



Appendix 14-PD-3: Land Contamination Methodology

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Appendix 14-PD-3: Land Contamination Methodology

1. Introduction

- 1.1.1 In line with the Environment Agency's Land Contamination Risk Management (LCRM) guidance (Ref. 1), the assessment of land contamination uses a tiered, risk-based approach, as summarised below:
- a. Tier 1: qualitative risk assessment based on a desktop study of available information to identify potential sources of contamination, receptors to contamination and potential pathways between them. The identified sources, pathways and receptors are presented in the form of a Conceptual Site Model (CSM) showing the potential contaminant linkages (PCL);
 - b. Tier 2: If PCL are identified, this means there is a theoretical risk to receptors from contamination and intrusive investigation should be used to provide data to inform a generic quantitative risk assessment (GQRA). The GQRA involves comparison of site-specific, laboratory analytical data against appropriate generic assessment criteria (GAC) for human health and/or controlled waters which represent minimal or tolerable risk; and
 - c. Tier 3: detailed quantitative risk assessment to identify whether contamination identified above minimal or tolerable risk levels represents an unacceptable risk and therefore requires remediation.

1.2 Screening Assessment (undertaken as part of Tier 1)

- 1.2.1 A qualitative assessment of the risks posed by land contamination within the study area has been undertaken as part of the Preliminary Environmental Information (PEI) Report (**Appendix 14-PD-4** in PEI Report **Volume 4**) by first assigning a 'baseline risk score' to each identified historical or current area of potential land contamination identified in the baseline review (**Appendix 14-PD-2** in PEI Report **Volume 4**). The baseline risk score has been determined using Tables 1 to 3 below. The baseline risk score is based partly on the relationship between the identified area of potential land contamination and its proximity zone to the Preliminary Order Limits (**Table 1**) together with the nature of the current and / or historical land use, as certain land uses typically result in a greater potential for contamination of the ground to have occurred (**Table 2**). The baseline risk score then considers the relationship between the proximity zone, potential contaminated land and whether cut or fill earthworks / embankment / tunnels are part of the Proposed Development design at its closest point (**Table 3**).

- 1.2.2 The lower the baseline risk score then the lower the perceived level of risk. Professional judgement has been applied in reviewing the generated baseline risk scores. Generally, baseline risk scores of two or less are considered not to pose an unacceptable risk and will not be considered for further assessment. Baseline risk scores of three or more will be considered for further risk and impact assessment (but subject to a professional judgement check).
- 1.2.3 The next stage of screening relates to a review of sensitive receptors and their proximity to the potential areas of land contamination. A combination of this review and the baseline risk score defines whether a site advances to the detailed assessment stage for further risk and impact assessment which is described in section 1.4.
- 1.2.4 A flow chart summarising the screening, risk and impact assessment steps is presented in **Plate 1**.

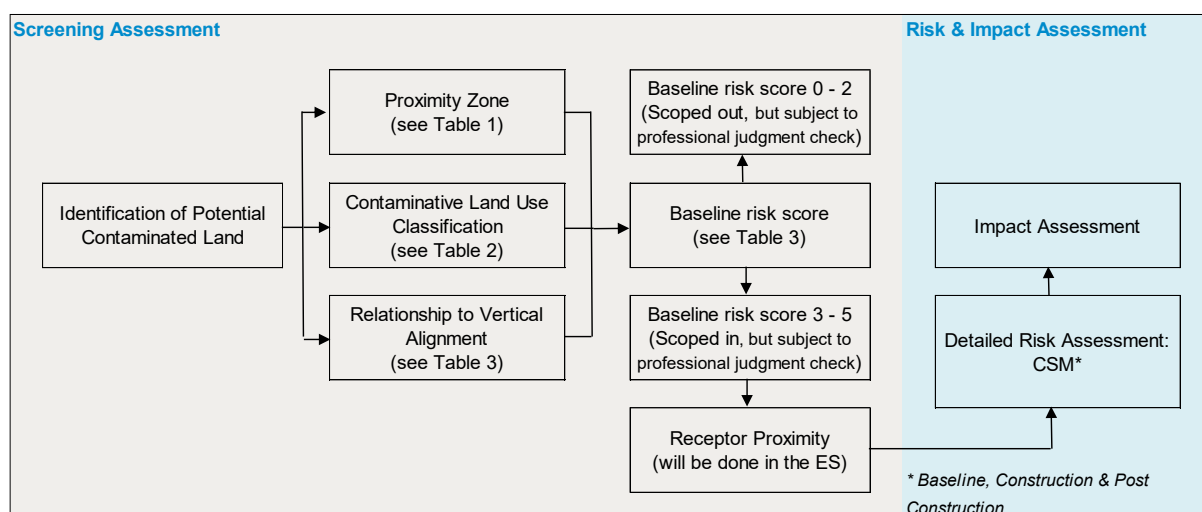


Plate 1: Land contamination assessment flow chart

1.3 Land Contamination Methodology Tables

- 1.3.1 **Table 1**, **Table 2** and **Table 3** describe the additional details for the approach to the assessment of potential land contamination in relation to the Proposed Development.

Table 1: Proximity zone definition

Zone number	Definition
Zone 1	All land on or within the footprint of the Preliminary Order Limits and including a 10 m margin.
Zone 2	All land between 10 m and 50 m from the Preliminary Order Limits.

Zone number	Definition
Zone 3	All land between 50 m and 250 m from the Preliminary Order Limits.

Table 2: Potentially contaminative land uses

Class	Generic description	Typical land uses
Class 1	Low risk of potential contamination, or less hazardous chemicals in use	Farms (ancillary buildings and areas for storing chemicals, fuel etc.) Warehouses Goods yards Hospitals Builders yards Retail and business parks
Class 2	Medium risk of potential contamination, more hazardous chemicals in possible use.	Engineering workshops Railways / disused railway lines Brick works Dry cleaners (retail) Sewage works Former clay pits and quarries Cement / asphalt works Car breakers Garage workshops Waste transfer facilities Paper works Power stations Glass works Timber treatment works Foot and mouth burials Metal manufacturing and plating Depots Scrap yards
Class 3	High risk of potential contamination, hazardous chemicals likely to be present.	Gas and coke works Landfills and historic landfills Petrol filling stations Oil depots Iron and steel works Historical foundries Chemical works

Table 3: Baseline risk score

Potentially contaminative land uses	Proximity to Preliminary Order Limits	Vertical alignment	Baseline risk score
Class 1 Low Risk	Zone 1	Embankment	2
		Cutting / at grade / cut and cover tunnel	3
		Bored tunnel / Horizontal Directional Drilling (HDD)	0
	Zone 2	Embankment	1
		Cutting / at grade / cut and cover tunnel	2
		Bored tunnel / HDD	0
	Zone 3	Embankment	0
		Cutting / at grade / cut and cover tunnel	1
		Bored tunnel / HDD	0
Class 2 Medium Risk	Zone 1	Embankment	3
		Cutting / at grade / cut and cover tunnel	4
		Bored tunnel / HDD	2
	Zone 2	Embankment	2
		Cutting / at grade / cut and cover tunnel	3
		Bored tunnel / HDD	2
	Zone 3	Embankment	1
		Cutting / at grade / cut and cover tunnel	2
		Bored tunnel / HDD	1
Class 3 High Risk	Zone 1	Embankment	4
		Cutting / at grade / cut and cover tunnel	5
		Bored tunnel / HDD	3
	Zone 2	Embankment	3
		Cutting / at grade / cut and cover tunnel	4
		Bored tunnel / HDD	3
	Zone 3	Embankment	2
		Cutting / at grade / cut and cover tunnel	3
		Bored tunnel / HDD	2

1.4 Risk and Impact Assessment

1.4.1 The risk and impact assessment will be undertaken within the Environmental Statement (ES). Initially, this will involve creating a baseline CSM for the

potential contaminated land sites identified as part of the screening assessment (not the Proposed Development itself); broadly using the preliminary CSMs developed in the desk-based assessment, provided in **Appendix 14-PD-2** in PEI Report **Volume 4**.

- 1.4.2 The first stage to the CSM will be to look at grouping the sites that will be taken through to this stage of the assessment, where it is appropriate to do so, based on common land uses, e.g. landfills, industrial / commercial sites, etc. Potentially, not all sites will be grouped, and selected key individual sites may be assessed as standalone sites (based on their potential for contamination / proximity to the Preliminary Order Limits / size).
- 1.4.3 Potential risks will be determined and assessed based on the likelihood (or probability) and consequence using the principles given in the National House Building Council (NHBC), Environment Agency and Chartered Institute of Environmental Health (CIEH) report R&D66 (2008) (Ref. 2). This provides guidance on development and application of the consequence and probability matrix to risk assessment and broad definitions of consequence and is widely used for a range of developments. The risk classification matrix is presented in **Table 4**.

Table 4: Estimation level of risk

	Consequence			
Probability	Severe	Medium	Mild	Minor
High likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
Likely	High risk	Moderate risk	Moderate/low risk	Low risk
Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

- 1.4.4 The approach to assessing the potential impacts of the Proposed Development from and to land contamination will be based on comparing the risk levels at baseline and the assessed risk levels for the construction and post-construction¹ stages respectively, to evaluate the change in risk at each stage; this defines the magnitude of impact classification for land

¹ For this chapter, a post-construction stage is introduced which recognises that the potential beneficial effect from any soil and/or groundwater remediation undertaken is realised upon completion of construction, but it is not an effect related to the operation of the Proposed Development.

contamination. This stage of the assessment is detailed further in **Chapter 14: Ground Conditions** in PEI Report **Volume 2**.

- 1.4.5 Evaluation of the magnitude of impact (Table 14.7 of **Chapter 14: Ground Conditions** in PEI Report **Volume 2**) and the sensitivity / value of the receptor (Table 14.6 of **Chapter 14: Ground Conditions** in PEI Report **Volume 2**) will define the significance of the effects of land contamination (Table 14.8 of **Chapter 14: Ground Conditions** in PEI Report **Volume 2**). Reference will be made to Design Manual for Roads and Bridges (DMRB), LA109 Geology and Soils (2019) (Ref. 3), LA104 Environmental Assessment and Monitoring (2020) (Ref. 4) and LA113 Road Drainage and the Water Environment (2020) (Ref. 5), which although applicable to road schemes, is considered to provide a suitable framework within which to conduct an assessment of ground conditions on developments which include linear elements (including the Proposed Development).
- 1.4.6 The full assessment of the potential impacts of the Proposed Development will be completed as part of the ES.

2. References

- Ref. 1 Environment Agency's online guidance for the management of land contamination 'Land contamination: risk management' (LCRM) (2023). Available at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm> [Accessed 23/10/2025].
- Ref. 2 National House Building Council (NHBC), Environment Agency and Chartered Institute of Environmental Health (CIEH) report R&D66, Guidance for the Safe Development of Housing on Land Affected by Contamination (2008).
- Ref. 3 Design Manual for Roads and Bridges (DMRB), LA109 Geology and Soils (2019).
- Ref. 4 DMRB, LA104 Environmental Assessment and Monitoring (2020).
- Ref. 5 DMRB, LA113 Road Drainage and the Water Environment (2020).