



Photo 13 – Start of drainage ditch approx. 175m south-east of the site. Observed as dry and does not appear to have received water for some time.



Photo 14 – Continuation of drainage ditch 150m east of the site – dry. Identified in Envirocheck as the nearest surface water feature to the site.

Title	Photolog		App'd:	Drawn JC	Date: March 2017
Location	Engineering Building (HLS Project)		Draft	Ref:	Walkover
Client	University of Reading		Scale:	Job No:	60441574
			N/A		
			Drg. Size: A4		PLATES



Photo 15 – Site of 'spring' indicated of OS mapping approximately 275m east of the site.



Photo 16 – Pond downstream (north) of spring site – start of Whiteknights Lake to north.

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				JC	March 2017
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			Drg. Size:		PLATES
			A4		



Photo 17 – View north from 'Friend's Bridge' at Whiteknights Lake. Discharge Consented drainage point visible at left.



Photo 18 – Detail of Discharge Consented drainage (surrendered) identified 286m NE of site in Envirocheck report.

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Photo 19 - View north into overgrown surface drainage ditch identified in Envirocheck report, 186m south east of the site (up-gradient). Observed as dry and apparently inactive for some time.



Photo 20 - View of pond in school grounds, identified in Envirocheck report, 225m south west of the site (up-gradient).

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Appendix E Background to Legislation on Contaminated Land

Legislative Framework

The contaminated land regime in Part 2A of the Environment Protection Act 1990 was introduced to specifically address the historical legacy of land contamination. Part 2A of the Environmental Protection Act 1990 (Amended April 2012) has introduced the following statutory definition for “contaminated land”:

“any land which appears to the local authority in whose area it is situated to be in such a condition by reason of substances in, on, or under the land, that:

- (a) significant harm is being caused or there is significant possibility of such harm being caused; or*
- (b) significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.”*

Part 2A provides a means of dealing with unacceptable risks posed by land contamination to human health and the environment. Enforcing authorities are required to identify and deal with such land but Part 2A is only to be used by the Enforcing Authority where no appropriate alternative solution exists.

The Process of Risk Assessment

The assessment of contaminated land can be seen as a two phase risk based process, comprising:

- (1) A qualitative assessment of the likelihood of plausible contaminant linkages, i.e. there must not only be a source of contamination, but a pathway and a receptor; and
- (2) A quantitative element which will seek to determine the degree of harm and the significance of such harm on a receptor.

A “contaminant” is a substance which is in, on or under the land and which has the potential to cause significant harm to a receptor or to cause significant pollution of controlled waters.

A “pathway” is a route by which a receptor is or might be affected by a contaminant.

A “receptor” is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property or controlled waters.

The term “contaminant linkage” indicates that all three elements (i.e. a contaminant, a pathway and a receptor) have been identified. The term “significant contaminant linkage” means a contaminant linkage which gives rise to a level of risk sufficient to justify a piece of land being determined as contaminated land (in other words, there is unacceptable risks posed by the land contamination to human health and or the environment). The term “significant contaminant” means the contaminant which forms part of a significant contaminant linkage.

Significant Harm to Human Health

The following health effects constitute significant harm: death, life threatening diseases (cancers), other diseases likely to have a serious impact on health, serious injury, birth defects and impairment of reproductive functions.

Significant Possibility of Significant Harm to Human Health

In deciding whether or not land is contaminated land on the grounds of significant possibility of significant harm to human health, the local authority use the following categorisations:

Category 1: Human Health

Land should be deemed to be a Category 1: Human Health case where:

- (a) the authority is aware that similar land or situations are known, or are strongly suspected on the basis of robust evidence, to have caused such harm before in the United Kingdom or elsewhere; or
- (b) the authority is aware that similar degrees of exposure (via any medium) to the contaminant(s) in question are known, or strongly suspected on the basis of robust evidence, to have caused such harm before in the United Kingdom, or elsewhere;
- (c) the authority considers that significant harm may already have been caused by contaminants in, on or under land, and that there is an unacceptable risk that it may continue or occur again if no action is taken.

Category 2: Human Health

Land should be placed into Category 2 if the authority concludes, on the basis that there is a strong case for considering that the risks from the land are of sufficient concern, that the land poses a significant possibility of significant harm. Category 2 may

include land where there is little or no direct evidence that similar land, situations or levels of exposure have caused harm before, but nonetheless the authority considers on the basis of the available evidence, including expert opinion, that there is a strong case for taking action under Part 2A on a precautionary basis.

Category 3: Human Health

Land should be placed into Category 3 if the authority concludes that the strong case of Category 2 does not exist. Category 3 may include land where risks are not low, but nonetheless the authority considers that regulatory intervention under Part 2A is not warranted. This recognises that placing land in Category 3 would not stop others, such as the owner or occupier of the land, from taking action to reduce risks outside of the Part 2A regime if they choose.

Category 4: Human Health

The local authority should consider that the following types of land should be placed into Category 4: Human Health:

- (a) Land where no relevant contaminant linkage has been established.
- (b) Land where there are only normal levels of contaminants in the soil.
- (c) Land that has been excluded from the need for further inspection and assessment because contaminant levels do not exceed generic assessment criteria.
- (d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed in the normal course of their lives).

“Normal” Presence of Contaminants

“Normal” levels of contaminants in soils should not be considered to cause land to qualify as contaminated land, unless there is particular reason to consider otherwise. “Normal” levels of contaminants in soils may result from:

- (a) The natural presence of contaminants (e.g. caused by underlying geology) at levels that might reasonably be considered typical in an area and have not been shown to pose an unacceptable risk.
- (b) The presence of contaminants caused by low level diffuse pollution, and common human activity. For example, this would include diffuse pollution from historic use of leaded petrol and the presence of benzo(a)pyrene from vehicle exhausts and the spreading of domestic ash in gardens that might reasonably be considered typical.

Significant Pollution of Controlled Waters

Pollution of controlled water means the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter. The term “controlled water” is as defined in Part 3 of the Water Resources Act 1991, except that ground waters does not include waters contained in underground strata but above the saturation zone (i.e. perched water).

The following criteria are used to establish whether significant pollution of controlled waters has occurred:

- (a) Pollution equivalent to “environmental damage” to surface water or groundwater as defined by The Environmental Damage (Prevention and Remediation)(England) Regulations 2015
- (b) Inputs resulting in the deterioration of the quality of water abstracted, or intended to be used in the future.
- (c) A breach of a statutory surface water Environmental Quality Standard, either directly or via a groundwater pathway.
- (d) Input of a substance into groundwater resulting in a significant and sustained upward trend in concentration of contaminants.

The following categories are adopted in relation to determining the significant possibility of significant pollution of controlled waters.

Category 1: Water

This covers land where the authority considers that there is a strong and compelling case for considering that a significant possibility of significant pollution of controlled waters exists. In particular, this would include cases where there is robust science-based evidence for considering that it is likely that high impact pollution would occur if nothing were done to stop it.

Category 2: Water

This covers land where:

- (a) The authority considers the strength of evidence to put the land into Category 1 does not exist; but
- (b) Nonetheless, on the basis of the available scientific evidence and expert opinion, the authority considers that the risks posed by the land are of sufficient concern that the land should be considered to pose a significant possibility of significant pollution of controlled waters on a precautionary basis, with all that this might involve (e.g. likely remediation requirements, and the benefits, costs and other impacts of regulatory intervention). Among other things, this category might include land where there is a relatively low likelihood that the most serious types of significant pollution might occur.

Category 3: Water

This covers land where the authority concludes that the risks are such that (whilst the authority and others might prefer they did not exist) the tests set out in Categories 1 and 2 are not met, and therefore regulatory intervention under Part 2A is not warranted. This category should include land where the authority considers that it is very unlikely that serious pollution would occur; or where there is a low likelihood that less serious types of significant pollution might occur.

Category 4: Water

This covers land where the authority concludes that there is no risk, or that the level of risk posed is low. In particular, the authority should consider that this is the case where:

- (a) No contaminant linkage has been established in which controlled waters are the receptor in the linkage; or
- (b) the possibility only relates to type of pollution that should not be considered to be significant pollution; or
- (c) The possibility of water pollution similar to that which might be caused by "background" contamination.

Terminology

The term 'Contaminated Land' is used to mean land which meets the Part 2A definition. Other terms, such as 'land affected by contamination' or 'land contamination' are used to describe much broader categories of land where contaminants are present but usually not at sufficient level of risk to be Contaminated Land.

Planning Policy and Land Contamination

The National Planning Policy Framework has replaced Planning Policy Statement PPS23: Planning and Pollution Control. Under the Part 2A Statutory Guidance the planning system is highlighted as one of the other ways in which land contamination can be addressed. The key parts of the policy specifically relating to soils, geology and contamination are summarised below (taken from the Section 11 – Conserving and enhancing the natural environment):

109. *The planning system should contribute to and enhance the natural and local environment by:*
- *protecting and enhancing valued landscapes, geological conservation interests and soils;*
 - *preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and*
 - *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.*
111. *Planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value. Local planning authorities may continue to consider the case for setting a locally appropriate target for the use of brownfield land.*
120. *To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.*
121. *Planning policies and decisions should also ensure that:*
- *the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;*
 - *after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990; and*
 - *adequate site investigation information*, prepared by a competent person**, is presented.*

For a site undergoing development or redevelopment it should be the case that upon completion of that work the site should sit within Category 4 in respect of all receptors.

**Site investigation information:* Includes a risk assessment of land potentially affected by contamination, or ground stability and slope stability reports, as appropriate. All investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175 (2011) Code of Practice for the Investigation of Potentially Contaminated Sites). The minimum information that should be provided by an applicant is the report of a desk study and site reconnaissance.

***Competent person (to prepare site investigation information):* A person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land stability, and membership of a relevant professional organisation.

Appendix F Risk Assessment

Classification of Consequence

The classifications of consequence (severity) are taken from R&D Publication 66 (NHBC and Environment Agency, 2008). AECOM has chosen to apply the classifications to a broad range of development scenarios.

It should be noted that the categories of pollution incident have no relation to the categories of significant possibility of significant harm to human health or significant possibility of significant pollution of controlled waters in respect of the Part 2A Statutory Guidance.

Classification	Definition
Severe	Highly elevated concentrations likely to result in “significant harm” to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which 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. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations which could result in “significant harm” to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which 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. Significant damage to crops, buildings or property.
Mild	Exposure to human health unlikely to lead to “significant harm”. Equivalent to EA Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce. Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population. Minor damage to crops, buildings or property.
Minor	No measurable effect on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structure and services.

Classification of Probability

The classifications of probability are taken from R&D Publication 66 (NHBC and Environment Agency, 2008). AECOM has chosen to apply the classifications to a broad range of development scenarios.

It should be noted that the categories of pollution incident have no relation to the categories of significant possibility of significant harm to human health or significant possibility of significant pollution of controlled waters in respect of the Part 2A Statutory Guidance (Appendix D). Also, in the Part 2A Statutory Guidance "pollutant linkage" is now termed "contaminant linkage", although it is noted that the terms are effectively synonymous.

Category	Definition
High Likelihood	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.
Likely	There is 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	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

Categorisation of Risk

		Consequence (Severity)			
		Severe	Medium	Mild	Minor
Probability (Likelihood)	High Likelihood	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low Likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Description of Risk Levels and Likely Action Required

Term	Description
Very high risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remediation action <u>or</u> there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High risk	Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remediation action. Realisation of the risk is likely to present a substantial liability to the site owner or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Moderate risk	It is possible that without appropriate remediation action, harm would arise to a designated receptor. It is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low risk	It is possible that harm could arise to a designated receptor from identified hazard. It is likely that, at worst, if any harm was realised any effects would be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very low risk	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.
No potential risk	There is no potential risk if no pollutant linkage has been established.

Summary of Definitions

Term	Description
Hazard	A property or situation which in certain circumstances could lead to harm. (The properties of different hazards must be assessed in relation to their potential to affect the various different receptors).
Consequences	The adverse effects (or harm) arising from a defined hazard which impairs the quality of the environment or human health in the short or longer term.
Probability	The mathematical expression of the chance of a particular event in a given period of time (e.g. probability of 0.2 is equivalent to 20% or a 1 in 5 chance).
Likelihood	Probability; the state of face of being likely.
Risk	A combination of the probability or frequency of the occurrences of a defined hazard AND the magnitude of the consequences of that occurrence.
Contaminant linkage	An identified pathway is capable of exposing a receptor to a contaminant and that contaminant is capable of harming the receptor. In the Part 2A Statutory Guidance the terms "contaminant", "pollutant" and "substance" have the same meaning, and some non-statutory technical guidance relevant to land contamination uses alternative terms such as "pollutant", "substance" and associated terms in effect to mean the same thing.

