 3-1 and summarised below.

Table 3-1: Previous Site Assessments

Ref	Date	Document Title and Author
1	February 2018	SLR Consulting Ltd: Environmental Site Assessment Report SLR Ref: 416.06307.00019
2	February 2022	SLR Consulting Ltd: Phase One Environmental Assessment SLR Ref: 427.02082.00272

The key findings from both assessments are summarised below.

SLR undertook an Environmental Site Assessment (ESA) in February 2018 to support planning application 18/01684/Full. The proposed development involved:

- Demolition of all above ground infrastructure.
- Removal of current and historic below ground fuel storage and dispensing infrastructure.
- Installation of new underground fuel tanks.
- New petrol forecourt with new canopy.
- New fuel distribution pipework and pumps.
- Installation of a new shop and above ground facilities.

The report produced a preliminary conceptual model of potential risks to human and environmental receptors and aimed to establish whether there is evidence of significant subsurface contamination. The Conceptual Model and Preliminary Risk Assessment concluded that the site has a recent history of potentially contaminative activities and therefore underlying hydrocarbon impact may be present. Due to the absence of previous intrusive investigations the report considered there to be a possible risk to human health and controlled waters and recommended further assessment was needed.

The report concluded that the planned development works would provide environmental betterment of the site by assessing the current infrastructure and the replacement of the current fuel infrastructure. The works would also allow for the assessment and if necessary, any remediation of impacted soils that posed an unacceptable risk to human health or controlled water receptors. The report stated that works should be undertaken in accordance with an agreed engineering plan and method statements that ensure:

- Betterment is achieved by removing all redundant historic infrastructure; and
- Validation samples are recovered from decommissioning excavations to provide a baseline of current site conditions and a completion report is prepared that presents the validation test results.

The most recent phase of works carried out at the site was by SLR in February 2022, was to support planning application 21/01744/VAR and comprised the following:

- Phase One (desk study) environmental assessment (Preliminary Land Quality Risk Assessment);
- review of geological and hydrogeological data for the site;
- analysis of historical maps to establish the history of the site as well as past on and off site potentially contaminative activities;
- collection and analysis of environmental data and proprietary database; and
- development of a site conceptual model and recommendations for further works, as necessary.

This report provided information about the environmental condition of the site, including the site history, current uses, geology, hydrogeology and hydrology. The information was used to create a Conceptual Site Model to assess the potential contaminant sources, pathways and receptors associated with the site.

The report concluded that the historic and current uses of the site and its surroundings indicate that contamination could potentially be present beneath the site. In the absence of any previous intrusive investigations the risk to human health and controlled water was considered possible. SLR recommended that further assessment is required to characterise the environmental condition of the underlying soils and groundwater.

The planned redevelopment of the site provides an opportunity for this assessment and also allows for the remediation, if necessary, of any impacted soils and groundwater that are identified during the works that pose an unacceptable risk to human health or controlled water receptors.

4.0 Enabling Works

4.1 Site Demolition and Clearance

No previous intrusive investigations assessments have been carried out on-site and therefore no information with regards to soil and groundwater quality beneath the site are held.

The proposed development work includes the demolition and clearance of the existing shop building, canopy, fuel pumps and islands, tank vents and offset tank fills. The now defunct carwash drainage interceptor will also be removed.

The planned development provides the opportunity to inspect and sample the shallow soils beneath the site during the clearance phase.

In line with common petroleum industry practice, the demolition, clearance and construction works will be conducted as a single rolling development program, with construction of the new development occurring immediately following the demolition and clearance phase.

Given the above approach, the development present a limited window of opportunity of approximately four to six weeks, to undertake any remediation of shallow soil impact (via source excavation and removal) during the groundworks. Therefore, the implementation of any required remediation must take place at the same time as the further characterisation works.

This document therefore sets out a remedial strategy, implementation and sampling plan in order to enable any necessary remediation to take place within the planned development program.

4.2 Definition of Expected and Unexpected Contamination

The following measures are to be implemented during the demolition and redevelopment works to address expected impact and what would constitute unexpected impact. This approach has been devised to ensure the redevelopment achieves environmental betterment.

4.2.1 Expected Contamination

Based on typical petrol filling station site usage it is anticipated that areas of hydrocarbon impact may be encountered in soils adjacent to fuel and drainage infrastructure during the development groundwork. Therefore, this impact would not be regarded as coming under the definition of 'unexpected contamination'.

For clarification, contaminants of concern that are expected to be encountered during development groundwork include:

- petroleum hydrocarbons (petrol, diesel, lubrication/waste oil sources);
- volatile organic compounds (VOCs), BTEX²; and
- MTBE³.

This strategy and remedial method statement have therefore been produced in order to identify measures to address these contaminants of concern during the groundwork.

² Benzene, toluene, ethylbenzene and xylenes

³ Methyl *tert*- butyl ether

4.2.2 Unexpected Contamination

No other contaminant sources have been identified on site. Potential contaminants that are not addressed by this strategy, and therefore would meet the definition of that which is ‘not previously identified’, may include (but are not limited to):

- asbestos and asbestos containing materials;
- buried mixed waste (e.g. domestic / commercial waste);
- buried ash or slag; and
- tar based waste.

5.0 Remediation Method Statement

5.1 Outline Remedial Strategy

Previous assessments carried out by SLR identified the potential for underlying hydrocarbon impact to be present beneath the site.

The redevelopment of the site provides the opportunity to expose and remove any hydrocarbon impacted soils encountered during the works. Therefore, the outline remedial strategy is focussed on achieving “environmental betterment” by removing soils grossly impacted with petroleum hydrocarbons.

A scheme of further investigation and validation sampling together with laboratory testing and reporting will be completed as part of site clearance works in order to implement the above strategy.

Section 6.0 outlines the proposed further assessment, fuel infrastructure removal and soil validation methodology in more detail and Section 7.0 presents a proposed sampling and analysis plan. The strategy outlined in both sections will be reviewed as work proceeds and, where necessary, modified and extended to address changing ground and groundwater conditions.

The works will comprise two main phases:

5.1.1 Trial Pit Investigation and Waste Classification

- 1) Following demolition of above ground structures, a series of trial pits will be advanced beneath the former shop building, beneath the footprint of the proposed new building, beneath the former pump islands, beneath the off-set fill point and beneath the fuel distribution pipework. Soils that exhibit significant hydrocarbon impact will be delineated, and any excavations required to remove soils for offsite disposal will be validated through additional sampling.
- 2) Waste classification sampling and analysis will also be undertaken to characterise soils to be excavated and removed from site for building foundation and any other proposed excavations.

5.1.2 Historical Infrastructure Removal, Soil Source Removal and Validation Works

- 1) During the removal of the decommissioned infrastructure (e.g. pumps, pipework, interceptor etc), any soils exhibiting significant hydrocarbon impact (e.g. soils saturated with fuel), will be locally excavated and stockpiled on site for subsequent classification and offsite disposal under Duty of Care.
- 2) Validation testing comprising sampling of resulting excavation bases and sides for field and laboratory testing will be completed.

The above intrusive investigation and sampling works predominantly make use of planned groundwork and excavations that will be taking place on the site as part of redevelopment activities.

6.0 Remediation & Validation Methodology

6.1 Validation Targets

It is proposed that remedial validation targets for soils and groundwater are based on SLR’s Generic Assessment Criteria for Petrol Filling Stations (PFS GAC) for a medium sensitivity controlled waters receptor. In addition to the individual contaminant thresholds, a generic target value for TPH in soils will also be used to ensure that high residual concentrations of the lower solubility high molecular weight hydrocarbons are not left in situ.

The proposed soil and groundwater remediation targets (laboratory data) are as set out in Table 6-1 below and correspond to the appropriate value from the SLR PFS GAC (included as Appendix 03).

Table 6-1: Proposed Validation Targets

Contaminant	Soil Target (mg/kg)	Validation	Source Ref	Groundwater Target (mg/l)	Source Ref
Benzene	3.6		SLR PFS GAC	0.6	SLR PFS GAC
Toluene	>sat		SLR PFS GAC	380	SLR PFS GAC
Ethyl Benzene	>sat		SLR PFS GAC	>sol	SLR PFS GAC
Total Xylenes	>sat		SLR PFS GAC	>sol	SLR PFS GAC
MTBE	0.2		SLR PFS GAC	0.051	SLR PFS GAC
TPH Aliphatics					
>C5-C6	>sat		SLR PFS GAC	>sol	SLR PFS GAC
>C6-C8	>sat		SLR PFS GAC	>sol	SLR PFS GAC
>C8-C10	>sat		SLR PFS GAC	>sol	SLR PFS GAC
>C10-C12	>sat		SLR PFS GAC	>sol	SLR PFS GAC
>C12-C16	>sat		SLR PFS GAC	>sol	SLR PFS GAC
>C16-C21	>sat		SLR PFS GAC	>sol	SLR PFS GAC
>C21-C35	>sat		SLR PFS GAC	>sol	SLR PFS GAC
TPH Aromatics					
>EC8-EC10	>sat		SLR PFS GAC	>sol	SLR PFS GAC
>EC10-EC12	>sat		SLR PFS GAC	>sol	SLR PFS GAC
>EC12-EC16	>sat		SLR PFS GAC	>sol	SLR PFS GAC
>EC16-EC21	>sat		SLR PFS GAC	>sol	SLR PFS GAC
>EC21-EC35	>sat		SLR PFS GAC	>sol	SLR PFS GAC
Sum of TPH (C5-C35)	2,500		Generic site management limit	No SPH	Generic management site limit (diesel range)

SPH – separate phase hydrocarbons

>sat – soil validation target greater than soil saturation limit, therefore only fuel saturated soils require removal

>sol– groundwater validation target greater than chemical solubility limit, therefore only measurable SPH requires removal

These values should be used to determine the extent of the soil excavations surrounding the historic infrastructure during redevelopment works. Additionally, SLR recommends that all hydrocarbon saturated soils encountered are excavated during redevelopment works.

6.2 Remedial Design & Implementation

The scope of works for the soil remediation comprises the removal and offsite disposal of identified localised sources of hydrocarbon saturated soils. The works will be completed in conjunction with the site clearance and development programme and which SLR understands will comprise the following sequence of work:

- (a) decommissioning all live utilities and fuel pipework to be removed;
- (b) establishing the site work compounds and offices;
- (c) demolition of above ground structures;
- (d) breaking out, and off-site disposal of tarmac and concrete hardstanding across the redevelopment area;
- (e) carrying out the trial pit and waste classification investigation;
- (f) removal of the decommissioned buried fuel supply and drainage infrastructure followed by validation sampling;
- (g) excavation of identified hydrocarbon contaminated soils as specified, followed by controlled stockpiling and off-site removal to a licensed landfill or soil treatment facility; and
- (h) reinstatement of excavations by placement and compaction of the granular imported materials.

The proximity of adjacent structures, services and the public highway may require the implementation of safe standoff distances and/or temporary support works to ensure they are not undermined.

The developer/contractor shall perform the work in accordance with industry standards and inform the necessary authorities of the proposed works.

The validation works shall be supervised and validated by an appropriately experienced specialist Environmental Consultant.

Based on the likely depths of the required excavations and data from nearby British Geological Survey borehole records it is considered unlikely that groundwater management will be required during excavations.

6.3 Remediation Excavations and Validation

The proposed remedial strategy comprises excavation and off-site removal to a licensed landfill or soil treatment facility of any encountered, unacceptably hydrocarbon contaminated soils. Depths of excavation are expected to be on average no more than 1m to 2m bgl, locally extending deeper where necessary. The limits of the excavations will be determined by the extent of impacted soils and the proximity of adjacent structures, services and the public highway.

The initial extent of the excavations will be such as to facilitate removal of redundant infrastructure and enable the proposed development. The excavation works will be monitored on site as works progress by continued validation of the excavation sides and base by visual inspection and on-site screening by an Environmental Consultant. Validation samples will be taken from the sidewalls and base of the excavations at their limits, as outlined in Section 7.0. It is important to note that soil sampling and analysis will be required to validate the completion of any soil removal works.

Assessment of the results will be undertaken upon receipt of the analysis data and the preliminary Conceptual Model and remedial strategy updated where necessary. Recommendations will be made if necessary and any additional remedial requirements incorporated into the remedial works and development design.

Following completion of the works a verification report will be prepared detailing the works undertaken.

6.4 Excavation Backfill

The Contractor will be required to backfill all excavations resulting from the decommissioning operations and any contaminated soil removal with an appropriate clean imported granular material. If material other than virgin quarried material is to be used, the Contractor is required to provide laboratory certificates for such materials to ensure they are fit for use and not contaminated prior to importation to site.

The backfill material should be a well graded granular material such as gravel, sand, crushed gravel, crushed rock, crushed concrete or any combination thereof, as long as the material is free draining and can be suitably compacted and meets with the engineers' specification. This can be derived from virgin quarried material or a commercially supplied recycled aggregate product.

Site derived demolition waste (crushed bricks and concrete) may be reused subject to obtaining a U1 waste exemption certificate in advance of the works.

The depth of the backfill material will vary in accordance with the depth of the excavations.

In the absence of laboratory certificates for imported re-cycled materials, prior to placement such materials will be stockpiled on site for subsequent sampling and confirmatory laboratory analysis according to the suite and schedule set out in section 7.0.

6.4.1 Imported Material – Quality Thresholds

Any recycled aggregate imported to site shall meet the following criteria:

- Inert waste acceptance criteria (WAC) limits (solid suite);
- No visual asbestos containing materials present;
- No asbestos detected (NAD) either by screening or below quantification limits (<0.001%).

Any material recording laboratory results outside of the above specification will be rejected and removed from site, or subject to further sampling and analysis.

6.5 Review and Update of Remedial Design/Strategy

Following completion of the validation sampling works, the remedial design will be reviewed, and any further remedial measures required incorporated into the development design, if required.

Should the Contractor encounter any unexpected contaminants (i.e. not including proven or expected hydrocarbon impact) as identified in Section 4.2, in the absence of the Environmental Consultant's presence on site, work should cease, and the Environmental Consultant's project manager contacted to provide advice and/or attend.

6.6 Waste Disposal

Further assessment and field testing is likely to be required to classify excavated soils for off-site disposal. Excavated material should be segregated into either impacted (potentially Hazardous waste) or non-impacted soils (potentially Non-Hazardous waste). Any contaminated stockpiles need to be covered with, and placed upon, impermeable sheeting, to prevent dust generation and contaminated water run-off, particularly in inclement weather.

The waste classification of impacted material cannot be detailed at this time as it depends on the level of impact recorded during the excavation works.

The Contractor shall confirm the waste material's landfill waste disposal category and any required pre-treatment as the works commence.

6.7 Verification Report

The Environmental Consultant will produce a report detailing the findings of the validation sampling, including any further conclusions and recommendations as a result of the investigation work. Details of any changes to the remedial design and remedial works implemented will be provided.

The report will include the details of the supervision and validation of any further works undertaken during or after construction. This will include any required gas/vapour resistant membrane installation, imported materials certificates and validation reporting requirements. Future validation reports, if any, will include a description of the works carried out, site records, the laboratory results and a photographic record.

The report should be retained by MFG so that, if required, it can be demonstrated that the site has been successfully decommissioned and remediated and is suitable for the proposed use. Copies will be formally submitted to the Local Planning Authority as per conditions 4 and 5 of Basildon Borough Councils planning decision notice 21/01744/VAR.

6.8 Health and Safety

The Client is solely responsible for the implementation of Health and Safety onsite.

The Environmental Consultant will provide their own detailed Health and Safety Plan (HASP) and risk assessments to the Client for the further assessment/remediation works, covering the possibility of working in areas that contain potentially hazardous materials, including contact with materials, potentially and actually containing hydrocarbons.

6.9 Contingency Measures

Should the Contractor encounter material that constitutes unexpected contamination or suspected of hydrocarbon contamination or identify any unidentified below ground tanks or oil filled structures in the absence of the Environmental Consultant's presence onsite, the Environmental Consultant's project manager should be contacted to provide advice and/or attend the site.

7.0 Sampling and Analysis Plan

7.1 Trial Pit Investigation and Waste Classification

Following site demolition and clearance works, a series of trial pits will be advanced across the site to characterise the sites soil quality and to collect samples for waste classification testing.

Table 7-1 below outlines likely sampling locations and analytical test numbers; these will vary depending upon the encountered ground conditions. A plan of the proposed trial pit locations is included as Drawing 02.

Table 7-1: Proposed Trial Pit Sampling Locations

Area of Site	Proposed Sampling Locations	Analytical Testing Numbers
Current and proposed shop footprints	4 trial pits	4x Soil Suite 1 1x Waste Disposal Suite
Off-set fill point	1 trial pit	1x Soil Suite 1
Fuel pumps	5 trial pits	4x Soil Suite 1 1x Waste Disposal Suite
Central forecourt fuel pipework	1 trial pit	1x Soil Suite 1

7.2 Decommissioning Excavation Locations

Following removal of existing fuel and drainage infrastructure, the resulting excavations will be inspected, logged and sampled.

Table 7-2 below outlines likely sampling locations and analytical test numbers; these will vary depending upon the encountered ground conditions. A plan of the proposed sampling locations is included as Drawing 02.

Table 7-2: Proposed Decommissioning Sampling Locations

Area of Site	Proposed Sampling Locations	Analytical Testing Numbers
Redundant Carwash Interceptor	4 sidewall samples, 1 basal sample	5x Soil Suite 1 1x Waste Disposal Suite
Northeast pump island excavation (above Tank 6)	1 basal sample	1 Soil Suite 1
Fuel pipework excavations (above Tanks 2 and 5)	2 x basal samples	2 x Soil Suite 1

7.3 Soil Sampling, Logging and Screening

The trial pits and other excavations will be inspected, logged and photographed on site by an Environmental Consultant and disturbed samples taken from the floor and sidewalls and head space screened for volatile organic compounds (VOCs) using a photo ionisation detector (PID).

The head space screening results together with visual and olfactory observations will be used to determine the limits of the excavations where impacted soil removal is considered necessary.

On-site, SLR will define hydrocarbon contaminated soil requiring removal from site as anything encountered exhibiting **Moderate** impact, as defined by the following:

- headdress reading >150 ppm Total Organic Vapour (TOV) by PID;
- slight discolouration of soil (grey/green staining, fuel sheens);
- hydrocarbon sheen on groundwater, if encountered; and
- hydrocarbon odour noticeable within the excavation.

Field screening test samples will be recovered in an undisturbed condition from the walls and base of the excavations. Wall samples would be recovered at the horizon of the strongest hydrocarbon odours, typically at the depth of the water table (if encountered) and from the base of the excavation.

If no significant visual discolouration or hydrocarbon odours are detected, the soil will be considered to be non-impacted. Table 7-3 summarises the characteristics that would be used to define the degree of soil impact both during the site works and in the follow up verification report.

Table 7-3: Soil Impact Characteristics

Definition Of Impacted Soil Used During Decommissioning			
	Light	Moderate	Heavy
Criteria	Remain in situ/confirm with lab duplicate	Dispose Off-Site	Dispose Off-Site
Visual	None	Grey/green	Black discolouration, fuel globules
Olfactory	Detected in hand	Noticeable in excavation	Distinct / Strong
Field Tests(PID)	<50ppm	50-150ppm	>250ppm

The Environmental Consultant will be responsible for identifying the contaminated soils to be dealt with by the Contractor.

Selected duplicate validation soil samples will be collected from the floor and sidewalls of each excavation (typically a minimum of 5 per excavation, i.e. 1 per face) at its final limits for environmental laboratory analysis and based upon the following criteria:

- exhibits high headspace screening values;
- visual or olfactory evidence of significant impact; and
- representative of different depths or lithology.

The actual number and distribution of soil samples to be submitted for chemical analysis should be based upon the ground conditions encountered, site observations and field screening results.

7.4 Groundwater Validation

No monitoring wells are present on site and significant groundwater seepage is not anticipated to be encountered within the likely shallow depths of excavations.

7.5 Waste Sampling

A minimum of three representative samples will be collected per waste stockpile for field screening, with selected duplicates retained for laboratory analysis for the Waste Disposal Suite at a ratio (samples per 1,000m³) to be advised by the Contractor.

7.6 Chemical Analysis Suites

Soil samples will be scheduled for the analysis suites outlined in Table 7-4.

Table 7-4: Proposed Analysis Suites

Suite Contents	Analytical Suite
Total petroleum hydrocarbons (TPHCWG)	Soil Suite 1
BTEX compounds (benzene, toluene, ethylbenzene, xylene)	
MTBE	
Total Petroleum Hydrocarbons (TPHCWG), BTEX and MTBE	Waste Disposal Suite
Heavy Metals	
Asbestos Screen	
Waste Acceptance Criteria	
Total Petroleum Hydrocarbons (TPHCWG), BTEX and MTBE	Imported Fill Suite
Waste Acceptance Criteria (solid suite only)	
Asbestos Screen (and quantification if required)	

7.7 Longer Term Monitoring & Maintenance

The works completed to date have not identified significant or widespread hydrocarbon contamination on site. A soil validation sampling plan has been proposed to enable verification of the site demolition and infrastructure clearance groundwork.

Provided the validation sampling does not identify any unexpected contamination, a scheme of longer-term monitoring or maintenance is not considered to be required and has therefore not been proposed.

In the event of any unexpected contamination being encountered during site clearance, consideration of the need for longer term monitoring or maintenance will be made and agreed with MFG at the time.

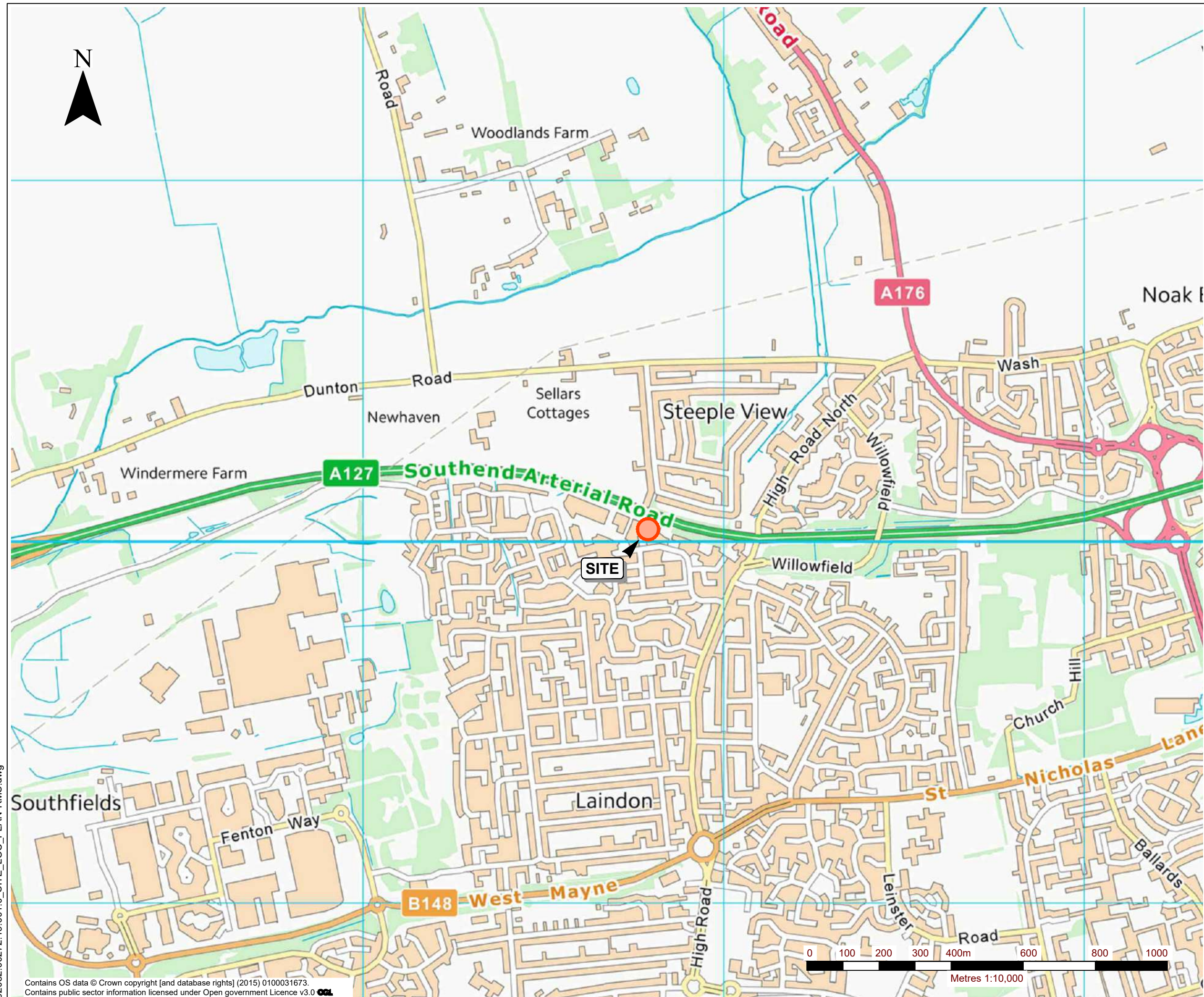
Steps will be taken to retain the existing monitoring wells for future use.

7.8 Quality Assurance

All soil samples will be stored in cool boxes (with ice packs) and transported by courier under chain of custody to an independent UKAS and MCERTS accredited laboratory.

The Environmental Consultant responsible for the above work should be suitably experienced in undertaking such work and operate under an externally accredited quality assurance scheme (i.e. ISO9001).

DRAWINGS



NOTES

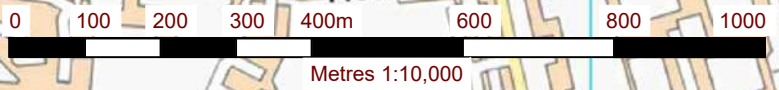


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LANDON SERVICE STATION
 REMEDIAL METHOD STATEMENT
 AND SAMPLING ANALYSIS PLAN
 SITE LOCATION PLAN

DRAWING 01

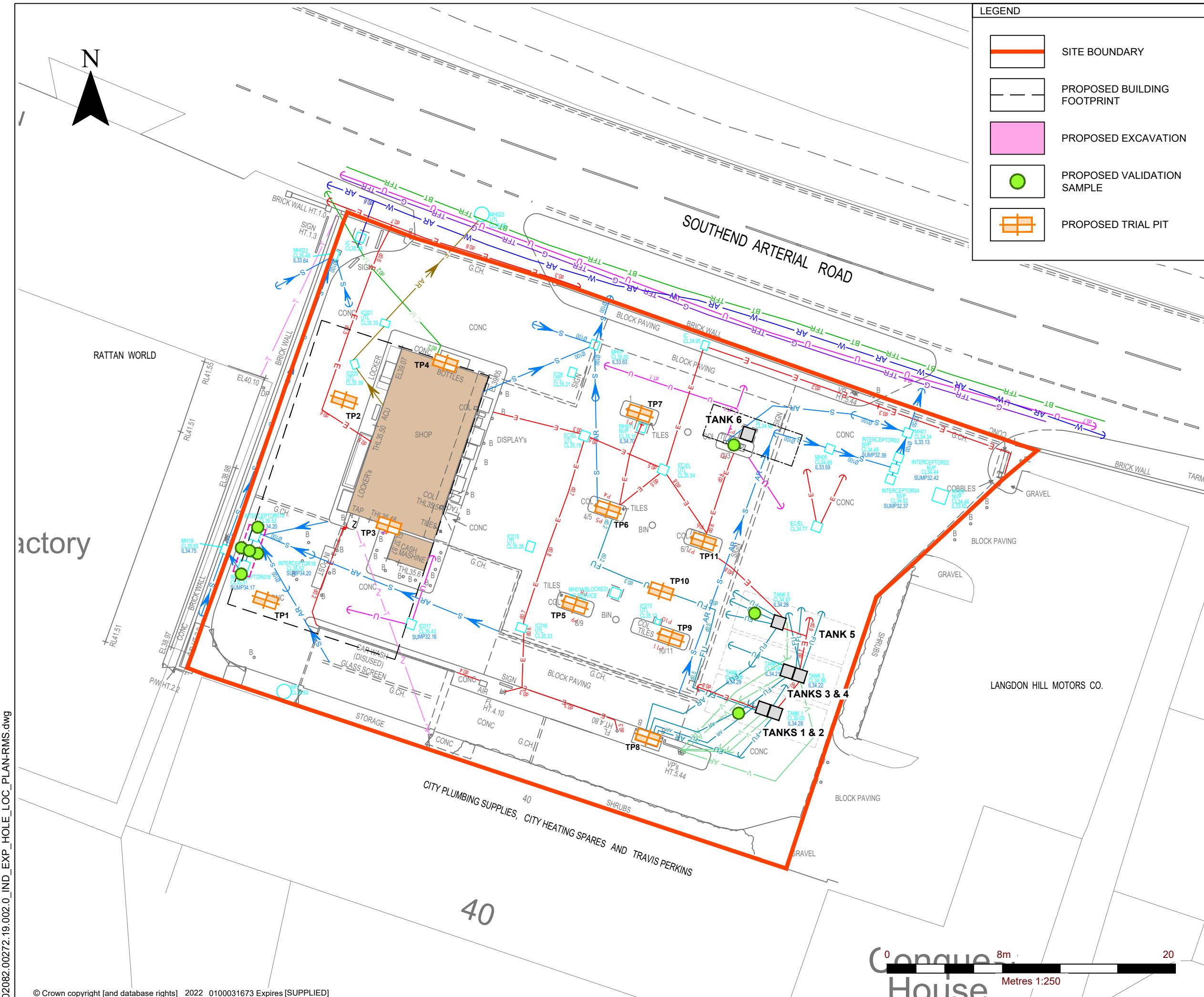
Scale: 1:10,000 @ A3 Date: FEBRUARY 2022



02082_00272_19.001.0_SITE_LOC_PLAN-RMS.dwg

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LEGEND	
	SITE BOUNDARY
	PROPOSED BUILDING FOOTPRINT
	PROPOSED EXCAVATION
	PROPOSED VALIDATION SAMPLE
	PROPOSED TRIAL PIT

NOTES	
1. DRAWING IS BASED ON WYETH PROJECT SERVICES EXISTING SITE PLAN, REF: WPS_MFG_104_P_11 REV A, DATED: FEB 2022.	
2. SERVICES ARE TAKEN FROM MALCOLM HUGHES UNDERGROUND SURVEY, REF: 18747/2, DATED: SEPT 2016.	
	ABANDONED
	ACID DRAIN
	BRITISH TELECOM
	CABLE TV
	COMMUNICATION CABLES
	SEWER COMBINED
	SEWER SURFACE WATER
	SEWER FOUL
	DUCTING
	ELECTRIC CABLES
	EFFLUENT PIPES
	FUEL LINE
	FUEL GAUGE LINE
	FUEL VENT LINE
	GAS PIPES
	HEATING PIPES
	TRAFFIC LIGHT CABLES
	VAPOUR RECOVERY PIPES
	WATER PIPES
	UNIDENTIFIED GPR OR ELECTRO LOCATION TRACE
	RISING MAIN
	SCAR TRACE
	END OF TRACE
	TAKEN FROM RECORDS (NOT PROVEN ON SITE)
	ASSUMED ROUTE





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LAINDON SERVICE STATION
REMEDIAL METHOD STATEMENT
AND SAMPLING ANALYSIS PLAN
INDICATIVE EXPLORATORY HOLE
LOCATION PLAN

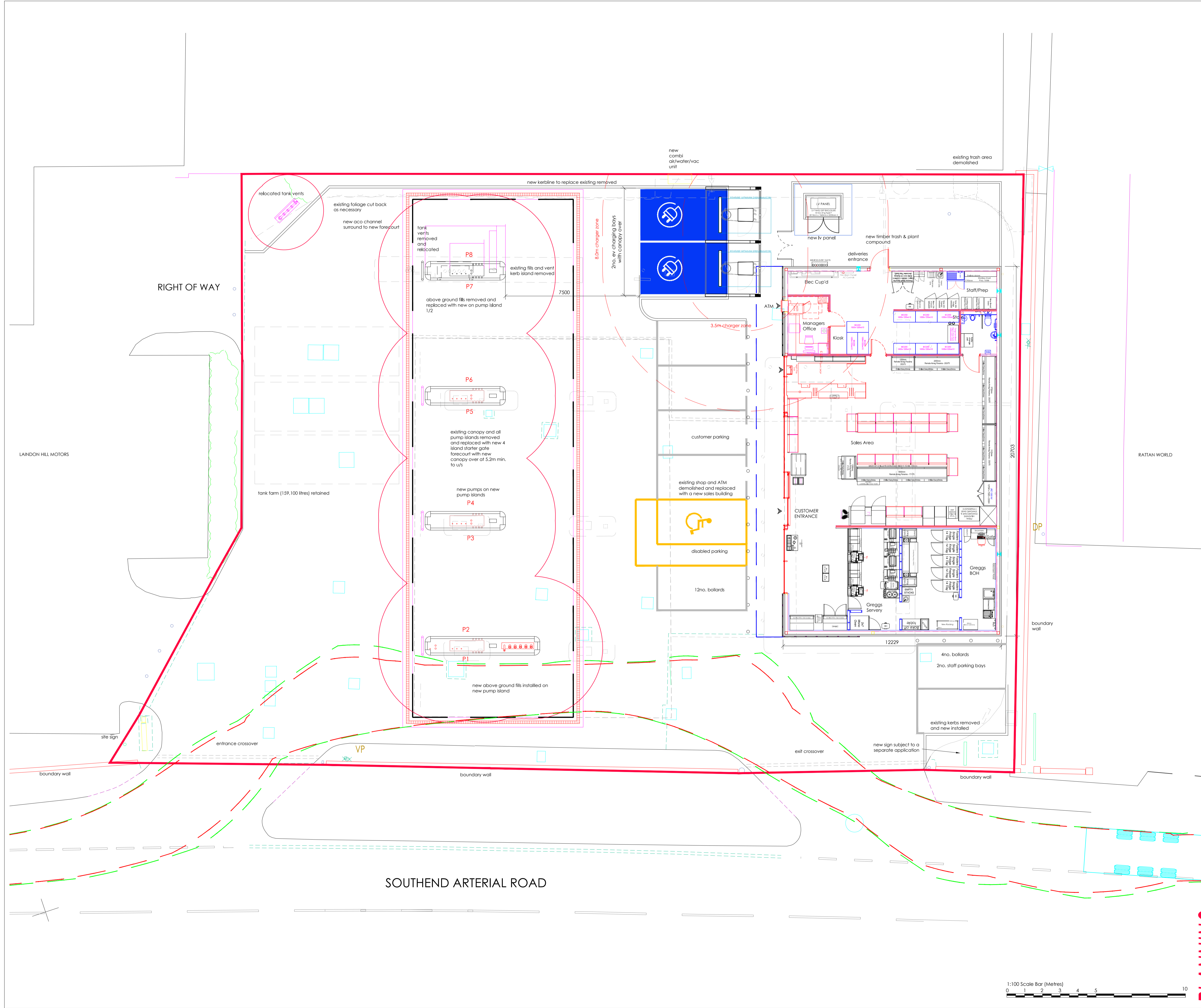
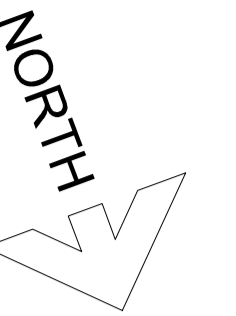
DRAWING 02

Scale 1:250 @ A3	Date FEBRUARY 2022
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APPENDIX 01

Proposed Development Layout



RIGHT OF WAY

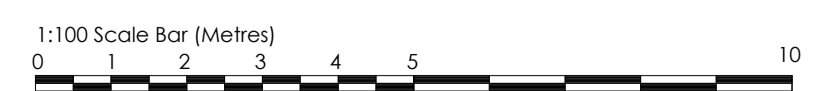
LAINDON HILL MOTORS

RATIAN WORLD

SOUTHEND ARTERIAL ROAD

rev	date	by	description
CLIENT			
mfg motor fuel group			Gladstone Place 36-38 Upper Marlborough Road St. Albans. AL1 3UU
PROJECT LOCATION			
Laindon Service Station Arterial Road, Laindon, Essex. SS15 6DP			
DRAWING			
Replacement shop building and forecourt alterations Proposed Site Plan			
			
The Cart Shed, Amberley Court, Amberley Lane, Millford, Surrey, GU8 5EB, United Kingdom			Tel: +44 (0)1483 424704 Email: enquires@wyethprojects.com
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Date:	September 2021	Drawn By:	DB/DS
Scale:	1:100	Dwg No.:	WPS-MFG-104-P-13
			A1 original.pnt.corr
			Rev:

PLANNING



APPENDIX 02

SLR PFS GAC

Contaminant Type	Receptor Sensitivity Contaminant of Concern	Onsite Human Health		Offsite Human Health		Controlled Waters						Site Management Limits	
		Commercial - Site Worker		Neighbouring Residential		High		Medium		Low		Soil (mg/kg)	GW (mg/l)
		Soil (mg/kg)	GW (mg/l)	Soil (mg/kg)	GW (mg/l)	Soil (mg/kg)	GW (mg/l)	Soil (mg/kg)	GW (mg/l)	Soil (mg/kg)	GW (mg/l)		
BTEX / MTBE	Benzene	16	0.92	0.79	0.047	0.03	0.0015	3.6	0.6	>sat	460	140	No SPH
	Toluene	>sat	>sol	>sat	56	4.7	0.12	>sat	380	>sat	>sol		
	Ethyl benzene	>sat	140	>sat	8.6	5.7	0.075	>sat	>sol	>sat	>sol		
	Xylene (Mixed Isomers)	>sat	50	220	2.9	8.8	0.11	>sat	>sol	>sat	>sol		
	Methyl t-Butyl ether (MTBE)	8200	3700	1900	180	0.2	0.018	0.2	0.051	1.2	0.54		
Petrol (GRO)	TPH - Aliph >C05-C06	>sat	18	280	1.0	8.3	0.03	>sat	>sol	>sat	>sol	700	No SPH
	TPH - Aliph >C06-C08	>sat	>sol	>sat	2.2	>sat	0.42	>sat	>sol	>sat	>sol		
	TPH - Aliph >C08-C10	>sat	>sol	>sat	>sol	>sat	>sol	>sat	>sol	>sat	>sol		
	TPH - Arom >C08-C10	>sat	15	290	1.2	53	0.21	>sat	>sol	>sat	>sol		
Diesel (DRO)	TPH - Aliph >C10-C12	>sat	>sol	>sat	>sol	>sat	>sol	>sat	>sol	>sat	>sol	1000	No SPH
	TPH - Arom >C10-C12	>sat	>sol	>sat	4.6	130	0.32	>sat	>sol	>sat	>sol		
	TPH - Aliph >C12-C16	>sat	>sol	>sat	>sol	>sat	>sol	>sat	>sol	>sat	>sol		
	TPH - Arom >C12-C16	>sat	>sol	>sat	>sol	>sat	0.56	>sat	>sol	>sat	>sol		
High Mol. Wt. Hydrocarbons	TPH - Aliph >C16-C34	No risk	No risk	No risk	No risk	>sat	>sol	>sat	>sol	>sat	>sol	2500	No SPH
	TPH - Arom >C16-C21	No risk	No risk	No risk	No risk	>sat	>sol	>sat	>sol	>sat	>sol		
	TPH - Arom >C21-C35	No risk	No risk	No risk	No risk	>sat	>sol	>sat	>sol	>sat	>sol		

Controlled Waters Sensitivity	High	Medium	Low
Aquifer	Principal	Secondary	Unproductive
Source Protection Zone	Total catchment	None	None
Surface Water	<25m	25m - 100m	>100m
Adopted Compliance Point	25	50	50
Geology	sand	sandy loam	clay

AQUIFER / DISTANCE TO SW	<25	25 - 100	>100
Principal and/or SPZ3	High	High	High
Secondary	High	Medium	Medium
Unproductive	Medium	Medium	Low

Notes

- >sat Derived risk based target exceeds the soil saturation limit based on three phase partitioning calculations. Soil concentrations exceeding the soil saturation limit indicates the presence of separate phase hydrocarbon, likely present as a residual immobile phase within the soil porosity. A saturation exceedance doesn't indicate a risk as the risk model indicates that the soil is already saturated with vapour, so further vapour migration cannot occur.
- >sol Derived risk based target exceeds the contaminant solubility limit. The solubility limit indicates the maximum theoretical dissolved phase concentration possible. Groundwater concentrations exceeding the solubility limit indicates the presence of separate phase hydrocarbon within the sample analysed, likely deriving from residual immobile phase within the aquifer porosity or sediment within the sample.
- No risk The contaminants of concern are not volatile, and no toxicological data is available for inhalation exposure, so contaminant does not present a health risk via inhalation
- No SPH Target is based on no measurable Separate Phase Hydrocarbon being present
- Site Management Limits These are soil limits derived from CCME, and include consideration of issues outside of the standard exposure pathways assessed in the model, including Fire / explosion hazards, workers exposure to vapours in trenches, effects on buried services, limits at which odour and aesthetics (eg black staining), would be apparent, and concentrations at which mobile separate phase is likely to occur. These limits are particularly applicable to heavy end hydrocarbons which have negligible solubility and no vapour risk, but could potentially be present at significant concentrations. Exceedance of management limits does not necessarily indicate an actual risk, but illustrates that further consideration and appraisal of these issues should be carried out.

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