



Qualitative Risk Assessment Methodology

The approach adopted by Sirius for the qualitative assessment of risk is based upon that given in Annex 4 of NHBC-Environment Agency-CIEH “Guidance for the Safe Development of Housing on Land Affected by Contamination” (2008) and is consistent with other current guidance.

The risk posed by viable contaminant linkages is based upon the consideration of both:

- a) the magnitude of the potential consequence (i.e. its severity); and,
- b) the probability (likelihood) of that consequence being realised.

The classifications used in this report for consequence and probability are given in Tables 1 and 2, respectively. The derived risk classifications are defined in Table 3.

Where there is no viable contaminant linkage there is no potential risk.

Table 1. Classification of Consequence

Classification	Definition
Severe	<p>Contaminant concentrations at the receptor that are likely to result in “significant harm” to human health (as defined in Part 2A of the Environmental Protection Act 1990).</p> <p>Major pollution of controlled waters that could have persistent and/or extensive effects on water quality, for example fish kills, closure of an abstraction, or substantial deterioration in quality of the receiving water body.</p> <p>Major impact on receptor amenity value or major damage to agriculture or commerce.</p> <p>Major damage to an ecosystem that is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population.</p> <p>Catastrophic damage to crops, buildings or property.</p>
Medium	<p>Elevated concentrations at the receptor that might result in “significant harm” to human health (as defined in Part 2A of the Environmental Protection Act 1990).</p> <p>A pollution incident that has significant effect on water quality or abstraction potential.</p> <p>An incident that has a marked effect on receptor amenity value, agriculture or commerce.</p> <p>Damage to an ecosystem that may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population.</p> <p>Significant damage to crops, buildings or property.</p>



Classification	Definition
Mild	<p>Potential human health impact at the receptor point but unlikely to be classified as “significant harm” (as defined in Part 2A of the Environmental Protection Act 1990).</p> <p>Pollution of water that will have a small or short-lived effect on water quality and marginal effects on its amenity or resource value or its use in agriculture or commerce.</p> <p>Minor or short-lived damage to ecosystems, which is unlikely to result in a substantial adverse change</p> <p>Minor damage to crops, buildings or property</p>
Minor	<p>No potential measurable detrimental human health impacts at the receptor point.</p> <p>Impact on water that will have no or minimal effect on water quality or use.</p> <p>No or minor and easily repairable effects on buildings, structures and services.</p>

Table 2. Classification of Probability

Classification	Definition
High	An impact is already occurring or is very likely in the short-term and almost inevitable over the long-term.
Medium	It is probable that an event would occur. This is not inevitable but possible in the short-term and likely over the long-term.
Low	Circumstances are possible under which an event could occur. However, it is by no means certain that an event will take place, even over the long-term.
Unlikely	Circumstances are such that it is improbable that an event would occur even over the very long-term.

Table 3. Risk Classification

Probability	Consequence			
	<i>Severe</i>	<i>Medium</i>	<i>Mild</i>	<i>Minor</i>
<i>High</i>	Very High	High	Moderate	Low
<i>Medium</i>	High	Moderate	Low to Moderate	Low
<i>Low</i>	Moderate	Low to Moderate	Low	Very Low
<i>Unlikely</i>	Low to Moderate	Low	Very Low	Negligible



Table 4 provides a context for interpretation of the risk classification categories. The definitions provided are based on those given in CIRIA (2001) "Contaminated Land Risk Assessment. A Guide to Good Practice", Report C552.

Table 4. Interpretation of Risk Classification Categories

Risk Classification	Definition
Very High	There is a high probability that severe harm to one or more identified receptors could occur or there is evidence that this is already happening. This risk is likely to result in a substantial liability. Urgent investigation and remediation are likely to be required.
High	Harm is likely to be caused to one or more identified receptors. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could be caused to one or more identified receptors. However, it is relatively unlikely that such harm would be severe. Investigation is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low	It is possible that harm could be caused to one or more identified receptors but it is likely that this harm, if realised, would normally be mild. No further investigation is considered necessary to assess risk or environmental liability but investigations could be undertaken if desired to confirm 'baseline' conditions for the purposes of liability management. Remedial works are unlikely to be required.
Very Low	There is a low probability that harm could be caused to one or more identified receptors. In the event of such harm being realised, it is likely to be mild, at worst. No further investigation is considered necessary to assess risk or environmental liability but investigations could be undertaken if desired to confirm 'baseline' conditions for the purposes of liability management. Remedial works are very unlikely to be required.
Negligible	It is unlikely that harm could be caused to one or more identified receptors. In the event of harm being realised, it is likely to be minor. No further investigation is considered necessary to assess risk or environmental liability. Remedial works are not expected.

APPENDIX E

Terms of Reference

Ref 1	NA to BS EN ISO 1997-2: 2007 UK National Annex to Eurocode 7: Geotechnical Design Part 2: Ground Investigation and Testing.
Ref 2	BS EN ISO 1997-1:2004 Eurocode 7 Geotechnical Design, General Rules
Ref 3	BS EN ISO 1997-2: 2007 Eurocode 7 Geotechnical Design, Ground Investigation and Testing
Ref 4	BS EN ISO 14688-1: 2018 Geotechnical Investigation and Testing – Identification and Classification of Soil, Identification and Description (ISO 14688-1: 2017)
Ref 5	BS EN ISO 14688-2: 2018 Geotechnical Investigation and Testing – Identification and Classification of Soil, Principals of Classification (ISO 14688-2: 2017)
Ref 6	BS EN ISO 14689: 2018 Geotechnical Investigation and Testing – Identification, Description and Classification of Rock (ISO 14689; 2017)
Ref 7	BS EN ISO 22476-3: 2005 +A1: 2011 Geotechnical Investigation and Testing, Field Testing, Standard Penetration Testing
Ref 8	BS5930:2015+A1:2020 Code of Practice for Ground Investigations
Ref 9	BS 1377-1 to 9:1990-2022 Methods of Test for soils for Civil Engineering Purposes.
Ref 10	BS EN ISO 17892-1 to 12: 2014-2022 Geotechnical Investigation and Testing, Laboratory Testing of Soil
Ref 11	BS5975: 2019 Code of Practice for Temporary Works
Ref 12	CIRIA Report 97 1992 (2001 revision) Trenching Practice
Ref 13	Highways England CD225 & CD226 Design for new pavement construction.
Ref 14	BRE Digest SD1 (v3): 2005 Concrete in Aggressive Ground
Ref 15	BRE BD365: 2016 Soakaway Design
Ref 16	CIRIA 758D: 2019 Abandoned Mine Workings Manual
Ref 17	NHBC Standards 2023 Chapter 4
Ref 18	Highways Agency Manual of Contract Documents for Highways Works Volume 1 Series 600 Earthworks.
Ref 19	SEPA Contaminated Land Guidance. https://www.sepa.org.uk/regulations/land/contaminated-land/

- Ref 20** CL:AIRE 2020 'Professional guidance : Comparing Soil Contamination Data with a Critical Concentration'.
- Ref 21** BS 10175:2011+A2:2017 Investigation of potentially contaminated sites – Code of practice.
- Ref 22** BS 8485:2015+A1:2019 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
- Ref 23** BS 8576:2013 Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs).
- Ref 24** CIRIA C665: 2007 Assessing risks posed by hazardous ground gases to buildings.
- Ref 25** CIRIA C682: 2009 The VOCs Handbook.
- Ref 26** CIRIA C735: 2014 Good practice on the testing and verification of protection systems for buildings against hazardous ground gases.
- Ref 27** CIRIA C733: 2014 Asbestos in soil and made ground: a guide to understanding and managing risks.
- Ref 28** SEPA, Natural Resources Wales and Environment Agency Technical Guidance WM3 Version 1.2.GB October 2021 Waste Classification guidance on the classification and assessment of waste.
- Ref 29** Stroud, M.A. "The standard penetration test in insensitive clay and soft rocks", Proceedings of the European Symposium on Penetration Testing, 2, 367-375 1975.
- Ref 30** TRL publication LR1132 "Structural design of bituminous roads", 1984

SIRIUS GEOTECHNICAL LTD

North East	Yorkshire
Russel House	4245 Park Approach
Mill Road	Thorpe Park
Langley Moor	Leeds
Durham	LS15 8GB
DH7 8HJ	0113 264 9960
0191 378 9972	
www.thesiriusgroup.com	