



# Appendix F

## Risk assessment



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## Introduction

A contaminant is a substance that has the potential to cause harm. This simple environmental risk assessment is based on a source of contamination - pathway - receptor methodology.

- Source** Sources can include particular ground conditions or objects, for example redundant footings in the ground or a former sheep dip, which have the potential to impact on redevelopment proposals.
- Pathway** The route by which the source is brought into contact with the receptor. This can include the transport of contamination via water (surface and groundwater), wind borne dust, vapours, excavation and deposition.
- Receptor** Human beings, other living organisms, physical systems and built structures that could be affected by the source. A receptor will only be affected if a pathway from the source to the receptor is present. Groundwater and surface water systems can be considered as receptors in their own right as their quality is regulated by statutory bodies, as well as being pathways for contaminant migration to other receptors.

The source-pathway-receptor relationship allows an assessment of potential environmental risk to be determined, based on the nature of the source, the degree of exposure of a receptor to a source and the sensitivity of the receptor.

On this basis an assessment is made of the potential for a risk linkage to exist. These can be expressed for example, in terms of additional costs associated with site redevelopment or remedial measures, the potential for costs, fines or penalties imposed for breaches of environmental legislation or third party claims, and loss of land value.

The identified potential environmental liabilities have been evaluated with respect to the potential impacts on the following National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NES<sub>Soil</sub>) receptors:

- Current site users
- Future site users
- Adjacent site users

And also the following non-NES<sub>Soil</sub> receptors:

- Construction and maintenance workers
- Surface water bodies
- Groundwater
- Sensitive ecosystems, flora and fauna
- Site infrastructure (such as buried services and utilities)

## Contaminant migration pathways

The potential pathways for contaminant exposure to both people and the environment are interwoven and include:

- Site drainage and underground service pits, vaults and conduits (Non NES<sub>Soil</sub>)
- Release through the air (particularly if disturbed during demolition and excavation)
- Groundwater (Non NES<sub>Soil</sub>)
- Direct contact with soil (which can lead to dermal absorption or ingestion)
- Soil vapour inhalation (Non NES<sub>Soil</sub>)



- Nearby watercourses (Non NES<sub>Soil</sub>)

Airborne release and soil vapour can result from demolition and excavation activities, and dermal absorption can occur via direct contact with contaminated material. During the construction phase of a project, contaminated soil can reach off-site receptors during transportation or movement of stockpiles.

The dispersal and migration of chemical contaminants is generally controlled by sub-surface conditions (e.g. soil type, permeability and moisture content) along with physical and chemical properties of individual contaminants. Other factors that may impact the movement and migration of contaminants on the site include:

- Erosion of disturbed and cleared areas that contribute to sediment transport and deposition
- Stripping of topsoil material
- On-site movement of light vehicles and machinery that will contribute to shallow soils being disturbed
- The presence of naturally occurring erodible soils
- The presence of surface water drainage pathways and culverts forming preferential migration pathways down gradient of identified Areas of Environmental Concern (AECs)
- Rainfall conditions