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Phase III Remediation & Validation Proposals

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SUTCLIFFE INVESTIGATIONS

Phase III Remediation & Validation Proposals

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1 Terms of Reference

T J Thomas Ltd have appointed Sutcliffe Investigations to prepare a Phase III Remediation & Validation proposal for the site known as the former Penny Black Pub, Lickers Lane, Prescott.

The site is centred on Grid Reference (NGR) 347547, 390575 and is approximately 0.2ha in area.

The site consists of a roughly rectangular plot of land, located off Lickers Lane. The site consists of a number of a former public house with an associated area of hardstanding that formed the car park; there is also an associated outbuilding that is to be demolished before development can occur on site.

Access to the main area of the site is from Lickers Lane. The main site boundaries are fenced with wooden panel fencing along the northern and western boundaries with low concrete fencing along the southern and eastern boundaries.

The surrounding land use is a mixture of residential properties, with associated amenities and fields.

This report provides details on the protocols to be adopted during remedial works required to be undertaken on the site to ensure that any risks associated with long term human health are mitigated.

The soil sampling strategy and chemical analysis proposals set out in this document are produced in light of a Phase 1 Desk Study and Phase II Ground Assessment previously conducted by Sutcliffe Investigations for this site. This report and the outlined strategy should be read in conjunction with:

Sutcliffe's have completed the following studies:

- *Phase I Desk Study, Former Penny Black Pub, April 2012.*
- *Phase II Geotechnical & Environmental Assessment, Former Penny Black Pub, June 2012.*

This report incorporates the findings of the 2012 investigation along with the findings of the 2016 post demolition works that have been carried out in line with the requirements of Knowsley Council.

No other previous studies are known to have been undertaken to Sutcliffe's knowledge.

2 Development Proposals & Legislation Context

2.1 Development Proposal

It is understood that consideration is being given to redevelopment of the site with the development of 9No. new residential properties. The site will be assessed against a residential with plant uptake scenario. A proposed development plan is presented as *Drawing no. 1757-125* as prepared by Larrosa Marshall.

2.2 Legislative Context

The presence of contaminants which may pose a risk to human health or the environment is a material planning consideration and it remains the responsibility of the developer to ensure safe development. For planning it should be considered whether the site is suitable for its new use, and the responsibility for securing a safe development rests with the developer and/or landowner.

The level of contamination is expected to be low relative to the level of risk and the concern is for the site's proposed use not its current use. This is the opposite to Part 2A which considers high levels (significant harm) and the current use of the site.

Section 57 of the Environment Act 1995, adds Part 2A (ss.78A-18YC) to the Environmental Protection Act 1990 and contains the legislative framework for identifying and dealing with contaminated land. Where development is undertaken on land which may be affected by contamination, the National Planning Policy Framework, paragraphs 120 to 122 consider pollution. This links the contaminated land regime within the development process.

3 Aims & Objectives

This report provides details of the remedial options applicable for a residential with plant uptake end use scenario.

It also provides procedures to be implemented, in order to verify the remedial measures. The remediation strategy report is required to provide information to regulatory authorities to satisfy planning conditions relating to contaminated land aspects on the site.

This document outlines Sutcliffe Investigations proposals for Remediation Strategies, and includes the following:

- (i) Soil sampling and analysis to be conducted for purposes of site characterisation and remediation planning.*
- (ii) Anticipated remediation strategy.*
- (iii) Soil sampling and analysis to be conducted for remediation validation purposes.*

4 SOIL VALIDATION CRITERIA

4.1 Generic Soil Assessment Criteria – Imported Top & Sub soils

The results of the topsoil and subsoil samples may be contrasted to contemporary UK soil assessment criteria.

With regards to the soil risk assessment for imported top and sub soils Sutcliffe will use the following hierarchy:

- *LQM Suitable 4 Use Levels (S4ULs).*
- *ATRISK Soil Screening Values (SSVs) and DEFRA Generic Assessment Criteria (GACs).*
- *DEFRA Category 4 Screening Levels (C4SLs) for Lead.*

Based upon the above we will use the LQM S4ULs. These use similar assumptions and land uses to C4SLs. However, toxicological information has been based on 'minimal risk' as per previous guidelines and assumptions.

If contaminants are not present as S4ULs, then we propose to use ATRISK SSVs or CL:AIRE GACs. These follow the 'minimal' risk principle and more stringent exposure parameters and will be conservative. The only exception to this is for Lead where the C4SL is used.

5 Conceptual Site Model Prior to Remediation

5.1 Soils

Methodology

Based on the Preliminary Risk Assessment (presented in the Desk Study) and Ground Model as completed by Sutcliffe for this site, a Generic Quantitative Risk Assessment for human health has been undertaken in accordance with CLR and SR (SC050021 series) (DEFRA) guidance and comprised the following:

- *Selection of appropriate generic screening values for human health assessment;*
- *Assessment of contamination distribution and comparison of site data to screening values using the mean and maximum value test (in accordance with CLR7 and CL:EH/CL:AIRE Guidance);*
- *Assessment of risks to receptors; and,*
- *Determination of requirements for further investigation or remediation.*

Selection of Soil Screening Values

Soil screening values appropriate for a residential with plant uptake end use scenario were selected as detailed in *Section 4.1*.

Creation of Relevant Datasets

All sampled material was from made ground, the chemical results were assessed together, as one data set.

Assessment

The soil analytical data has been assessed following CL:AIRE/CL:EH guidance 2008 “Guidance on Comparing Soil Contamination Data with a Critical Concentration”, CLR11 Model Procedures Section 2.3 and CLR7 and using the Mean Value Test as laid out in CLR7. Where determinands analysed for could not be detected, the limit of detection has been used as a worst case scenario.

Summary of Results

Elevated levels of contamination were recorded in one sample taken from site when assessed against the 2.5% SOM Residential with plant uptake values. These are recorded below in *Table 5.1*.

Table 5.1: Statistical Analysis Results for Made Ground Stratum Top 1.00m

Contaminant	Guideline Assessment Value	95% ile	Mean Value Test	Max Value Test
Lead	200	172.17381	Pass	1 Outlier

The statistical analysis results for Lead indicate that the upper 95th percentile bound values (US95) is below the relevant UK guidance threshold value for a residential with plant uptake scenario. Lead passes with one statistical outlier, therefore the material is deemed acceptable to be retained on site.

The statistical analysis has shown that the made ground, although containing contamination, does not pose an unacceptable risk to future site uses. It is however noted that there is a sample that contains asbestos from WS4 which will have to be removed from the site.

Asbestos

All samples were tested for asbestos sampling. Asbestos has been noted in 1No. of the samples in WS4 at 0.40mbgl, the asbestos detected consisted of Amosite (Brown). Due to the practice used at the time of sampling the asbestos has not been quantified to assess the risk to long term human health and as such a full risk assessment cannot be carried out on the identified asbestos.

An Asbestos Survey has been undertaken by Asbestos Management UK. To date this report has not been supplied to Sutcliffe and it is expected that the client will issue it separately to the planners.

Discussion

The statistical analysis indicates that the identified elevated level of lead does not pose a long term risk to human health and as such the null hypothesis can be rejected, in favour of the alternative hypothesis.

Asbestos identified on site will require remediation to ensure it is removed from site to be protective of long term human health.

Conclusions

Currently due to the identified asbestos the site poses a risk to human health, and remediation works will be required as part of the development to ensure that the site is suitable for occupation and no longer poses a risk to human health.

Given the extent of the identified contamination a localised site strip will be required to a depth of 600mm in the area of WS4 with a capping layer being placed in any impacted soft landscaped areas to bring site levels back up.

It would be anticipated that the remainder of the hot spot that is not formed of landscaping will be covered by hardstanding, this along with the capping system would provide a break layer to source pathway receptor linkages.

Elsewhere on site, site levels will be dictated by depth of foundation construction beneath areas of hardstanding (roadways & building footprints), and a need to emplace a suitable growth medium in areas of soft landscaping to facilitate landscape proposals.

6 Ground Gas Risk Assessment – Qualitative

6.1 Methodology

Sutcliffe have undertaken a qualitative ground gas risk assessment in accordance with “*A Pragmatic Approach to Ground Gas Risk Assessment (RB17)*”. This is based on the low risk attached to the site from potential sources of ground gas, with only on site made ground considered to be a major source.

The development proposal is likely to comprise a “cut” exercise, required to achieve proposed formation levels. In consequence the risk from ground gas is considered negligible and RB17 is considered suitable to assess the risk.

Our assessment comprises the following:

- *Review of the forensic test results.*
- *Assessment of risks from ground gas.*
- *Development options.*

6.2 Laboratory Assessemnt

Three (3) samples were recovered from site for the purpose of undertaking forensic testing to obtain the Total Organic Carbon to allow the assessment of the potential for the made ground to generate ground gas.

The forensic testing was undertaken by Envirolab laboratories in line with Research Bulletin 17 (RB17) on three 1kg samples provided to them by Sutcliffe. The findings are summarised below.

Table 6.1: Forensic & TOC Summary for Site

Forensic Descriptions & TOC	Sample Total Weight (Kg)	Fine Soil and Gravel <10mm (%)	Coarse Inert Particles >10mm (%)	TOC Fine Soil as Whole (%)	TOC Remaining Soil as Whole (%)	Average TOC (%)
TH1	1	92.10	7.90	0.22	0.00	0.22
TH2	1	91.29	8.71	0.45	0.00	0.45
TH3	1	96.09	3.91	2.20	0.00	2.20
Site Average	/	/	/	/	/	0.96

6.3 Discussion

Samples retrieved from the site revealed an average TOC value of 0.96%, the samples generally consisted of Dark brown gravelly sand with rare angular fine brick fragments.

Using the *"Pragmatic Approach to Ground Gas Risk Assessment (RB17)"* the TOC and forensic testing has given a site wide average TOC value of 0.96% with the levels of TOC ranging from 0.22% to 2.20%. This classifies the site as Characteristic Situation 1 and therefore indicates that no gas protection measures are required on this site.

Additionally due to the small amount of made ground noted on site it is anticipated that the majority, if not all, made ground will be removed to achieve formation levels across the site.

7 Controlled Waters Risk Assessment

7.1 Methodology

Based on the Preliminary Risk Assessment and Ground Model for this site, a Level 1 Screening Assessment has been undertaken in general accordance with Environment Agency guidance Environment Agency Remedial Targets Methodology, Hydrogeological Risk Assessment for Land Contamination, 2006.

The methodology comprises:

- Identification of potential contaminant linkages.
- Selection of appropriate generic screening values for controlled waters.
 - o *Screening measured concentrations of leachate against the generic screening values available for UK Drinking Water Standards (UK DWS) and Environmental Quality Standards (EQS).*
- Assessment of contaminant distribution and risk to receptors.
 - o *Identification of contaminants of concern and relevant contaminant linkages.*
 - o *Identification of potential contaminants and contaminant linkages which are no longer of concern.*

Identification of Potential Contaminant Linkages

Contaminant linkages have been identified in *Section 3.0* between the made ground and the underlying aquifer via infiltration and/or migration of dissolved phase contaminants.

Selection of Generic Screening Values

Screening values for Drinking Water Standards (DWS) have been used to assess leachability. DWS are relevant to potable receptors (Principal Aquifer).

Environmental Quality Standards (EQS) screening values have been used to assess risks to surface water resources.

Leachate Screening – UK DWS & EQS

Metals, TPHCWG and Speciated PAHs were assessed. Exceedances of relevant UK DWS and EQS screening criteria were encountered, details of which are

identified in *Table 7.1*. It should be noted that several determinands have limits of detection greater than their respective screening values. Due to the level of uncertainty associated with such results, these exceedances are not considered significant and are excluded from the table below.

Table 7.1: Leachate Exceedances Summary - EQS

Determinant	EQS Screening Value (µg/l)	Range of concentrations (µg/l)	Location and depth of outliers, if present
Copper	1 to 28	3.43-6.69	WS1 @0.50m bgl – 6.69µg/l WS4 @ 0.40m bgl – 3.43µg/l

Conclusion

Exceedances of EQS screening criteria are not considered significant given the levels recorded on site, with only low levels of Copper recorded within the EQS range.

8 Land Contamination Risks and Remediation Requirements

8.1 Revised Conceptual Model

Based on the findings of the human health risk assessment as completed by Sutcliffe, the conceptual model has been revised and has been presented within the Ground Assessment report.

8.2 Discounted Contaminant Linkages

Controlled Waters – Groundwater & Surface Waters

Groundwater Resources

No exceedances of the UK DWS Leachate screening values were identified on site.

Surface Water Resources

The EQS Leachate screening identified concentrations of Copper within the EQS, however due to the low levels noted the risk is unlikely to be significant.

Ground Gas

Based on the results of the forensic testing there is no requirement for gas protective measures on site, with the ground gas generation potential of the made ground considered low. Based on the qualitative assessment of the risks posed by ground gases no further action is required.

8.3 Remaining Potential Contaminant Linkages

A single elevated level of Lead was identified as part of the tier 1 assessment, when this was run through the statistical analysis it was shown to pass the mean value test. This indicates that the identified lead contamination is an acceptable risk to long term human health and can remain on site. Additionally one sample identified Asbestos fibres within WS4 that will require remediation on site.

Due to the time at which the asbestos was identified no quantification testing was undertaken and as such a delineation hot spot will be required to remove the potential risk posed by the identified asbestos to future occupiers of the site. This will require the removal of material from a circular area around WS4 with side wall and base testing once the excavation is complete.

Construction workers may be exposed via dermal contact, ingestion and inhalation of soil / dust during the construction period. Adjacent site users may also be exposed to contaminated soils via inhalation of dust generated during the construction phase.

8.4 Additional Works Required to Assess Outstanding Contaminant Linkages

Prior to the excavation the proposed excavation works in the area of WS4 where asbestos fibres were identified a delineation exercise is recommended comprising additional testing for asbestos within a 2.5m radius of WS4.

8.5 Remediation Requirements

Human Health – Soils

Currently due to the identified asbestos the site poses a risk to human health, and remediation works will be required as part of the development to ensure that the site is suitable for occupation and no longer poses a risk to human health.

Given the extent of the identified contamination a localised site strip comprising a 2.5m radius in the area of WS4 will be required to a depth of 600mm. This proposed area is subject to variation subject to the findings of the asbestos delineation exercise as detailed in *Section 8.4*. Any hardstanding and emplaced capping system would provide a break layer to source pathway receptor linkages.

On completion of the excavation works and removal of asbestos impacted material side wall and base samples will be recovered and submitted for the screening of asbestos fibres. If additional asbestos fibres are identified and subject to quantification testing identifying <0.001% asbestos then no further excavation works are proposed.

It is recommended that good hygiene practices should be employed during construction work, in addition, the findings of this investigation should be included within the contractors H&S file and an assessment of risks associated with short term human health completed. No consumption of food or smoking should occur without prior handwashing. If dust is encountered, dust masks should be worn and dust suppression employed. The recommendations laid out in the above HSE document and CIRIA report 132 'A Guide to Safe Working on contaminated sites' (1996) should be followed.

A plan detailing the location of the proposed remedial works is presented as *Drawing No. 26045-701*.

Human Health – Ground Gas

No further action required.

Controlled Waters

No further action required.

Proposed Capping Thickness – Soft Landscaping Area

It is anticipated that to facilitate landscape proposals a growth medium will need to be emplaced in proposed landscaped areas> This is likely to comprises the emplacement of a 150-200mm clean validated topsoil capping system.

NOTE: the if the development is subject to NHBC sign off and as a minimum all soft landscaping areas will be subject to the emplacement of a capping system comprising a 300mm clean validated “fit for purpose” sub and top soils.

8.6 Imported Soil Validation

All imported soil will be chemically validated at a rate of 1 sample per 50m³ for topsoil and 1 sample per 100m³ for subsoil. A minimum of 3 samples per soil source will be undertaken.

The validation criteria for the plot areas will comprise the ‘residential (with plant uptake).

The typical testing suite will comprise:

Arsenic, boron, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, vanadium, zinc, water soluble sulphate, pH, USEPA PAH 16, asbestos (presence or absence) and organic matter.

Where the source is ‘brownfield’ or to site source unknown the soil will additionally be tested for the following:

Speciated banded petroleum hydrocarbons (TPHCWG), benzene, toluene, ethylbenzene and xylene (BTEX), MTBE, cyanide suite, boron and phenol.

The source of the soils must be recorded together with copies of the conveyance notes. A level survey must also be taken before the soils are emplaced and after.

8.7 Capping Layer Depth Validation

The depth of the capping layer on site will be demonstrated by excavating a hole and collecting photographic evidence. The photographs will show the location of the validation, the downhole view and the depth using a levelling staff.

8.8 Site Completion Report

The site completion report will include details of the imported soil validation and photographs of the soil depth placed across the site.

The site wide planning conditions may only be discharged once Knowsley EHD are satisfied that, in accordance with the National Planning Policy Framework (NPPF):

- The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation.
- Adequate site investigation information, prepared by a competent person, is presented.

8.9 Additional Remedial Requirements

8.9.1 Site Material Management Plan (SMMP)

It is advised that an appropriate SMMP is designed for the scheme and prior to the commencement of any works and maintained throughout the development of the scheme. All waste transfer notes will need to be retained and documented to allow ease of review by the regulators.

8.9.2 *Material Reuse*

Should any material from the site be reused an assessment for suitability for use would be required. Sampling protocols to be implemented on receipt of agreement with the Knowsley EHD are detailed in *Section 9*.

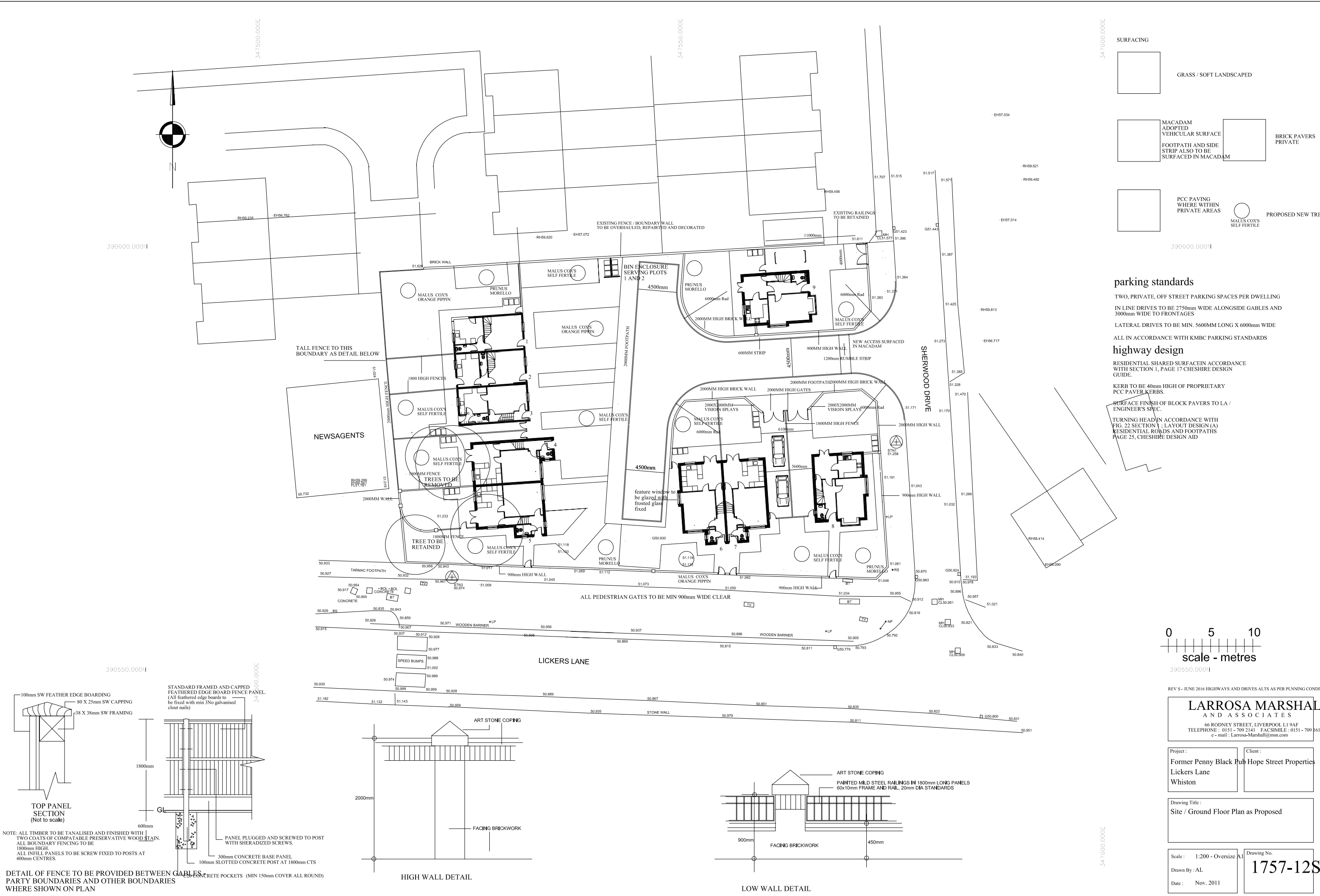
8.9.3 *Unexpected Contamination*

In the event that during the development works if unexpected contamination is identified then all works should cease and the appointed environmental consultant notified.

8.10 Human Health Remediation Strategy

Consultation with Knowsley contaminated land officer is recommended regarding the acceptability of this validation proposal.

Drawing No. 1757-125



SURFACING

GRASS / SOFT LANDSCAPED

MACADAM ADOPTED VEHICULAR SURFACE
FOOTPATH AND SIDE STRIP ALSO TO BE SURFACED IN MACADAM

BRICK PAVERS PRIVATE

PCC PAVING WHERE WITHIN PRIVATE AREAS

MALUS COX'S SELF FERTILE

PROPOSED NEW TREE

parking standards

TWO, PRIVATE, OFF STREET PARKING SPACES PER DWELLING

IN LINE DRIVES TO BE 2750mm WIDE ALONGSIDE GABLES AND 3000mm WIDE TO FRONTAGES

LATERAL DRIVES TO BE MIN. 5600MM LONG X 6000mm WIDE

ALL IN ACCORDANCE WITH KMBC PARKING STANDARDS

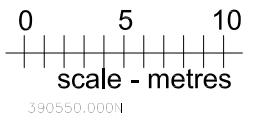
highway design

RESIDENTIAL SHARED SURFACE IN ACCORDANCE WITH SECTION 1, PAGE 17 CHESHIRE DESIGN GUIDE.

KERB TO BE 40mm HIGH OF PROPRIETARY PCC PAVER KERBS.

SURFACE FINISH OF BLOCK PAVERS TO LA / ENGINEER'S SPEC.

TURNING HEAD IN ACCORDANCE WITH FIG. 22 SECTION 1 : LAYOUT DESIGN (A) RESIDENTIAL ROADS AND FOOTPATHS PAGE 25, CHESHIRE DESIGN AID



REV S - JUNE 2016 HIGHWAYS AND DRIVES ALTS AS PER PLANNING CONDIT

LARROSA MARSHALL AND ASSOCIATES

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Project :

Former Penny Black Pub Hope Street Properties
Lickers Lane
Whiston

Client :

Drawing Title :

Site / Ground Floor Plan as Proposed

Scale: 1:200 - Oversize A1

Drawing No. 1757-12S

Drawn By : AL

Date: Nov. 2011

TOP PANEL SECTION (Not to scale)

100mm SW FEATHER EDGE BOARDING
80 X 25mm SW CAPPING
38 X 38mm SW FRAMING

NOTE: ALL TIMBER TO BE TANALISED AND FINISHED WITH TWO COATS OF COMPATIBLE PRESERVATIVE WOOD STAIN.
ALL BOUNDARY FENCING TO BE 1800mm HIGH.
ALL INFILL PANELS TO BE SCREW FIXED TO POSTS AT 400mm CENTRES.

STANDARD FRAMED AND CAPPED FEATHERED EDGE BOARD FENCE PANEL.
(All feathered edge boards to be fixed with min 3No galvanised clout nails)

1800mm

600mm

GL

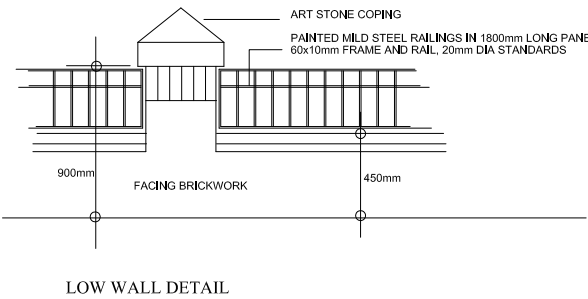
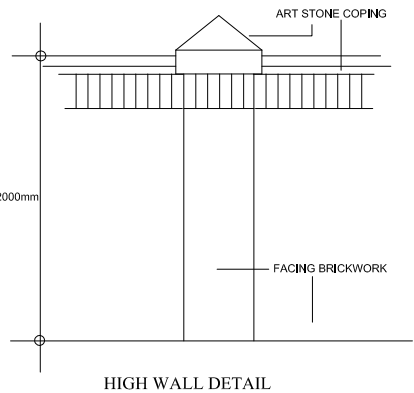
PANEL PLUGGED AND SCREWED TO POST WITH SHERADIZED SCREWS.

300mm CONCRETE BASE PANEL

100mm SLOTTED CONCRETE POST AT 1800mm CTS

300mm CONCRETE POCKETS (MIN 150mm COVER ALL ROUND)

DETAIL OF FENCE TO BE PROVIDED BETWEEN GABLES, PARTY BOUNDARIES AND OTHER BOUNDARIES WHERE SHOWN ON PLAN



Drawing No. 26045-701



KEY

WS1 DENOTES WINDOW SAMPLE HOLE LOCATION

HAH1 DENOTES HAND AUGER HOLE LOCATION

TH1 DENOTES TRIAL HOLE SAMPLING LOCATION

INDICATES AREA OF ASBESTOS HOT SPOT

DO NOT SCALE OFF THIS DRAWING

GENERAL NOTES

This drawing to read in conjunction with all relevant structural and architectural drawings and specifications.

All dimensions to be checked on site by the contractor / fabricator prior to commencement of works.

All dimensions are in millimetres unless stated otherwise.

All works to be carried out in strict accordance with the engineer's specifications, relevant British Standards and where applicable Local Authorities requirements.

For final setting out information relating to grid lines and wall positions refer to the architect's drawings.

0	16.9.16	WGB	SITE INVESTIGATION PLAN	DB
Rev	Date	Checked	Description	By

NOT WORKING DRAWING

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Client

TJ THOMAS

Project

FORMER PENNY BLACK PUB,
LICKERS LANE,
WHISTON

Drawing title

PROPOSED VALIDATION
ON EXISTING SITE LAYOUT

Scale at A3	1:250	Drawing number	26045-701
Drawn by	D.BOWEN		
Date	16.9.16	Revision suffix	