

**GUIDANCE ON PRELIMINARY SITE INSPECTION OF CONTAMINATED LAND
ON SITE CHECKLIST
CLR N0 2 1994**

Key Questions inset and in ordinary type are those that may require more knowledge to make a meaningful assessment.

Key Questions in bold are those that can be answered with little or no experience; the other key questions may require more knowledge to make a meaningful assessment.

Section 1

Aim/Action 1. Identify any past industrial activities, which could have been associated with the site.

Question	Notes	Guidance
KQ 1a Are there relevant street/house/ locality or pub names within 500m of the site?		e.g. Coal Tar Lane, Gasworks Alley etc
KQ 1b Are there any site features or relics, which may indicate the past history of the site?		e.g. old equipment, drums, signs, remains of buildings or structures. NB. Care must be taken to ensure personal safety. It is also necessary to be aware that fly tipping may have taken place
KQ 1c Are there any signs of steam or smoke emanating from the ground; or other signs (e.g. melting snow) or temperature differences		Temperature differences could be associated with subterranean fires and/or landfill gas, both of which are associated with former landfill disposal operations.

Section 2

Aim/Action 2. Assess whether the site, or part of the site, is likely to have been infilled or used for waste disposal

<p>KQ 2a Does the site appear markedly different from its surroundings in terms of: Topography Vegetation Drainage Soil type Any other factors?</p>		<p>If you have answered 'yes' to any of these questions, the differences could result from the presence of infill materials either deposited as waste or as fill for example to level the site</p>
<p>KQ 2b Are there discontinuities within the site in terms of: Topography Vegetation Drainage Soil type?</p>		<p>If there are discontinuities within the site, it may be advantageous to divide the site into several homogeneous areas. As far as possible, the boundaries of obvious discontinuities of the vegetation, topography, and drainage should be outlined on the site map. If the site has been subdivided the following information should be recorded for each separate area.</p>

Section 3

Aim/Action 3. Assess whether anything is adversely affecting the health of trees and vegetation.

<p>KQ 3a Are there patches of bare or sparsely vegetated ground contrasting with the vegetation cover over the rest of the site?</p>		<p>Bare patches should be mapped and investigated more fully using the following questions as a guide - If there are no obvious bare patches, these questions should be answered with respect to the site generally</p>
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<p>KQ 3b Are trees present on the site?</p>		<p>It would be helpful, but not essential, to identify any trees present, and note their frequency, approximate age (e.g. young/mature).</p>
<p>KQ 3c Are any trees showing signs of stress or do they appear stunted or diseased?</p>		<p>Some signs of stress can be linked to some types of contamination. Examples are given below, but it is generally extremely difficult to say whether contamination or other environmental factors are the cause of such symptoms, and any conclusions should be made in the context of the other site observations. Notes should be made of any observed symptoms:</p> <p>Symptom of stress include:</p> <ul style="list-style-type: none"> • Yellowing leaves/needles out of season • Premature leaf fall • Dead branches • Shedding bark
<p>KQ 3d Are young seedling and sapling trees regenerating naturally?</p>		<p>Regeneration of young, healthy, trees tends to indicate that any stress is not associated with the soil conditions.</p>

<p>KQ 3e Does the vegetation appear healthy?</p>		<p>In spring and summer healthy vegetation will appear plentiful and vigorous. If there is any doubt about the status of the vegetation the root system should provide a further guide.' A healthy plant will have a full and spreading root system. The roots of clover can be a good indicator of stress. Roots of healthy plants have pink nodules whereas unhealthy plants are likely to have small white nodules. The vigour of plants will depend on the season, and it may be particularly difficult to make an assessment of plant health in winter when any vegetation which is present may not look its best. The roots may still give some guide.</p> <p>Comparison of vegetation on site with the appearance of similar species outside the site will help in the identification of whether symptoms are related to stress. Features to look for include:</p> <ul style="list-style-type: none"> • Defoliation • Yellowing or otherwise discoloured foliage • Wilting • Stunted growth
<p>KQ 3f From closer examination is there any indication of the cause of symptoms?</p>		<p>For example, yellowing at the tips of the leaves may be the result of a hard frost, while yellowing at the margins is more likely to result from nitrogen or other nutrient deficiencies. Yellow blotches can sometimes be caused by air pollution.</p>

Note: It is an offence to dig up species protected under Section 8 of the Wildlife and Countryside Act (1981).

Section 4

Aim/Action 4. Assess whether there are any factors on site inhibiting the natural diversity and succession of the vegetation.

<p>KQ 4a Does the vegetation cover consist mainly of annual species, or are perennial plants characteristic of the surrounding area present?</p>		<p>If the site has been undisturbed for some time, herbaceous and perennial plants are likely to be present. If they are not, then some adverse condition or combination of conditions (which could include contamination, infertility, poor soil structure) is inhibiting the natural succession.</p>
<p>KQ4b Is the range and diversity of species present in the sward what you would expect for the relevant soil type?</p>		<p>Soils of different pH support markedly different flora, and species diversity. If there are fewer species than would normally be expected, some adverse conditions or stresses may be limiting the range of species able to exist. Species diversity will vary with the extent of area investigated, but as a rough guide species diversity would reflect pH as follows:</p> <p>Acid soil (pH <4.5): 4 5 species Neutral soil (pH 4.5 6.5): 20 30 species Calcareous soil (pH > 6.5): 30 40 species</p>

Section 5

Aim/Action 5. Identify specific signs that may indicate contamination is present

<p>KQ 5a Are there any plants present that are typically associated with a contaminant or group of contaminants?</p>		<p>Examples of indicator species include:</p> <p>Orchids - high pH wastes or soils Vernal sandwort - lead and other metals Rushes - waterlogged areas (possibly affected by landfill gas) Heathers - low pH wastes or soils Nettles - high nitrogen and phosphorus</p> <p>Further examples can be found in CLR 2 Volume 2.</p>								
<p>KQ 5b Is there any surface staining visible on the soil or any surface deposits or seepages from the soil?</p>		<p>Notes or photographs of any obvious occurrences should be taken. Some visual characteristics and associated contaminant sources are provided below:</p> <table border="1" data-bbox="1447 895 2040 1155"> <thead> <tr> <th data-bbox="1447 895 1742 935">Examples</th> <th data-bbox="1742 895 2040 935">Possible cause</th> </tr> </thead> <tbody> <tr> <td data-bbox="1447 935 1742 970">Blue Billy</td> <td data-bbox="1742 935 2040 970">Gas works waste</td> </tr> <tr> <td data-bbox="1447 970 1742 1043">Black sulphide deposits</td> <td data-bbox="1742 970 2040 1043">Landfill gas, hydrocarbons</td> </tr> <tr> <td data-bbox="1447 1043 1742 1155">Oily patches</td> <td data-bbox="1742 1043 2040 1155">Chemical processing/ transport industries</td> </tr> </tbody> </table>	Examples	Possible cause	Blue Billy	Gas works waste	Black sulphide deposits	Landfill gas, hydrocarbons	Oily patches	Chemical processing/ transport industries
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<p>KQ 5c Are there any obvious stains or coloured layerings at depth within the soil?</p>		<p>It will be necessary to dig a small profile into the soil as far as practicable. If stains etc are visible these should be noted. Cf. 5b.</p>																
<p>KQ 5d Are any odours present, particularly associated with any deposits/stains found in 5b and 5c above?</p>		<p>If odours are present the location, source, its strength and prevailing wind direction should be noted. Odours which may be encountered on site and possible sources are listed below:</p> <table border="1" data-bbox="1447 708 2045 1007"> <thead> <tr> <th data-bbox="1447 708 1744 746">Source</th> <th data-bbox="1744 708 2045 746">Odour</th> </tr> </thead> <tbody> <tr> <td data-bbox="1447 746 1744 785">H₂S</td> <td data-bbox="1744 746 2045 785">Bad eggs</td> </tr> <tr> <td data-bbox="1447 785 1744 823">Phenols</td> <td data-bbox="1744 785 2045 823">Antiseptic</td> </tr> <tr> <td data-bbox="1447 823 1744 861">Solvents</td> <td data-bbox="1744 823 2045 861">Ether</td> </tr> <tr> <td data-bbox="1447 861 1744 900">Oils/tars</td> <td data-bbox="1744 861 2045 900">Ink</td> </tr> <tr> <td data-bbox="1447 900 1744 938">Amines</td> <td data-bbox="1744 900 2045 938">Tarry smell</td> </tr> <tr> <td data-bbox="1447 938 1744 976">Fuel stores</td> <td data-bbox="1744 938 2045 976">Rotting fish</td> </tr> <tr> <td data-bbox="1447 976 1744 1007"></td> <td data-bbox="1744 976 2045 1007">Petrol/diesel</td> </tr> </tbody> </table> <p>Further information is included in Table 16 of CLR 2 Volume 2.</p>	Source	Odour	H ₂ S	Bad eggs	Phenols	Antiseptic	Solvents	Ether	Oils/tars	Ink	Amines	Tarry smell	Fuel stores	Rotting fish		Petrol/diesel
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Section 6

Aim/Action 6. Assess general soil characteristics including pH levels.

<p>KQ 6a What is the pH of the soil?</p>		<p>An approximate soil pH may be estimated from the species assemblage and diversity (c.f. 4b). Plant species tolerant of acidic and alkaline soils are included in Tables 9 and 11 of CLR2 Volume 2. Alternatively a quick on site test can be carried out on a soil/distilled water slurry using pH paper or a portable pH meter. To ensure comparability between samples taken from the same site the ratio of water to soil should be constant (approx. 2: 1). It will generally be necessary to take a number of samples from different locations and, in particular, from any bare patches or where staining, odours etc. are present. An extreme pH value (i.e. outside the range 3 to 8) could indicate contamination. Variation of pH within the site may also indicate that discrete areas of waste materials exist.</p>
<p>KQ 6b Are soil dwelling animals present?</p>		<p>Soil macro invertebrates which might be expected include worms (but not on an acid soil), woodlice, and insects. The presence of worm casts at the surface should be noted. A lack of soil organisms would indicate that the soil system is not functioning normally. This could be as a result of contamination / hazardous gases from landfill/soil compaction / waterlogging.</p>

<p>KQ 6c Are there any areas of soil compaction or waterlogging?</p>		<p>Soil which has been used to cover wastes, or which is affected by landfill gas, may be compacted and poorly drained. Compaction and poor soil structure can also result from a number of other factors (eg. off road motorcycles) and lack of cultivation.</p>
<p>KQ 6d What is the depth of organic matter on the surface of the soil?</p>		<p>It may be helpful to compare the depth of soil surface litter with that on land outside the site. An excessive build up of litter indicates that the normal soil organisms are not present. Reasons for litter build up may be natural (e.g. very acid soil) or as a result of contamination.</p>

Section 7

Aim/Action 7. Assess the quality of any standing or running water on, or draining from, the site

<p>KQ 7a Are there any obvious signs of contamination associated with water?</p>		<p>Possible indications of aquatic contamination:</p> <ul style="list-style-type: none"> • Staining, discoloration of water or deposited materials (N.B. these can also occur naturally, eg. ochre staining from iron rich deposits) • Odour associated with water (see Se above) • Eutrophication eg. choked with algae, deoxygenated • Presence of oily substances on surface (can also occur naturally) • Sewage fungus • Continuous rapid bubbling through water
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<p>KQ 7b Is there an abundance and diversity of aquatic fauna?</p>		<p>A reasonable impression of water quality can be gained from visual assessment of the abundance and diversity of aquatic invertebrates. This can be carried out either by just looking into the water, if it is reasonably clear, or by pulling a glass container through any submerged vegetation and then observing the fauna sampled. Where possible include names of indicator groups.</p> <p>Further information on invertebrate indicators of aquatic systems is included in CLR 2 Volume 2.</p>
<p>KQ 7c Is the water clear, or cloudy?</p>		<p>Clear water can sometimes indicate a reasonable water quality. Cloudy water may be caused by the presence of fine sediment or clay particles, by colloidal suspension of substances either caused naturally (eg. reddish ferric 'gel'); by pollution; or, if greenish, by the dominance of algae associated with eutrophication. Eutrophication could be a result of fertiliser run off.</p>
<p>KQ 7d Are there any differences in water quality between streams draining into the site, upstream of it, and those leaving the site downstream?</p>		<p>If streams entering a site appear to be less contaminated than those on the site or downstream from the site, then the site is very likely to be a source of contamination. The EA should be consulted for water quality records.</p>
<p>KQ 7e What are the pH values of water from various parts of the site?</p>		<p>Extreme pH results (e.g. >8.0; <3.0) can indicate contamination. pH values which differ from those which would be expected given the local soils and geology are particularly significant .</p>