Appendix F: Contamination Risk Assessment Methodology

Land Contamination Risk Assessment Methodology

In order to evaluate the possible risks associated with the potential contaminant linkages that have been identified within each of the zones, the methodology provided in CIRIA C552 (2001) has been adopted. This approach is consistent with the guidance provided within Land Contamination Risk Management, 2020.

Risk is considered to be a function of both the likelihood (probability) of contamination occurring at a zone and also the potential severity (consequence) of the environmental impacts associated with this contamination.

The classification system used to define likelihood, severity and risk is described in the following tables.

A contaminant linkage, and therefore a risk of harm exists, when a contaminant, receptor and exposure pathway to this receptor are present. The terminology used for these terms is consistent with those provided within the LCRM guidance as follows:

- A **contaminant** – a substance that is in, on or under the land and has the potential to cause harm or pollution of controlled waters
- A **receptor** – in general terms, something that could be adversely affected by a contaminant, such as people, and ecological system, property, or a water body
- A **pathway** – a route or means by which a receptor can be exposed to or affected by a contaminant
- A **risk** – a combination of the likelihood (or probability) of occurrence of a defined hazard and the magnitude of the severity (consequence) of the occurrence.

Classification of Severity

CLASSIFICATION	RATING	DEFINITION	EXAMPLES
Severe	4	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment protection Act 1990, Part IIA. Short term risk of pollution of controlled waters. Catastrophic damage to buildings/property. A short-term risk to an ecosystem, or organism forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from the Study Area into controlled water. Explosion causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	3	Chronic damage to Human Health ("significant harm"). Pollution of controlled waters. A significant change in an ecosystem, or organism forming part of such ecosystem.	Concentrations of contaminants from the Study Area exceeding generic or site-specific screening criteria. Leaching of contaminants into a major or minor aquifer. Death of species within a designated nature reserve.
Mild	2	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	1	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve.	The presence of contaminants at such concentration that protective equipment is required during site works.

CLASSIFICATION	RATING	DEFINITION	EXAMPLES
		Non-permanent health effects to human health (easily prevented by measures such as protective clothing etc). Easily reparable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discolouration of concrete.

Classification of Severity

Classification of severity does not take into account the likelihood of a hazard being realised. Both a severe and medium classification can result in death. Severe relates to short term (acute) risk while medium relates to long term (chronic) risk. Mild relates to significant harm but to less sensitive receptors. Minor classification relates to harm which is not significant but could have a financial cost.

Classification of Likelihood

CLASSIFICATION	RATING	DEFINITION
High Likelihood	4	There is a pollutant linkage and an event that either appears very likely in the short term and almost inevitable in the long term, or there is evidence at the receptor or harm or pollution.
Likely	3	There is a pollutant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	2	There is a pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the short term.
Unlikely	1	There is a pollutant linkage, but circumstances are such that it is improbable that an event would occur even in the very long term.

Classification of Likelihood

Classification of Risk

The classification gives a guide as to the severity and consequence of identified risk when compared with other risk presented in the zone. It should be noted that if a risk is identified it cannot be classified as “no risk” but as “very low risk”. Differing stakeholders may have a different view on the acceptability of a risk.

A risk score is calculated as the product of Likelihood x Severity as indicated in the table below

		SEVERITY			
		SEVERE (4)	MEDIUM (3)	MILD (2)	MINOR (1)
LIKELIHOOD	HIGH LIKELIHOOD (4)	16	12	8	4
	LIKELY (3)	12	9	6	3
	LOW LIKELIHOOD (2)	8	6	4	2
	UNLIKELY (1)	4	3	2	1

Classification of Risk

Risk classifications and descriptions (for the risk scores identified above) within the context of land contamination are provided in the table below.

RISK RATING	RISK CLASSIFICATION	DESCRIPTION
16	**Very High Risk**	There is a high probability that severe harm could arise to a designated receptor from an identified hazard OR there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
12- 15	**High Risk**	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely in the long term.
5 – 11	**Moderate Risk**	It is possible that harm could arise to a designated receptor from an identified hazard. However, if it is either relatively unlikely that such a harm would be severe, or if any harm were to occur it is more likely the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
3 – 4	**Low Risk**	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
1 – 2	**Very Low Risk**	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Description of Risk