



**Ground Investigation &
Risk Assessment Report**

Project Name: Eagle Brewery Wharf

Location: off High Street, Kingston upon Thames, KT1 1HH

Client: Royal Borough of Kingston upon Thames

Project ID: J15525

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SUMMARY

The site, which extended to approximately 0.14ha, comprised a public amenity space; consisting of landscaping and areas of hard paving, with seating areas. It is proposed to renovate the area and to undertake landscaping and public realm improvements.

Geological records indicated the site to be underlain by Alluvium and Langley Silt Member, underlain by London Clay. It was deemed likely that Made Ground would be present.

A Desk Study was carried out previously by STL, and this indicated that the site has had a history of industrial use as a brewery, followed by a coal yard and wharf, and later as temporary offices; before it became public amenity space.

An Unexploded Ordnance (UXO) risk assessment was not included in our brief for this investigation.

A single phase of intrusive investigation was carried out. All areas of the site were accessible during the fieldwork. However, it should not be assumed that the same ground conditions as encountered, would apply to the site as a whole.

The soils encountered comprised Made Ground materials, to the full depth of the trial pits at 1.2mbgl. The Made Ground comprised silty sands with ash content, gravel of brick and concrete, and gravels of brick, concrete and flint.

Groundwater was not encountered during the course of this investigation.

There was evidence of soil contamination, comprising traces of asbestos containing materials (chrysotile) in one of the soil samples analysed. This sample was subject to quantification analysis and the result was: sample TP4 @ 0.7mbgl was <0.001% by weight; which is below the laboratory limit of detection.

Further work may be required to define the extent of the contamination and/or enable design of any remediation that may be required. The presence of contamination may affect the classification of waste soils, or the potential for their re-use.



The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

As with any site, areas of contamination not identified during investigation works may come to light during the course of redevelopment. Accordingly, a discovery strategy must be in place during the redevelopment to ensure that any hitherto unknown contamination is identified and dealt with in an appropriate manner. Depending on the nature of any such contamination, it may prove necessary to reassess the remedial strategy for the site. The presence of contamination may affect the classification of waste soils, or the potential for their re-use.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Royal Borough of Kingston upon Thames and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Ltd accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

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For and on behalf of Southern Testing Laboratories Limited

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A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in a Royal Borough of Kingston upon Thames project order form ref: 31020152, dated 5 January 2024, from Paul Cohoon, of Royal Borough of Kingston upon Thames.

2 Location

The site is located on the eastern bank of the River Thames; approximately 0.5km south west of Kingston Railway Station. The approximate National Grid Reference of the site is TQ 17757 69035. The site location is indicated on Figure 1, within Appendix A.

3 Proposed Construction

It is proposed to renovate the existing area of public open space and to undertake landscaping and public realm improvements. At this stage the final design is unknown.

For the purposes of the contamination risk assessment, the proposed development land use is classified as Public Open Space (park), CLEA Model Ref [1] / C4SL Report Ref [2].

4 Object

This is a Phase II contamination (risk estimation and evaluation) investigation (Tier 1).

The object of the investigation was to assess the likely nature and extent of soil and groundwater contamination on the site.

5 Scope

This report presents our exploratory hole logs and test results and our interpretation of these data.

A UXO risk assessment was not requested within our brief for the investigation.

As with any site there may be differences in soil conditions between exploratory hole positions.

The ground investigation has been completed with reference to BS 5930 Ref [3] and BS 10175 Ref [4].

Geotechnical issues are not considered in this report.

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B DESK STUDY AND WALKOVER SURVEY

6 Desk Study

A desk study has been carried out previously by STL; see report ref: J15525, dated September 2023, for further information and findings.

6.1 Geology

The British Geological Survey Map No 270 (South London, 1998) indicated that the site geology consisted of Alluvium, Langley Silt Member and London Clay. STL records indicated that Made Ground was likely to be present.

6.1.1 Alluvium

Alluvium is a geologically recent deposit found in association with watercourses. It is typically soft to firm normally consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present.

Running sand or silt may be encountered. Excavations are often unstable. Bottom heave may be encountered in clayey soils below 3 m.

It is inherently variable and rapid lateral transitions in soil type should be anticipated.

6.1.2 Langley Silt Member

The Langley Silt Member is a Brickearth (loess deposit); a recent deposit which is so called as it is suited to brick manufacture. It is predominantly an aeolian deposit; formed during cold, dry climatic conditions. There is evidence that brickearth has been reworked as part of 'sheet flooding' which helped incorporate flint gravels into the deposit. Brickearth consists mainly of ferruginous silty clay, which is often sandy and may contain some finely divided chalk, scattered flints and gravelly seams, or other locally derived material. It is usually poorly consolidated and may contain numerous hollow root tubes and worm burrows.

6.1.3 London Clay

The London Clay mainly comprises blue-grey or grey-brown fissured clay and silty clay, which weathers to brown near the surface. It commonly contains thin courses of carbonate concretions ('cementstone nodules'), selenite crystals and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation.

Although slopes will stand in the clay at steep angles in the short term, the long-term stable slope angle is about 7 degrees for grassed, or cleared slopes, and a few degrees more for wooded slopes.

This formation is known to contain pyrite.

6.2 Hydrology and Hydrogeology

The River Thames is located adjacent to the western boundary of the site; flowing northwards.

The site is mapped as underlain by Alluvium, which is classified as a Medium Vulnerability Secondary Undifferentiated Aquifer. The underlying Langley Silt and London Clay bedrock is of low permeability, and is classified as unproductive strata.

The shallow groundwater (within the Alluvium/Langley Silt) will be at potential risk from mobile contaminants arising from both an on site source, and through migration from off site sources. Groundwater flow is anticipated to be in a westerly/north-westerly direction across the site, towards the River Thames. Therefore, the site will be at risk from the migration of mobile contaminants located to the south and east.

The banks of the River Thames are canalised and therefore this will prevent the lateral migration of any potentially mobile contamination into the River Thames.

The site is mapped within an area at risk from extreme flooding. Appropriate flood measures should therefore be considered for any future proposals on this site.

7 Site Walkover Survey

An initial walkover survey was carried out on 11th August 2023.

A site visit, to take soil samples, was undertaken on 13 February 2024. At the time of the second site visit, a total of five trial pit locations had been broken out and excavated.

The site encompassed an area of approximately 1457m². This is comprised approximately 700m² of green space and 757m² of hard surfacing/seating areas. It is proposed to undertake landscaping and public realm improvements.

7.1 General Site Description and Boundaries

The site comprised a paved road to the east and a public amenity space to the west. A footpath ran north/south through the western end of the site, parallel to the River Thames.

The site was accessed from the High Street, via Ram Passage. There was also pedestrian access in the north western and south western corners of the site via the aforementioned footpath.

The northern boundary was marked by the brick walls of the outside seating area associated with the adjacent café and a pub. The western boundary was marked by the quayside wall and moorings on the River Thames. The southern boundaries are marked by a three-storey residential building and wall surrounding associated parking and an adjacent shop. The western boundaries are marked by double yellow lines associated with the car park adjacent to the south west and the pavement on High Street.

7.2 Topography and Drainage

The site was generally flat, with the public amenity area being slightly raised. The footpaths sloped away from the site to the north and south.

Engineered drainage features were identified adjacent to the River Thames, and in the car park, adjacent to the south-east.

7.3 Vegetation

An area of grass with birch trees and various bushes was situated in the south western area of the site. Raised planters were also located in the west and northwest.

Two more trees (alder and ash) were identified growing into the quayside wall, on the south western boundary of the site.

7.4 Buildings and Land Use on Site and Nearby

The site itself comprised a paved road to the east and public amenity space to the west comprising benches, litter bins, raised planters and associated hard standings. Moorings with pontoons and house boats were situated on the River Thames, adjacent to the western boundary. A café with associated outside seating, and a pub were situated near the north-west and north-east of the site respectively. The High Street was adjacent to the site, to the east. Adjacent to the site to the south-west was a shop and associated car park. Flats were located to the site to the south.

7.5 Inaccessible Site Areas

It was not possible to view the quayside wall in detail, as the pontoons adjacent to the west of the site were not accessible.

7.6 Site Photographs

A series of photographs showing the site and associated features are included in Appendix D.

C PRELIMINARY SITE MODELS

8 Conceptual Engineering Geological Ground Model

From the desk study information and walkover undertaken at this site the following conceptual ground model has been formulated.

Data Source	Comments
Geology	Historical borehole records suggest that the soils underlying the site will comprise Made Ground, Alluvium, Langley Silt and London Clay. The Made Ground is anticipated to be 2-3m in thick, the Langley Silt 1-2m thick and the London Clay 97-98m thick.
Former Site Use	The site has had a history of industrial use, as a brewery, followed by use as a coal wharf. Contaminants associated with these land uses may still be present in the underlying Made Ground soil. Underground structures, including old foundations and basements may be encountered during any future intrusive works.
Groundwater	The site is not mapped within an area at risk of groundwater flooding. Shallow groundwater should however be anticipated to be encountered as the site is adjacent to the River Thames.
Surface Water	The site is mapped within an area at low risk from surface water flooding. Appropriate flood protection measures should therefore be considered for any future proposals on this site.

9 Conceptual Site Model

In the context of this report, the conceptual model summarises the potential pollutant linkages identified for the site and forms the basis of the risk assessment for the site. The preliminary model comprises the potential sources of contamination, receptors that could be harmed and exposure pathways identified from the desk study and walkover survey. These potential linkages form the basis upon which the investigation is designed and reported.

9.1 Potential Sources of Contamination

The site has had a history of industrial use and is located within an urban area.

A few potentially contaminative uses were identified, both on site and in the locality.

9.1.1 On-Site Sources

Potential Source	Potential Contaminants	Likely hazard to Site
Made Ground resulting from historic uses of the site as a brewery and later a coal yard/wharf	Asbestos, polyaromatic hydrocarbons (PAH compounds), metals and petroleum hydrocarbons	Low to moderate

The site has a long history of development, as a brewery and later as a coal yard. It is likely that this would have led to changes in the layout of the buildings on site over time, and consequently the deposition of Made Ground on the site. Such material is likely to contain a range of contaminants, most typically heavy metals and polyaromatic hydrocarbons – particularly given the storage and use of coal on the site.

The brewing process would have required heat, which is likely to have been generated by coal, or coke fired boilers, potentially with oil fired boilers at a later date.

There is also a possibility that the buildings, particularly during later phases of development, may have contained asbestos containing materials.

The date at which the site was redeveloped as an area of public open space is uncertain, but it appeared to have been in the 1980s/1990s, with renovations taking place in 2010. It is assumed that any gross contamination would have been removed, particularly during the later renovation works.

9.1.2 Off-Site Sources

The site may be impacted by contamination migrating from beyond the site boundary. The following potential off-site sources have been identified.

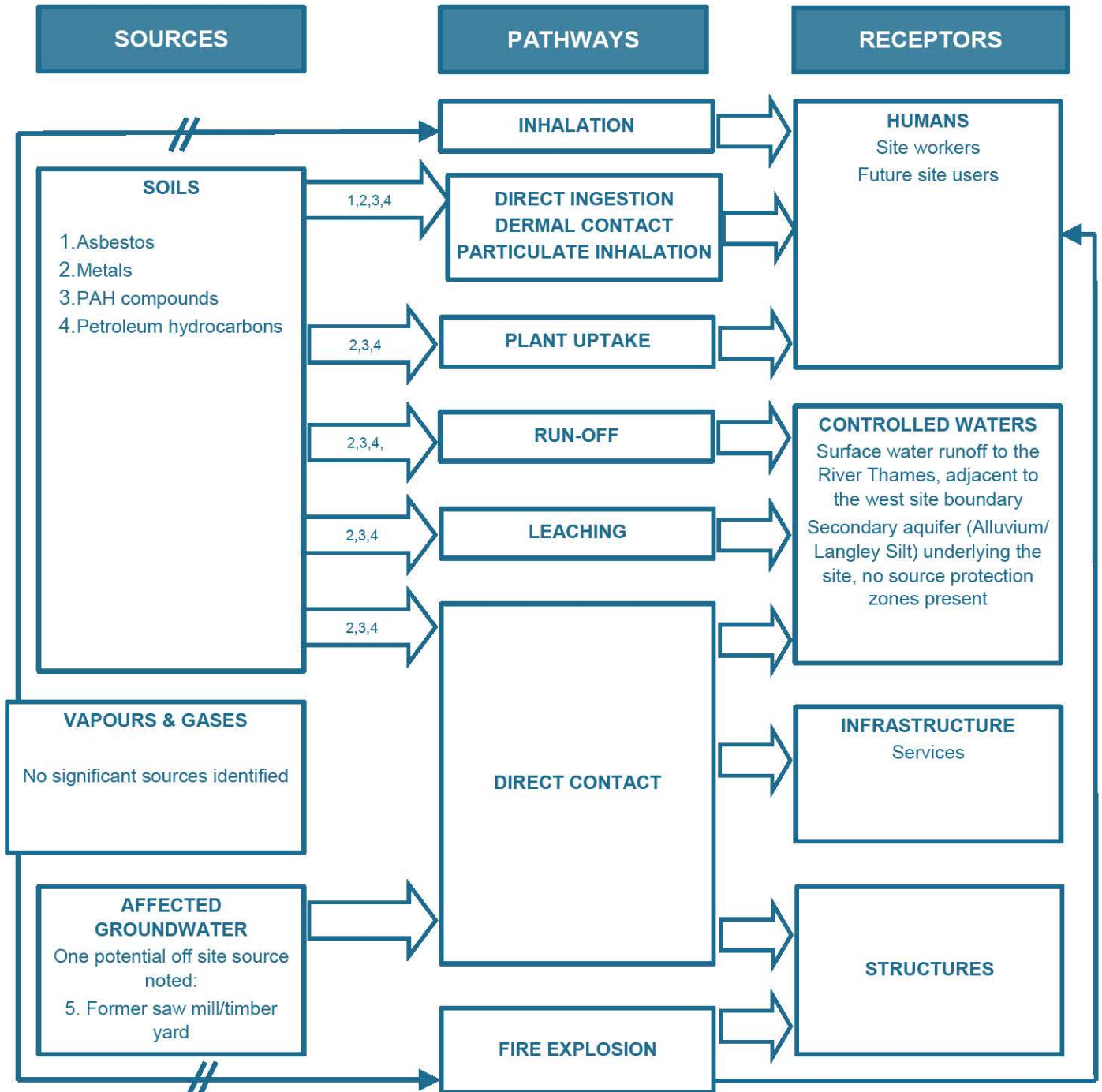
Potential Source	Distance from Site Boundary	Direction	Potential Contaminants	Likely hazard to Site
Car park	0m	SE	Metals, PAH, BTEX, Petroleum Hydrocarbons	Negligible
Former sawmill/timber yard	20m	S	metals, fuels, preservatives, acids/alkalis	Very Low

The nearest potential source of contamination is the car park adjacent to the site to the south east. This comprised a paved surface with associated drainage. It is therefore likely any surface water run-off will flow into the associated drains and not onto site. Contamination from this source is therefore considered to be negligible.

The former timber yard presents a potential, but very low, risk of contamination via migration of groundwater. Contaminants associated with this former land use may still be present on site within the Made Ground.

9.2 Pollutant Linkages and Conceptual Site Model Summary

The following diagram shows the potential pollutant linkages identified for the site and summarises the preliminary conceptual model:



// Denotes potential pollutant linkage not complete.

D GROUND INVESTIGATION

10 Strategy and Method

The strategy adopted for the intrusive investigation comprised the following:

Activity / Method	Purpose	Max Depth Range (mbgl)	Installations / Notes
TP1-TP5 Tracked machine / hand	Trial pits to investigate the shallow ground conditions. Dug by others.	1.0 – 1.2	TP1 terminated at 1.0mbgl, due to many services being found in this area

Exploratory hole locations were specified by the client and are shown on Figure 2 in Appendix A.

In-situ test and sampling methods descriptions employed are given in Appendix B together with the test results.

11 Weather Conditions

The fieldwork was carried out on 13 February 2024, at which time the weather was generally wet and cold.

12 Soils as Found

The soils encountered are described in detail in the attached exploratory hole logs (Appendix A), but in general comprised Made Ground. A summary is given below.

Depth (mbgl)	Thickness (m)	Soil Type	Description
GL-0.1	0.1	Made Ground	Blacktop surfacing
0.1-0.4/0.8	0.3-0.7	Made Ground	Fine to coarse GRAVEL of brick and flint with scant matrix of fine to coarse sand
>1.2	>1.2	Made Ground	Silty fine to coarse SAND with occasional fine to coarse gravel of brick and concrete

The soils found are generally in accordance with those anticipated.

12.1 Visual and Olfactory Evidence of Contamination

Evidence of possible contamination in the form of Made Ground with ash content, was recorded at the location of all trial pits.

These occurrences are discussed in Section E.

13 Groundwater Observations

Groundwater was not observed in the exploratory holes during the course of this investigation.

E DISCUSSION OF GEOENVIRONMENTAL TEST RESULTS AND RECOMMENDATIONS

14 Analytical Framework

There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.

The CLEA model Ref [1], provides a methodology for quantitative assessment of the long-term risks posed to human health by exposure to contaminated soils. Toxicological data is used to calculate a Soil Guideline Value (SGV) for an individual contaminant, based on the proposed site use; these represent minimal risk concentrations and may be used as screening values.

In the absence of any published SGVs for certain substances, Southern Testing have derived or adopted Tier 1 screening values for initial assessment of the soil, based on available current UK guidance including the LQM/CIEH S4UL's Ref [5] and CL:AIRE Soil Generic Assessment Criteria Ref [6]. In addition, in 2014, DEFRA Ref [7] published the results of a research programme to develop screening values to assist decision making under Part 2A of the Environmental Protection Act. Category 4 screening levels were published for 6 substances, with reference to human health risk only. This guidance includes revisions of the CLEA exposure parameters, presenting parameters for public open space land use scenarios, and also of the toxicological approach. The screening levels represent a low risk scenario, based on a 'Low Level of Toxicological Concern' rather than the 'Minimal Risk' of CLEA, and the analytical results of this investigation may be considered relative to these levels.

Site-specific assessments are undertaken wherever possible and/or applicable.

CLEA requires a statistical treatment of the test results to take into account the normal variations in concentration of potential contaminants in the soil and allow comparisons to be made with published guidance.

The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based upon them. Their validity should be confirmed at the time of site development.

15 Site Investigation – Soils

15.1 Sampling Regime

The number of sample locations was devised by the client and was intended to provide general coverage.

15.2 Testing

The potential for contamination by Made Ground, coal wharf and brewery activities was identified in the preliminary conceptual model. Therefore, the following tests were selected.

Test Suite	Number of Samples	Soil Tested
STL Key Contamination Suite	7	Made Ground
Asbestos screen	7	Made Ground
Asbestos quantification	1	Made Ground
Petroleum hydrocarbon screen	7	Made Ground

The test results are presented in full in Appendix C. A summary and discussion of the significance of the results and identified contamination sources is given below.

15.3 Test Results and Identified Contamination Sources

15.3.1 General Contaminants

The results of the key contaminant tests have been analysed in accordance with the CLEA methodology. The samples have been grouped into one population, comprising Made Ground. For each parameter in each population the sample mean is calculated and compared to a Tier 1 screening value. If the sample mean exceeds the screening value, the soil may be regarded as contaminated and further assessment may be required. If neither the sample mean nor any single value exceeds the screening value, the soil may be regarded as not contaminated, though further confirmatory assessment may be required. Where any single parameter value exceeds the screening value but the sample mean does not, further statistical analysis may be applied to that parameter if the available data is suitable. Such analysis would include an assessment of the Normality of the distribution of the data, consideration of the presence of outliers, and the calculation of a UCL estimate of the mean.

Summary data is presented in the tables below and the laboratory analysis is included in Appendix C. The screening values and source notes are presented in Table 1 “Tier 1 Screening Values” at the front of Appendix C.

Soil Type: Made Ground

Contaminants	Units	No of Samples Tested	Range	Sample Mean	Public Open Space (Park) Tier 1 Screening Values
Arsenic (As)	mg/kg	7	10-51	19	170
Cadmium (Cd)	mg/kg	7	<0.2	02	555
Trivalent Chromium (CrIII)*	mg/kg	7	16-27	19	33,000
Hexavalent Chromium (CrVI)	mg/kg	7	<1.8	1.8	220
Lead (Pb)	mg/kg	7	29-130	72	1300
Mercury (Hg)	mg/kg	7	<0.3-0.5	0.33	68-71
Selenium (Se)	mg/kg	7	<1-1.9	1.1	1,800
Nickel (Ni)	mg/kg	7	11-46	20	800
Copper (Cu)	mg/kg	7	28-77	46	44,000
Zinc (Zn)	mg/kg	7	42-180	66	170,000
Phenol	mg/kg	7	<1	1	440-1300
Benzo(a)pyrene (BaP)	mg/kg	7	<0.05-1.4	0.36	10
Naphthalene	mg/kg	7	<0.05-0.09	0.2	77-430 ⁺
Total Cyanide (CN)	mg/kg	7	<1	1	-
Acidity (pH values)	mg/kg	7	7.2-11.5	9.1	-
Soil Organic Matter	mg/kg	7	0.6-10	2.7	-

* Assumed as Total Cr minus CrVI

Based upon the seven samples taken and tested from the Made Ground, located beneath this site; no results of concern were noted. All results obtained were found to be below the STL Tier 1 screening values for a public open space (park) land use.

15.3.2 Asbestos Containing Materials

No suspected asbestos containing material (ACM) was visually identified within the Made Ground during the intrusive site works.

Asbestos containing materials were detected in one of the samples analysed by the laboratory. TP4 @ 0.7mbgl was found to contain loose fibres of chrysotile.

This sample was subject to quantification analysis and the result returned was <0.001% by weight, which is below the laboratory limit of detection.

However, it should be noted that the exploratory holes are of small size, relative to the area investigated and the investigation was constrained by site usage. Therefore, the samples obtained may not reflect the full composition of the soils on the site, and there is always the potential for pockets of asbestos, or for asbestos containing materials to be present, which have not been detected in the sampling.

It is also our experience that asbestos containing materials are quite often encountered in buried pockets and beneath slabs (sometimes adhering to the concrete) on older sites. However, given the works undertaken thus far, this aspect appears to be low risk.

15.3.3 Organic Contaminants

The following table summarises the results of the analysis for petroleum hydrocarbons:

Hydrocarbon Substance or Fraction	Measured Concentrations in mg/kg						
	TP1 @ 0.5m	TP2 @ 0.9m	TP3 @ 0.3m	TP3 @ 0.8m	TP4 @ 0.7m	TP5 @ 0.3m	TP5 @ 0.8m
TPHC6-C10	<1	<1	<1	<1	<1	<1	<1
TPHC10-C40	<10	70	40	29	71	210	290

The majority of the results were generally noted to be low. One was below the laboratory limit of detection.

The measured concentrations of the petroleum hydrocarbon fractions potentially exceed the UKWIR threshold(s) for the use of plastic water supply pipes / British Plastics Federation Pipes Group thresholds for drainage and sewage pipes for TP5.

16 Summary of Identified Contamination

Asbestos containing materials, comprising traces of chrysotile, were detected in one of the soil samples analysed (TP4 @ 0.7mbgl).

Quantification analysis returned a result of <0.001% by weight. This is below the laboratory limit of detection.

Levels of petroleum hydrocarbons could potentially impact upon underground services. Consultation with the relevant service providers is recommended.

Whilst the Made Ground present across the site would not be considered contaminated, with respect to the sites proposed end use, the physical composition of these soils means that they would not be considered to provide a suitable medium for plant growth. Therefore, where areas of soft landscaping and planting are proposed, a cap of imported soils will be required.

17 Risk Evaluation

The object of the risk evaluation is to assess the pollution linkages for specific contaminant groups considered in the conceptual model, identify any unacceptable risks and, therefore establish whether there is a need for further investigation and/or remedial action.

The risks are considered in the context of the specific development proposals for the site and, therefore, the conclusions may not be appropriate for alternative schemes.

17.1.1 Asbestos Containing Materials

Asbestos containing materials were detected in the one of the sample analysed. This comprised traces of chrysotile asbestos, as loose fibrous material, in TP4 at 0.7mbgl.

Quantification analysis was requested by STL and this indicated that the result for the soil sample was below the laboratory limit of detection of <0.001% by weight.

The presence of this material on site poses a potential risk to site workers. During the works appropriate precautions should be taken on site to protect site workers and the wider environment.

A careful watching brief should be kept for the presence of any such material during the site clearance and the groundworks.

Should further, more significant, asbestos containing materials be found, a remedial strategy will be required.

17.1.2 Petroleum Hydrocarbons

Levels of petroleum hydrocarbons could potentially impact upon underground services. Consultation with the relevant service providers is recommended, if new underground utilities (particularly water supply and sewerage pipes) are to be laid through the area.

17.2 Revised Conceptual Model

The preliminary site model has been refined in light of the findings of this investigation and is summarised below.

Metals	Petroleum Hydrocarbons	PAH Compounds	Land Gas	Asbestos	Pathways	Receptors
N	N	N	n/a	P	Ingestion/inhalation of contaminated soil & dust	Human Health
N	N	N	n/a	n/a	Dermal contact with contaminated soil & dust	
n/a	N	N	N	n/a	Inhalation of vapours or gases	
n/a	n/a	n/a	n/a	n/a	Uptake into edible fruit and vegetables	
n/a	n/a	n/a	n/a	n/a	Surface water run-off into surface water features	Water Environment
n/a	n/a	n/a	n/a	n/a	Migration through ground into surface water or groundwater	
n/a	n/a	n/a	n/a	n/a	Off-site migration of contaminated groundwater	
N	N	N	n/a	n/a	Vegetation on site growing in contaminated soil	Flora and Fauna
n/a	n/a	n/a	n/a	n/a	Aquatic life in affected waters	
n/a	P	N	n/a	n/a	Contact with contaminated soils	Building materials / buried services
n/a	N	N	N	n/a	Fire or explosion	

Key:

- Y Pollutant linkage likely
- N Pollutant linkage not likely
- P Pollutant linkage possible
- n/a Pathway not applicable to contaminant

17.3 Relevant Pollutant Linkages

One Relevant Pollutant Linkage for which remedial action may be required has been identified in the revised conceptual model, as follows.

Contaminant / Source	Pathways	Receptor
Asbestos containing materials in Made Ground	Soil/dust dermal exposure Soil/dust ingestion/inhalation	Site/construction workers

To date only one, very low, concentration of loose asbestos fibres has been found. However, a careful watch should be kept for any further more onerous pockets of asbestos based materials.

Potential pollutant linkages have also been identified for petroleum hydrocarbons with respect to underground service pipes.

18 Soil Waste Management

Soils from the vicinity of TP4 @ 0.7mbgl will need to be kept separate from other soils on site, because they were found to contain chrysotile asbestos materials. The Made Ground materials above this depth were not found to contain any asbestos based materials. The sample was were subject to quantification analysis and the result was <0.001% by weight.

18.1 Re-use of Soils

It is anticipated that the arisings from groundworks on this site will comprise Made Ground.

Clean natural arisings from groundworks may be re-used on site without further testing, where there is a definite use for such materials, e.g. raising levels or construction of landscaping layers or bunds as set out in the approved plans for the development.

Treated contaminated soils may be reused on site under an appropriate Materials Management Plan, where certain criteria are met, in accordance with the CL:AIRE Definition of Waste Code of Practice, Ref [8].

18.2 Disposal of Soils

Some soils will require removal from site and disposal to suitably licensed landfills. Different guidelines and charges will apply to different waste classifications. As waste producers, the Developer holds responsibilities under the various governing regulations, particularly the Waste Duty of Care Code of Practice under the Environmental Protection Act 1990, Ref [9].

The chemical analyses appended to this report can be used to inform the initial classification of the soils as either Hazardous or Non-Hazardous, and derive the appropriate EWC code, for offsite disposal or transfer. Waste Acceptance Criteria (WAC) testing may be needed for confirmation of the material's classification, and will be required to demonstrate an inert classification.

There are strict requirements in place for the accurate description of wastes using EWC codes and, therefore, it is essential that materials that would be given different descriptions (e.g. blacktop, made ground and natural soils), as well as those with different classifications, are carefully segregated during excavation and storage on site. This will also ensure the most cost effective disposal. Mixing these materials can give rise to significant difficulties in disposal and also substantially increase costs.

Soil arisings may be transferred to other development sites under a Materials Management Plan, where certain criteria are met, in accordance with the CL:AIRE Definition of Waste Code of Practice Ref [8].

All soils leaving site will need to be pre-treated. Waste minimisation by selective excavation is a recognised form of pre-treatment.

19 Discussion and Conclusions

The site comprises an existing area of public open space, which is to undergo improvement works. At the time of writing, the final design was unavailable, however, it is anticipated that the works will increase the areas of soft landscaping already present on the site.

The intrusive site works have found the site to be underlain by Made Ground to a depth of at least 1.2mbgl. Whilst this material has not been found to be chemically contaminated with respect to human health, given the sites proposed end use, the physical composition of the soils would make them unsuitable as a growing medium for plants.

It is suggested that as a minimum a 300mm depth of certified clean imported soils (including a minimum thickness of 150mm of topsoil) be provided within all areas of soft landscaping. This is subject to consultation with the horticultural consultant or landscape architect for the scheme, who may have further requirements for the depth and design of the planted areas, particularly if trees are to be included within the scheme.

Organic contaminants present in the soils, particularly petroleum hydrocarbons found in Made Ground, could affect plastic underground service pipes (such as the types used by water and gas supply companies). Guidance should be sought from the relevant companies regarding any proposed plant in the affected area. Many water supply companies now require higher specification pipe on contaminated sites, even following remediation.

As with any site, areas of contamination not identified during site investigation works may come to light in the course of redevelopment. Accordingly, a discovery strategy must be in place during the redevelopment to ensure that any hitherto unknown contamination is identified and dealt with in an appropriate manner. Depending on the nature of any such contamination, it may prove necessary to reassess the remedial strategy for the site.

20 General Guidance

It may be that specific local requirements apply to this site, of which we are not aware at this time.

In general terms, the workforce and general public should be protected from contact with contaminated material. There is a range of relevant documents published by the Health and Safety Executive, and organisations such as CIRIA, and the BRE.

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APPENDIX A

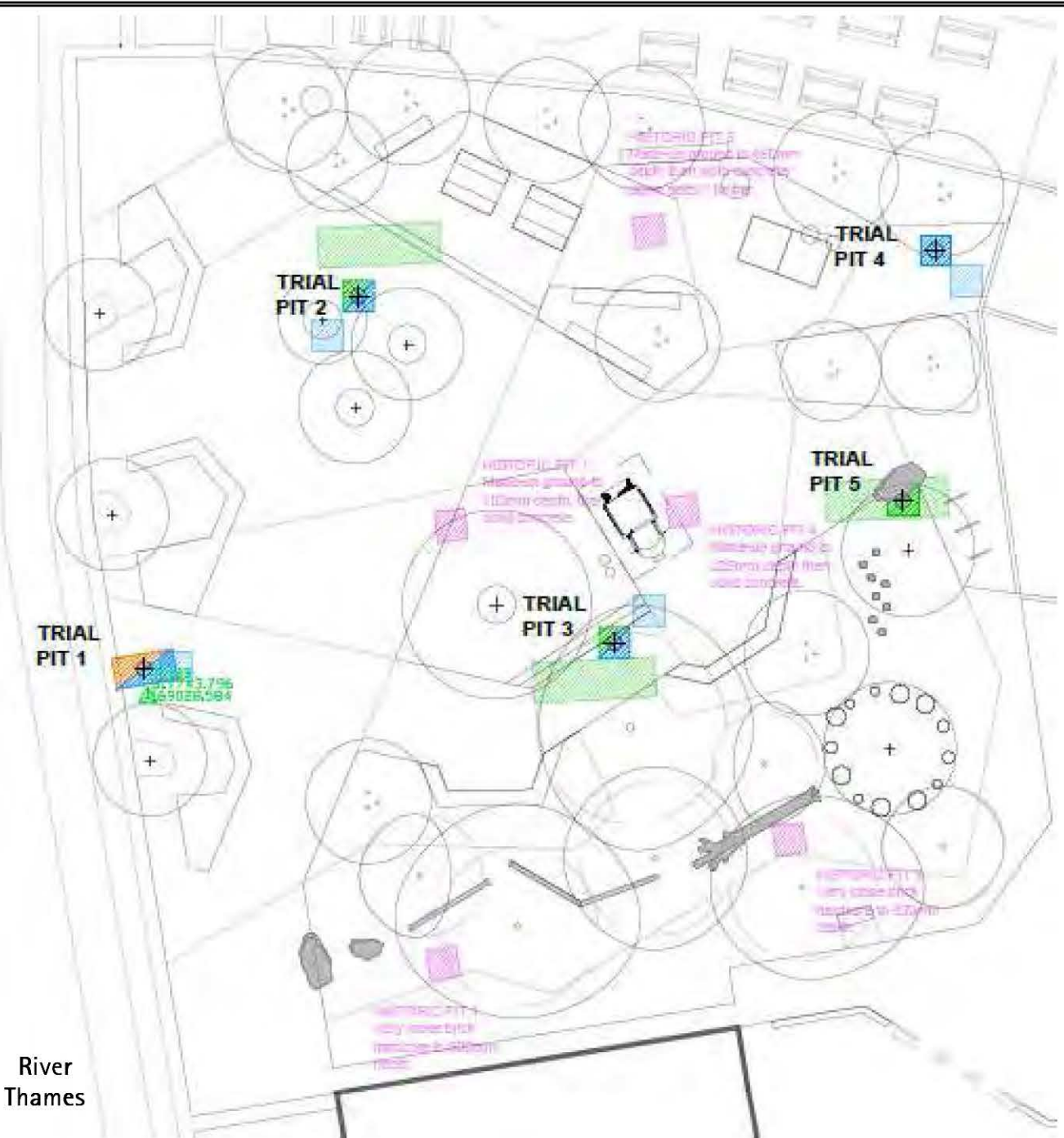
Site Plans and Exploratory Hole Logs





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Site:	Eagle Brewery Wharf, Kingston upon Thames, KT1 1HH	Project ID	J15525
Figure 1	Site Location Plan	Date:	14/08/2023



NB: Positions are only indicative.

Site: Eagle Brewery Wharf, Kingston upon Thames, KT1 1HH	STL: J15525	Fig No: 2
Date: 7 th March 2024	Trial Hole Location Plan - Not to Scale	

Key to Exploratory Hole Logs, Plans and Sections

Backfill Symbols		Pipe Symbols		Principal Soil Types		Principal Rock Types		Drilling Records	
Arisings		Plain Pipe		Topsoil		Mudstone		Water Strike	
Concrete		Slotted Pipe		Made Ground		Claystone		Depth Water Rose	
Blacktop		Piezometer		Clay		Siltstone		Total Core Recovery (%) [TCR]	
Bentonite		Piezometer Tip		Silt		Sandstone		Solid Core Recovery (%) [SCR]	
Gravel Filter		Filter Tip		Sand		Limestone		Rock Quality Index (%) RQD]	
Sand Filter		Extensometer		Gravel		Chalk		Fracture Index (fractures / m) [FI]	
		Inclinometers		Peat					

All soil and rock descriptions are in general accordance with BS5930 2015, BS EN ISO 14688-1:2002+A1:2013 and BS EN ISO 14689-1:2003. Chalk descriptions are also based on CIRIA C574 and "Logging the Chalk – R.N. Mortimer 2015". The Geology Code is only provided where a positive identification of the sample strata has been made.

Location / Method Identifiers		In-situ Test Location / Method	
BH	Borehole (undefined)	DP	Dynamic Probe
CP	Cable Percussive	CPT	Cone Penetration Test
RC	Rotary Core	CBR	In-situ CBR Test
RO	Rotary Open Hole	DCP	CBR using Dynamic Cone Penetrometer
ODC	Rotary Odex/Symmetrix drilling cased	CBRT	CBR using TRL Probe
CP+RC	Cable Percussive to Rotary Core	PB	Plate Bearing Test
SNC	Sonic	SPT (S)	Standard Penetration Test (Split Barrel Sampler)
CFA	Continuous Flight Auger	SPT (C)	Standard Penetration Test (Solid Cone)
FA	Flight Auger	N	SPT Result
VC	Vibro Core	-/-	Blows/Penetration (mm) after seating drive
WLS+RC	Windowless (Dynamic) Sampler to Rotary Core	-*/-	Total Blows / Penetration (mm)
WLS	Windowless Sampler	()	Extrapolated Value
WS	Window Sampler	PPT	Perth Penetration (In-House Method - Equivalent N Value)
HA	Hand Auger	HP / UCS	Strength from Hand Penetrometer (kN/m ²)
C	Road / Pavement Core	IVN	Strength from Hand Vane ((kN/m ²) P = peak, R = residual
IP	Inspection Pit (Hand Excavation)	PID	Photo Ionisation Detector (ppm)
TP	Trial Pit (Machine Excavated)	MEXE	Mexi-Cone CBR (%)
OP	Observation Pit (Supported Excavation Hand or Machine)		

Samples / Test Type	
B	Bulk Sample
BLK	Block Sample
C	Core Sample
CBRS	CBR Mould Sample
D	Small Disturbed Sample
ES	Environmental Sample (Soil)
EW	Environmental Sample (Water)
GS	Environmental Sample (Gas)

Samples / Test Type	
SPTLS	Standard Penetration Test Split Barrel Sample
TW	Thin Wall Push In Sample (e.g. Shelby Sampler)
U	Undisturbed Open Drive Sample (blows to take)
UT	Thin Wall Undisturbed Open Drive Sample (blows to take)
W	Water Sample (Geotechnical)
SP	Sample from Stockpile
P	Piston Sample
AMAL	Amalgamated Sample

Client:

Royal Borough of Kingston upon Thames

Co-ordinates:

Level (m AOD)

Logger:


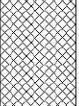
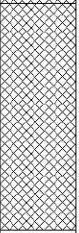
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Project Name:

Eagle Brewery Wharf (Open Space)

Location:

Riverside Walk, Kingston upon Thames

Samples and Insitu Testing			Level (m AOD)	Thickness (m)	Legend	Depth (m bgl)	Stratum Description
Depth (m bgl)	Type	Results					
0.50	ES			(0.10)		0.10	blacktop surfacing
				(0.30)		0.40	Brown GRAVEL of brick and flint with scant matrix of fine to coarse sand Made Ground (subbase)
				(0.60)		1.00	Black, silty fine to coarse SAND some sand of ash Made Ground
							@0.8mbgl 200mm diameter drainage pipe noted
							Pit terminated at 1.00m

Pit Dimension (m)		Pit Stability:	stable	Water Strikes	
Width:	1.00	Weather:		Depth (m)	Date/Time
Length:	1.00	Remarks:			
Depth:	1.00	pipe at 0.8mbgl, dry			
Status:	FINAL	Log Print Date and Time:	15/02/2024 11:12	Log Approved By:	