What is Contaminated Land?

''Contaminated Land'' refers to land that contains elevated concentrations of potentially hazardous substances. These concentrations may be present naturally, or more commonly, the contamination has resulted from historical use of the site or surrounding area.

Contamination may be derived from land uses that once handled or incorporated the use of substances, which have, through persistent use and miss management, become present within subsoil, water system or the environment.

Where contamination is present in elevated concentrations, this is known as the Source.

Why do we need to worry about contamination?

As a developer, the presence of contamination within a site proposed for re-development will impact on various features that may be present within the site in question. These features are known as ''Receptors''.

Should the presence of contamination within a site impact on these receptors, an unacceptable risk is considered present, such that action will be required. These receptors could take the form of the following: -

- Human Health.
- Building and Construction Materials.
- Statutory Services, (e.g., water mains, gas, electric, BT).
- Underlying Aquifer
- Surface Water Features in or surrounding the site.
- Vegetation and Plant Growth

How does Contamination impact on a Receptor?

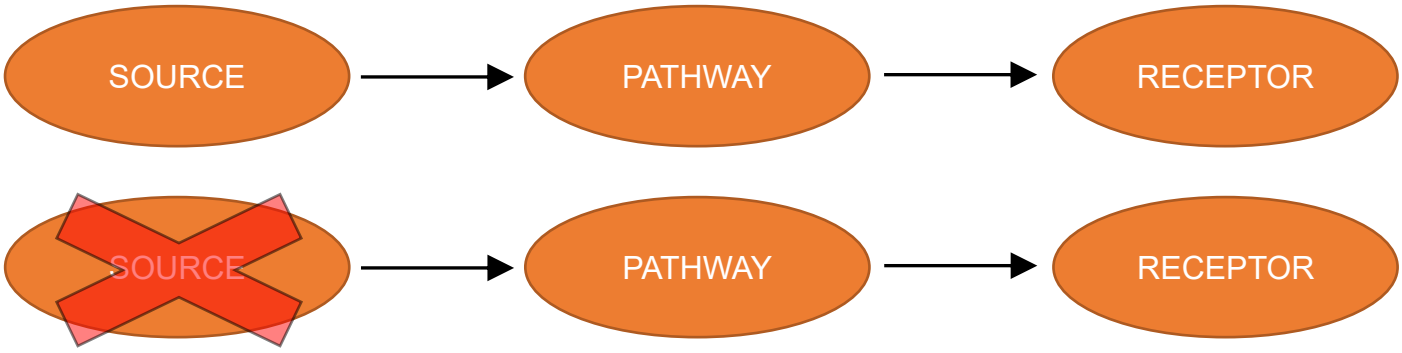
Where contamination is present within a site or surrounding area, it is possible that through transport links, the contamination could impact on the receptor. These transport links are known as the ''Pathway''.

To expand on the various pathways available for contamination to move in, we detail the following.

- **Ingestion**: Associated with ingesting home-grown vegetables within private residential garden or soil attached to vegetation. Additionally, ingestion of dust and fibres will impact on human receptors.
- **Inhalation**: Associated with the inhalation by humans of landfill or volatile gases. Can be derived from external vapours or internally within buildings.
- **Plant Uptake**: The uptake of contamination by plant and vegetative growth. Generally associated with the bioavailability and bio uptake factors associated with contaminants and plant/vegetation types.
- **Direct Contact**: Associated with the direct dermal contact of end user to the contaminated ground.
- **Site Drainage**: Drainage of pollutants through drainage channels, streams, rivers, or surface water courses. Surface run off may also impact on receptors.
- **Migration**: The migration of pollutants through a soil or rock medium to a water receptor, (an underlying aquifer). Pathways can be increased/reduced through sub-structure works, (i.e., piles).
- **Workforce** A temporary risk to the workforce involved in the development of the site during in ground works.

What does this all mean?

When considering the above, where a source-pathway-receptor is in place, a pollution chain is considered present such that an unacceptable risk is known to exist within the site. Action must be taken to break this chain.



Should one or another of these features be absent from the pollution chain, the chain is broken such that risk is no longer present, i.e.

''Should contamination from Nickel be present within a site, and the site proposed to be developed for private gardens, a ''Source'' is in place, (i.e., the Nickel), a ''Receptor'', (in the form the human receptor who owns the garden), and the ''Pathway, (which will form ingestion, plant uptake, direct contact, site drainage, migration and the workforce).

If the design were to change to incorporate hard landscaping in the form of paving or concrete, the pathway would be removed for all but the workforce who would take appropriate health and safety action, (i.e., gloves and masks, etc.). Therefore, the pollution chain would be broken, and the risk removed''.

This forms the essence of contaminated land risk assessment and incorporates the derivation of what is an acceptable concentration of pollutant above which risk is present, the assessment of the pathways in place and the receptors that may be impacted on by the contamination.

Obviously, within sites across the U.K, the assessment will take the form of several different contaminants, which makes the assessment that much more difficult. This, in essence, is what is undertaken in a contaminated land assessment.

How do we make this assessment?

In order to make this assessment, Herts & Essex Site Investigations get an instruction to undertake a land quality risk assessment from yourselves.

At this point, we approach all relevant sources to gain historical data relating to the site and surrounding area in question which is gained from several sources. Invariably, this will involve a number of visits to relevant authorities/companies and incorporate a site walk over survey of the site and surrounding area.

We undertake the assessment gathering information on historical uses of the site and the potential contaminants that may have been used within that site, (i.e., Garage would incorporate fuels, degreasants, metals, organic compounds etc). We gather this information from documentation provided by the Government and associated bodies and local information where available.

Within this data, the potential sources of contamination are identified and within the assessment, geological and topographical features are also identified to form pathways/receptors.

Within the assessment, the application of source-pathway-receptor must be undertaken fully and as such, a key feature will form, 'What is the development going to be?' If this information is lacking or reduced in its content, the Source-Pathway-Receptor chain cannot be completed fully and as such, is unlikely to pass at the planning stage.

Therefore where the developer sometimes lacks in communication is when plans and site proposals/changes to original plans are not given to the investigation team, such that this cannot be completed to an appropriate level of competency.

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What happens next?

On completion and approval by the Local Authority that the desk top study assessment of the site has been undertaken to a satisfactory level, the physical site investigation is undertaken and will involve an intrusive investigation into the actual site conditions based on the proposals of the desk top study.

Our assessment will consider the physical concentrations of contamination within the subsoil and where exposure levels are exceeded such that risk is potentially in place. Based on the information recovered within the desktop study and site plans included from the developer, the pathways and receptors will be assessed and where possible removed. Where risk is considered present, remedial action will be required to remove the risk.

Can we start the remediation?

On completion of the identification of the risk associated with the history of the site, a remedial strategy must be agreed with the Local Authority and any other relevant authorities such that the work can be undertaken. The remedial strategy may identify that remedial works should be undertaken prior to the development of the site or indeed as the development of the site progresses. Confirmation must be agreed with the Local Council as to which approach is to be adopted for the site and on completion of this, the remedial works can begin.

How do I validate the site?

Within the site investigation and assessment of the contamination within a site, certain areas of the site, (as a result of historical or ongoing source), may contain contamination above the desired risk level, however, some areas of the site may fall below the action level and as such, no action is required.

Where this scenario is in place, validation of the extent of the area known to be contaminated must be undertaken to limit where the actual contamination falls within the site.