



Phase 1 Land Contamination Assessment/Preliminary Risk Assessment

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1.0 What is Required for a Phase 1 Land Contamination Assessment/Preliminary Risk Assessment?

- 1.0.1 The purpose of a Phase 1 Land Contamination Assessment or Preliminary Risk Assessment (PRA) is to establish the previous uses of the land under consideration or land nearby or adjacent to it, and to identify potential sources of contamination, receptors and pathways. It is important to identify all past uses of the site, and adjacent or nearby sites, since pollutants have the potential to travel away from the source, depending on the geology, groundwater and surface water of the area.
- 1.0.2 The Phase 1 Land Contamination Assessment should contain an outline conceptual site model based on the findings of a desktop study and site walkover that characterises all actual or potential pollutant linkages. This will then form the basis of any subsequent work undertaken such as intrusive investigations, risk assessment etc and set out any necessary remediation works required as part of a subsequent Phase II assessment. Alternatively the findings will rule out the need for further work at an early stage.
- 1.0.3 Please note that this guidance is not an exhaustive list of requirements and readers must also note that legislation, guidance and practical methods are subject to change. All reasonable precautions have been taken to ensure that the information contained within this document is accurate at the time of publication however Gateshead cannot assume legal responsibility for any loss or damage caused to person, land or property for persons relying on this information.

1.1 Desk Top Study (Desk Study)

- 1.1.1 The desk top study comprises a search of available environmental information and historical maps, which can be used to identify changes in land usage from old maps, trade directories and other publicly available historical records, to determine the physical characteristics of the site and to identify the likelihood of contamination. This should not just be constrained to the application site. A study of adjacent sites and the surrounding area should also be provided as contaminants can migrate from elsewhere.

1.1.2 Information about the site can be obtained from many sources, including

- Previous investigations and monitoring
- Historical maps (e.g. O.S. 6" to a mile County Series)
- Trade directories
- Aerial photographs
- Local authority records of development on site and in the vicinity
- Current use of the site and adjacent sites
- Environment Agency
- Local history groups
- Utility companies
- Land registry
- Industry profiles
- British Geological Survey
- Petroleum Officer
- Company records
- Records of pollution incidents (local authority, Environment Agency, Health and Safety Executive)
- Local knowledge
- Coal Authority

1.1.3 The desktop study should also include information on the general characteristics of the site including details of the geological setting, e.g.:

- Sequence of strata at the site
- Variation of strata across the site
- Composition of formations
- Likely thickness of beds
- Aquifer classification
- Aquifer vulnerability
- Significance of geology as a source, pathway or receptor
- Surface water on or near the site
- Classification of surface water
- Distance and direction of each watercourse from the site
- Made ground
- Flood potential

- Topography

1.1.4 Other information which should be included to substantiate the desktop study to enable a comprehensive assessment includes:

- Part A and B processes within 250m
- Radioactive Substances Authorisations within 250m
- Licensed waste disposal sites and closed landfill sites within 250m
- Other industry within 250m
- Sewage works
- Protected habitats (e.g. Sites of Special Scientific Interest)

1.1.5 This initial part of the PRA should also include a detailed site plan showing the site location, extent and boundaries of the site in context with the findings of the Desktop study.

1.2 Site Walkover

1.2.1 A simple walkover survey of the site should then be conducted to identify pollution linkages not obvious from the desk study.

1.2.2 Having identified potential contaminative uses within the desktop study a site walk over survey will also help to locate potential problem areas on the ground.

1.2.3 Contamination of soil, groundwater and building fabrics all impart valuable visual information. Old foundations, backfilled areas, subsidence and drainage may indicate changes of use, and identify areas requiring detailed sampling. Features to look for include :

- Buildings
- Surface materials
- Underground and above ground tanks
- Surface disturbance, subsidence and discoloration
- Chemical stores
- 'Dirty' work areas
- Waste storage areas

- Adjacent properties

1.2.4 The report produced following the site walkover should include a description of structures, soils and vegetation. Limited intrusive investigation may also be appropriate at this stage.

1.3 Conceptual Site Model

1.3.1 After carrying out a detailed desktop study and walk over survey it should be possible to identify pollutant linkages and develop a preliminary conceptual site model . The conceptual site model (CSM) comprises three elements:

- Potential sources of contamination
- Potential receptors that may be harmed
- Potential pathways linking the two

1.3.2 The CSM is a written and diagrammatical summary of the environmental processes on a site and its surrounding area, the potentially significant sources of contamination, pathways through which contaminants can travel, and receptors that eventually could be harmed. This must be included at all stages of the Site Investigation. A CSM will provide a summary of the site including details such as;

- Its current status, history, geology and hydrogeology.
- Any potential contaminants, pathways and/or receptors.
- A summary of 'Significant Pollutant Linkages' – where there is a potential link between the potential contaminants and receptors.
- Any uncertainty in the information collected.

1.3.3 The CSM is used to collate and interpret results, guide further investigation, monitor changes and communicate results of the investigation to all stakeholders. It underpins each stage of contaminated land management. The 'conceptual site model' produced will depend upon the previous site use and proposed development. In some circumstances there may be a large number of plausible pollutant linkages and in others there may only be a small number. The 'conceptual site model' developed as part of the Preliminary Risk Assessment should provide enough detail to determine what, if anything, will be required as part of a Quantitative Risk Assessment.

1.4 Risk Assessment

1.4.1 The final part of the Land Contamination Assessment is then the Risk Assessment and Conclusions derived from the conceptual site model addressing each potential source, pathway and receptor in turn and should indicate if any, what the risk of contamination is.

1.5 Conclusion to Assessment

1.5.1 The conclusion should then state whether the findings of the PRA are satisfactory and that no further work is required i.e no risk to human health or whether additional Phase 2 contamination works (intrusive site investigation and risk assessment) are required to identify and confirm potential pollutant linkages.

See checklist A in Appendix A1 for more information on what information should be submitted as part of a Phase 1 Land Contamination Assessment.

1.5.2 If it can be confirmed that your site is underlain solely by 'natural ground' and there is no evidence of any potential contamination then there MAY be no need to carry out any further investigation. However, if there are significant amounts of 'made ground' (e.g. rubble and cinders used in the past to level up the ground; or signs of a former infilled agricultural pond, etc.) or evidence of contamination (e.g. oil staining from a former heating oil storage tank; or pieces of broken asbestos sheeting in the soil from a former garage on the site etc.) then you will need to engage professional consultants to carry out a detailed Phase 2 investigation of the site.

1.5.3 The Phase 2 investigation, consists of excavations into the ground and the recording of the ground conditions. Samples will need to be taken from the excavation at appropriate depths, this is normally from made ground or where there is staining of the soil or odours. These samples can then be analysed for contaminants. The record of ground conditions can be used to assess if there is any likelihood of the ground producing gas, either from organic matter

or hydrocarbon contamination. Gas wells may need to be installed and a programme of sampling undertaken. If potential ground water contamination has been identified it will also be necessary to install ground water monitoring wells and a programme of ground water sampling and analysis undertaken. A competent geo-environmental consultant will be familiar with this type of investigation. Full guidance on producing a Phase 2 report can be found in the Councils supplementary guidance “Phase 2: Intrusive Ground Investigations and Quantitative Risk Assessment”.

2.0 Key Points

- It is important to identify the potential for contamination to be present at an early stage in order that unexpected costs and delays can be avoided should a potential problem be identified during development works.
- Only a Phase 1 Land Contaminated Assessment is required at the application stage and although further investigations may be documented these can be conditioned if required. Examples of likely conditions can be found in Appendix 2.
- It is advised that a Phase 1 assessment is carried out by a suitably qualified professional.
- The Assessment should produce a conceptual site model that characterises all plausible pollutant linkages. This will form the basis of the Preliminary Risk Assessment and conclusions of the Phase 1 assessment as well as any subsequent work undertaken as part of a Quantitative Phase 2 Risk Assessment.
- An example of a basic Phase 1 Assessment can be found in appendix A3.

References (Useful Documents)

MANDATORY GUIDANCE

- The Contaminated Land (England) Regulations 2000
- Contaminated Land (England) (Amendment) Regulations 2012.
- The Environment Act 1995
- The Environmental Protection Act 1990
- Department for Communities and Local Government, 2012. National Planning Policy Framework.
- Department for Environment, Food and Rural Affairs, April 2012. Environmental Protection Act 1990, Contaminated Land Statutory Guidance. The Stationery Office Ltd.

ADVISORY GUIDANCE

- Model Procedures for the Management of Contaminated land (CLR11): 2004 Department for Environment Food and Rural Affairs & Environment Agency, www.environmentagency.gov.uk/commondata/105385/model_procedures_881483.pdf
- Environment Agency, Human health toxicological assessment of contaminants in soil (Science Report Final SC050021/SR2), 2009
- Environment Agency, Updated technical background to the CLEA model (Science Report Final SC050021/SR3), 2009
- CLEA software V1.06 licence agreement (PDF, 114KB)
- BS 10175:2011 – Investigation of Potentially Contaminated Sites – Code of Practice
- Environment Agency/NHBC R&D Publication 66 - 'Guidance for the Safe Development of Housing on Land Affected by Contamination', 2008
- www.communities.gov.uk/documents/planningandbuilding/pdf/pps2annex2.pdf
- DOE (Department of the Environment) Contaminated Land Research Report: Guidance on Preliminary Site Inspection of Contaminated Land: 1994.
- DOE Contaminated Land Research Report: Sampling Strategies for Contaminated Land: 1994.
- BRE Construction of New Buildings on Gas Contaminated Land: 1991.

- Environment Agency, Methodology for the Derivation of Remedial Targets for Soil and Agency R&D Groundwater to Protect Water Resources, R&D Publication 20,1999
- DoE, 1995 Industry profiles (various titles)
- CIRIA, 1995 Remedial Treatment for Contaminated Land, SP 104, Classification and Selection of Remedial Methods
- DoE, 1994 Guidance on Preliminary Site Inspection of Contaminated Land, CLR2
- DoE, 1994 Sampling Strategies for Contaminated Land
- EA, 2001 Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination
- INFO-PM2b CIRIA, 1996 A Guide for Safe Working on Contaminated Sites, R132
- CIRIA C659, Assessing risks posed by hazardous ground gases to buildings, 2006
- The Chartered Institute of Environmental Health: The Local Authority Guide to Ground Gas, 2009
- Chartered Institute of Environmental Health and Land Quality Management, Generic Assessment Criteria for Human Health Risk Assessment, 2006 www.lqm.co.uk/lqmpress/0823%20GAC%20web%20brochure.pdf
- British Standards Institute, BS5930:1999 Code of practice for site investigation, 1999
- www.bsi-global.com/en/Shop/Publication-Detail/?pid=000000000030176112
- Environment Agency, Guidance on Requirements for Land Contamination Reports, 2005 www.environment-agency.gov.uk/commodata/acrobat/devguidev1_1155225.pdf
- Environment Agency, Remedial Targets Methodology – Hydrogeological Risk Assessment for Land Contamination, 2006 publications.environment-agency.gov.uk/pdf/GEHO0706BLEQ-e-e.pdf
- National House-Building Council, Environment Agency and Chartered Institute of Environmental Health, Guidance for the Safe Development of Housing on Land Affected by Contamination - R&D Publication 66, 2008 publications.environment-agency.gov.uk/pdf/SR-DPUB66-e-e.pdf?lang=e

Appendix A1

Checklists for Phase 1

A checklist is attached below of the necessary information required. Please note that the checklist is not exhaustive and a site may need further information may be required.

CHECKLIST A **Phase 1 Land Contamination Assessment/PRA**

A.	Requirements
1	Site area in hectares.
2	Description of site and surroundings (including adjacent land uses which may affect, or be affected, by this site).
3	Details of desk study researches undertaken
4	Information on past and current activities on the site.
5	Information on history of surrounding area.
6	Historical Ordnance Survey maps and site plans and if available, aerial photographs
7	Geological strata (including man made) present, vertical & horizontal variation across the site.
8	Hydrology.
9	Hydrogeology including factors such as aquifer classification, position of water table, groundwater flow direction, generic details and surface groundwater interaction.
10	Relevant water quality factors i.e. river quality, discharges, abstractions.
11	Details of any IPC processes or radioactive substances relevant to the site.
12	Information on site drainage and other man-made potential pollutant pathways, e.g. underground services.
13	Identification of potential contaminants of concern and source areas.
14	Details of waste disposal activities at or in the vicinity of the site.
15	Consultations with the Local Authority, Environment Agency and appropriate bodies.
16	Review and summary of previous reports, with report references.
17	Details of any site visits/ walkovers conducted
18	Outline conceptual site model including nature and location of potential sources, pathways and receptors clearly identified. Also show potential pollutant linkages between these factors.
19	Description and justification of possible pollutant linkages for all potential receptors identified within the conceptual site model.
20	Identification of potentially unacceptable risks to potential receptors including the screening criteria used to identify those risks (state degree of confidence).
21	Justification of why any possible pollutant linkages have been assessed as posing an acceptable risk.
22	Description and justification of next steps proposed at the site, e.g. carry out site investigation and quantitative risk assessment (including timescale).

Appendix A2

Examples of Conditions:

In Accordance with Land Contamination Assessment

The development hereby approved shall be carried out fully in accordance with the findings and details of the Land Contamination Assessment refsubmitted as part of this application.

Reason

To ensure that the proposed site investigations and remediation will not cause pollution of Controlled Waters and address contamination issues which may affect human health and the wider environment in accordance with the National Planning Policy Framework as well as policies DC1 and ENV54 of the Gateshead Unitary Development Plan.

Phase 2 Site investigation – contaminated land

No development approved by this planning permission shall be commenced until the following have been carried out: -

a) A site investigation shall be designed for the site including the information obtained from the desktop study submitted with the application. This shall be submitted to, and be approved in writing by the Local Planning Authority (LPA) prior to this site investigation being carried out on the land. The site investigation must be comprehensive and enable: -

(i) the conceptual site model to be refined;

(ii) a Phase II detailed Risk Assessment to be undertaken relating to soil and on site and off site associated groundwater and surface waters that may be affected, and ground gas and vapour and

(iii) a Method Statement to be developed detailing the remediation requirements.

b) The site investigation including the risk assessment shall be carried out in accordance with the details approved in writing by the LPA.

c) A Method Statement detailing the remediation requirements, including measures to minimise the impact on soil, ground and surface waters, using the information obtained from the site investigation, shall be submitted to and be approved in writing by the LPA.

The remediation of the site shall be carried out in full accordance with the approved Method Statement prior to commencement of construction works.

Reason

To ensure that the proposed site investigations and remediation will not cause pollution of Controlled Waters and address contamination

issues which may affect human health and the wider environment in accordance with the National Planning Policy Framework and Policies DC1 and ENV54 of the Gateshead Unitary Development Plan.

Contamination not previously identified

If during development, contamination not previously identified is found to be present at the site then no further development, unless otherwise given prior written approval by the Local Planning Authority, shall be carried out until the developer has submitted and obtained written approval from the Local Planning Authority for an addendum to the Method Statement under condition 3 above. This addendum to the Method Statement shall detail how this unsuspected contamination shall be dealt with.

Reason

To ensure that the development complies with approved details in the interests of the protection of Controlled Waters and addressing contamination issues which may affect human health and the wider environment in accordance with the National Planning Policy Framework Policies DC1 and ENV54 of the Gateshead Unitary Development Plan.

Contaminated Land Verification Report

Upon completion of the remediation detailed in the Method Statement under the above conditions and prior to the occupation of the building, a report shall be submitted to the Local Planning Authority that provides verification that the required works regarding contamination have been carried out in full accordance with the approved Method Statement. Post remediation sampling and monitoring results shall be included in the report to demonstrate that the required remediation has been fully met. All proposed future monitoring and reporting shall also be detailed in the report.

Reason

To protect Controlled Waters, human health and the wider environment by ensuring that the remediated site has been reclaimed to an appropriate standard in accordance with the National Planning Policy Framework and Policies DC1 and ENV54 of the Gateshead Unitary Development Plan.

Gas Monitoring

Prior to commencement of development, full details of a monitoring scheme to test for the presence and likelihood of gas emissions from underground, including methane gas, shall be submitted to and approved in writing by the Local Planning Authority and such scheme shall be undertaken in full accordance with the approved details unless alternative arrangements have been submitted to and approved by the Local Planning Authority.

Reason

To check on gas emissions from underground so that any development can be suitably designed in accordance with the National Planning Policy Framework and policies DC1 of the Gateshead Unitary Development Plan

Appendix A3 – Example of a Basic PRA Report.

Site Name Project Number Land Condition – Phase 1 Assessment

Site Location & Description	<i>This would be a brief description of the site from a walkover survey and available records. The client will supply site location and layout plans independently</i>	
Site History		
	On site (salient only)	(from review of historical maps – Landmark)
<i>Feature</i>	<i>Location</i>	<i>Date(s)</i>
<i>Feature</i>	<i>Location</i>	<i>Date(s)</i>
<i>Feature</i>	<i>Location</i>	<i>Date(s)</i>
	Off site (within 50m & other obvious features)	(from review of historical maps – Landmark)
<i>Feature</i>	<i>Distance</i>	<i>Date(s)</i>
<i>Feature</i>	<i>Distance</i>	<i>Date(s)</i>
<i>Feature</i>	<i>Distance</i>	<i>Date(s)</i>
Site Setting		
Geology	<i>A brief description of the relevant geology and the map citation</i>	
Hydrogeology	<i>A brief description of the groundwater/aquifer characteristics and soil sensitivity taken from in-house maps</i>	
Mines	<i>Description of any known mining, or likelihood of mine related problems (Landmark & other)</i>	
Radon	<i>Presence of radon/likely protection measures – taken from BRE guidance</i>	
Conceptual Model		
Sources	▪ <i>list of sources by type and origin (likely)</i>	
Pathways	▪ <i>List of likely pathways</i>	
Receptors	▪ <i>List of likely receptors</i>	
Risk Assessment summary	<i>Summary of pollutant linkages likely to have greater than low impact on receptor(s)</i>	
Conclusions & Recommendations		
Basis of Assessment	<i>e.g. This assessment is a preliminary Phase 1 desk study intended to give an initial indication of whether there may be need for further investigation and assessment of the site. This report may be submitted in support of a planning application or for the purposes of due diligence or prior to acquisition but it is possible that further investigation and assessment may be required in order to fully characterise the site.</i>	

SAMPLE ONLY Land Condition – Phase 1 Assessment

Site Location & Description	<ol style="list-style-type: none"> 1. The site is located within the centre of the GATESHEAD at It is approximately 4.8 Ha, roughly rectangular in shape and slopes gradually to the north. 2. The site consists of a car park, numerous retail businesses and an associated service area. 3. The site is bounded by ? Street and ? Street with access from the north.
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	4. There is a fuel storage facility that is appropriately banded and well maintained within the service area. There is also a waste collection and storage area with numerous chemical containers evident.	
Site History		
	On site (salient only)	
Workshop and Garage	In the north	1952-1976
Repair depot	In the south	1960-1989
Chemical storage	In the east	1960-present
	Off site (within 50m & other obvious features)	
Quarry	100m SW	1929-1942
Petrol Garage	15m E	1952-1976
Site Setting		
Geology	(Boulder clay) Coal Measures	
Hydrogeology	Minor Aquifer, soils of high leaching potential. No evidence of abstractions or springs on current mapping	
Mines	No known mining or compressible ground risk in the area	
Radon	1-5% of homes affected by radon. Radon protection unlikely to be required	
Conceptual Model		
Sources	<ul style="list-style-type: none"> ▪ Hydrocarbons stored on site ▪ Hydrocarbons migrating from off site ▪ Chemicals stored on site ▪ Asbestos 	
Pathways	<ul style="list-style-type: none"> ▪ Ingestion of contaminated soils ▪ Inhalation of contaminated soil dusts ▪ Inhalation of vapours ▪ Dermal contact with contaminated soils ▪ Leaching/migration to controlled water 	
Receptors	<ul style="list-style-type: none"> ▪ Site workers ▪ Site visitors ▪ Groundwater/wider environment 	
Risk Assessment summary	A risk of vapour inhalation by site workers is possible (moderate), as is the possible contamination of groundwater by hydrocarbons (moderate). These risks would only be likely should evidence of hydrocarbon contamination in the soil be detected.	
Conclusions & Recommendations	<ol style="list-style-type: none"> 1. The site is assessed to present a moderate risk of contamination from evidence of historic and current use. 2. A possibility exists that hydrocarbon contamination could have an adverse impact on site workers. 3. It is less likely that hydrocarbons would adversely impact controlled waters due to the nature and lack of continuity of groundwater beneath the site. 4. The site is considered suitable for its current use. 5. For the purposes of redevelopment, the site should be fully characterised through a comprehensive Phase 1 and Phase 2 investigation. 	
Basis of Assessment	<i>This assessment is a preliminary Phase 1 investigation intended to give an indication as to the need for further assessment of the site. This report may be submitted in support of a planning application or for the purposes of due diligence prior to acquisition. It is possible that</i>	

	<p><i>further investigation and assessment may be required in order to fully characterise the site, or to satisfy the planning authority or other parties.</i></p>
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