Developing land affected by contamination

Reports to Support Planning Applications

June 2023

Mae'r ddogfen hon ar gael yn Gymraeg.
Cysylltwch â **Yr Adran Rheoli Llygredd.**
Ffon **01352 703400** i gael fersiwn Gymraeg.

This document is available in Welsh.
Please contact **Pollution Control.**
Tel **01352 703400** for a Welsh version.

CYNGOR Sir y Fflint
Flintshire
COUNTY COUNCIL

Introduction

It is the responsibility of the developer to demonstrate that when developing a site, contamination present at the site may reasonably be addressed and that once developed, the site will be suitable for the use proposed and is incapable of meeting the statutory definition of Contaminated Land in accordance with the provisions of Part 2A the Environmental Protection Act 1990.

Where there is a possibility that the site you intend to develop is affected by contamination, usually as a result of something that has taken place on or next to the site in the past, you will be required to have the site assessed to identify the nature and extent of land contamination present, the degree of risk it poses to public health and the environment and the steps that will be taken to address it.

This is particularly important where the proposed development would introduce something or someone that would be sensitive to or whose health could be adversely affected by the presence of contamination.

To avoid disappointment, delays and requests for further information, it is useful to be aware of the scale of the works, the cost of the works, how long the work is likely to take, health and safety precautions for those working on the development and how you will be required to show that land contamination has been addressed.

It is important to bear in mind that failure to provide sufficient information in a timely manner during the planning process may result in delays, increased expense or, a refusal of planning permission or to a refusal to discharge a planning condition.

This guide has been put together to assist you and your representatives by providing an explanation of the information involved in assessing and dealing with land contamination and which the Council needs when considering applications for planning permission or to discharge planning conditions.

Why is Land Contamination Important?

The Council's development management and planning function already plays a key role in many aspects of pollution prevention and control. Land contamination is a material planning consideration and so the Community and Business Protection Service is necessarily consulted by the Planning Department over applications for planning permission.

Many applications are received for sites that may be affected by land contamination and the presence of contamination in the ground can present not only risks to health, structures and the environment but can also adversely affect or restrict the use of the land. The development of the land offers an opportunity to assess and address those risks and to restore the beneficial use of the land.

Land contamination is a material planning consideration and so it must be taken into account by the Council when assessing an application for planning permission, when deciding whether or not to grant planning permission or to discharge a condition.

Developing a site may introduce changes to a site that could result in land being considered Contaminated Land, where that land would not be considered Contaminated Land if the development did not take place.

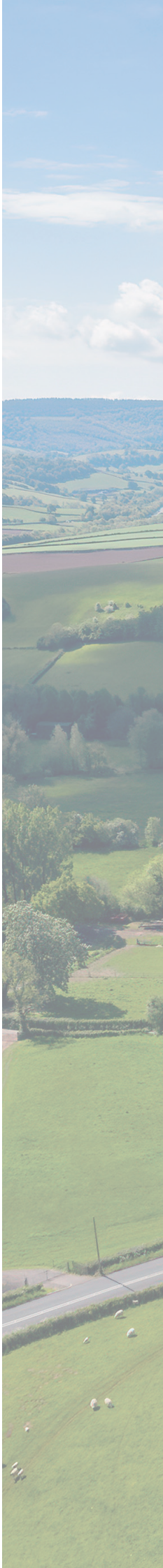
Once the development is complete or is occupied, risks associated with land contamination should have been addressed and the land should not be capable of being Contaminated Land in accordance with Part 2A of the Environmental Protection Act 1990.

The Consultation Process

Applications for planning permission or to discharge planning conditions are sent by the Planning Department to Community and Business Protection for comments.

To provide those comments the Contaminated Land Officer will take into account information from a variety of sources to decide whether land contamination assessments need to be carried out or not. Sources of information that may be taken into account include;

- Historical maps and historical land uses
- Historical and current records
- Previous site investigations
- The current land use
- The previous land use
- The proposed land use
- The sensitivity of the development proposed
- The likelihood that the site could be affected by contamination



It is important to remember that legislation, guidance, best practice and industry standards are updated and changed frequently. This means that assessments and reports from some time ago could be out of date and may need to be reviewed to make sure that they are up to date and consistent with current standards. If the report is very old, the information in it may be so out of date that it can't be used and the investigation may need to be started again from scratch.

The assessment of land contamination process takes into account the proposed development, potential contamination and the features of each site. Because these vary from site to site and even within the same site, land contamination assessments must be site specific and so the information gained from one assessment is not directly transferable to another.

Where it is suspected that land may be affected by contamination, the nature of the contamination and the sensitivity of the proposed development must be taken into account and each site assessed on its own merits.

Where there is a possibility that the site is affected by contamination, usually as a result of something that has taken place on or next to the site in the past, Community and Business Protection may ask the Planning Department to impose a condition requiring the site to be investigated on the planning permission if it is granted.

This is particularly important where the proposed development would introduce something or someone that would be sensitive to or whose health could be adversely affected by the presence of contamination.

Before giving a planning permission, the Council must first be satisfied that the site is suitable for the development proposed, that all potential risks have been identified and that those risks can reasonably be addressed.

In cases where it is suspected that a site may be grossly affected by contamination or that remediation to address land contamination may not reasonably be achieved, the Council will require that the site is assessed and that reports on the assessment are submitted in support of an application for planning permission.

Pre-application and Early Discussions

It is recommended that as much information as possible is provided in support of an application for planning permission.

Applications requesting an indication of the views across the different service areas of the Council which would be consulted about a planning application can be made before an application for planning permission is made.

It is always useful to discuss your proposals and any requirement for land contamination assessments at the earliest opportunity, sometimes even before the planning application is made. This is particularly useful if you are already aware that the site that you propose to develop may be or is affected by land contamination or that land contamination assessments will be required.

Enquiries should be made to the Planning service first of all and any information should be sent to the Planning service to be passed on to the Contaminated Land Officer and others who may need to be consulted about an application. Consultees have 21 days to provide their responses to the Planning service.

Applications for pre-planning advice may be made on-line at https://www.flintshire.gov.uk/en/Resident/Planning/Planning-permission-apply-for-it.aspx

It is not recommended that you enter into discussions or negotiations with other service areas of the Council or with other organisations without first receiving pre-planning advice from the Planning service.

Submitting Information

Information submitted in connection with development proposals, an application for planning permission or to discharge a condition needs to be sent to the Planning service and not sent directly to individual consultees such as the Contaminated Land Officer.

Applications for planning permission may be made and information submitted at https://www.flintshire.gov.uk/en/Resident/Planning/Planning-permission-apply-for-it.aspx

It is important to understand from the outset that when information is submitted to the Council, particularly when for a regulatory context like that of Planning or land contamination, the Council will expect that the information has been put together in consideration of best practice, current guidance and to an appropriate standard.

The information can be submitted electronically but it is important to make sure that complete reports, including any appendices, maps and pictures are sent. Some of the information, such as maps, charts and photographs, which may be used in land contamination assessments, may be protected by copyright laws and it is your responsibility to ensure that the information provided is compliant with those laws and that you have permission to either use or to reproduce it.

Although the public may view the information that you provide, plans, drawings, reports and other material submitted to the Council are protected by Copyright legislation. You may only use material which is downloaded from the Councils website for consultation purposes; to compare current planning applications with previous schemes and to check whether developments have been completed in accordance with approved plans.

The Contaminated Land Officer will consider the information that has been submitted and will provide observations, comments and advice as appropriate to the Planning Officer. The Planning Officer will in turn, pass this on to you or your representative.

It is important to be aware that whilst some advice may be given, the Contaminated Land Officer will not interpret information or to provide scopes of work for either you or your representatives. For example, the Contaminated Land Officer will not tell you how many samples to take, where from, why or what the results mean.

Land contamination assessments are specialised pieces of work and to carry them out requires competence, experience and careful professional judgement. They should only be carried out by suitably qualified, experienced and accredited professionals.

You will need to appoint a suitably qualified, experienced and accredited professional to complete a land contamination assessment or any remediation works for you. Information which does not meet minimum standards will be rejected.

Choosing a Competent Consultant

The Council is not able to make recommendations. Land contamination assessments are specialised pieces of work and to carry them out requires competence, experience and careful professional judgement. It is recommended that a suitable environmental consultancy is appointed to carry them out.

The Council does not provide a sampling service, does not design or carry out site investigations and does not interpret results from site investigations carried out for others. This includes those applying for or who have been given planning permission, developers and their agents.

It is not recommended that you carry out land contamination assessments yourself.

There are a number of things to take into account when designing and carrying out a site investigation. Some of these things are listed below as examples;

- Requirements for Personal Protective Equipment (PPE)
- Insurances and Indemnities
- Waste storage and disposal
- What to look for and why
- Where to take the samples and why
- The type of samples to take and why
- Suitable sample containers
- How to take the samples correctly
- Appropriate storage and handling of samples
- How many samples to take
- How to label the samples
- How to avoid mixing samples up
- Whether or not to dig trial pits, trenches or drill boreholes and why
- How deep they should be and why
- How far apart they should be and why
- How many samples to take from each and why
- How much sample to collect and why
- Where to take them to be tested

- Laboratory accreditations
- Which testing methods to ask the laboratory to use and why
- What to ask them to test for and why
- Which tests to ask for and why
- What the results mean
- Appropriate specialist computer software
- How often to take the samples
- How often to carry out monitoring
- Permits, consents and licences to do the work
- Toxicological information
- Appropriate investigation and remediation technologies

It is difficult to be certain that someone will do a good job but if you make a few checks and understand what you want them to do and the reasons why, you can ask them some informed questions which may help you decide who to appoint.

Some examples of the questions that you may like to ask are given below;

- Ask for a few quotations and ask for the quotation to be broken down into parts (sampling, site supervision, reporting, laboratory analysis, phone calls, letters, meetings, details and credentials of subcontractors etc). This will help you to make sure that you are getting value for money and will make comparing quotations easier.
- Discuss the site and proposed development, any information to support a planning application or the requirements of the conditions on the Planning Permission with the companies providing the quotations. Explain what you want them to do and why.
- Ask for references.
  - Who have they done work for in Flintshire?
  - Where have they done work in Flintshire?
  - Have they done much work of this type before?
  - Follow up the references, speak to the people that they have done work for and ask how things went.
- Ask which member of staff will be doing the work.
  - Ask if they have experience of this type of work.
  - Make sure that the quotation includes the supervision of the works on site by a suitable member of staff.

Supervision by a suitable person at all times during the investigation is very important as that person can make sure that the scope of the investigation, standards, best practice and procedures are adhered to and that samples are collected, recorded stored and handled correctly. This means that you receive a better service and value for money and recover the best information possible from your investigation.

- Do they follow quality assurance procedures?
- How much of the work will be done by them and how much will be subcontracted to someone else?
- Do they have professional indemnity insurance and public liability insurance?
- Have they been prosecuted for environment or pollution related offences?
- Is the company solvent?
- Do they have the expertise and experience to carry out each stage of the assessment from desk study all the way to verification if required?

Disappointment, delays, requests for further information, excess expense and refusals of planning permission or to discharge a condition are more likely to be avoided if the services of suitably qualified and experienced experts are used throughout. Information which does not meet minimum standards will be rejected.

The Land Contamination Assessment Process

Land contamination investigations and the assessment of risk are carried out in phases. There are usually 4 phases.

1. Phase 1 - desk based (preliminary risk assessment)
2. Phase 2 - intrusive assessment (detailed risk assessment)
3. Phase 3 - Remediation
4. Phase 4 - Verification

The outcome of the assessments carried out at each stage will determine if it necessary to progress to the next stage. For example, if Phase 1 finds that there are likely to be unacceptable levels of contamination present then it will be necessary to carry out Phase 2. If Phase 2 finds that there are unacceptable risks as a result of the presence of the contamination then it will be necessary to carry out remediation (Phase 3) and verification (Phase 4).

There is plenty of guidance, best practice and advisory documentation that is available to the public and to consultants. As the Council will expect that the information submitted has been prepared in consideration of that documentation; it is recommended that applicants and their representatives refer to those documents for more detailed advice and guidance.

A list of examples of documents that may be useful is provided at the end of this document.

Managing Risks from Land Contamination

To make a judgement and decide whether or not the risk posed by the presence of land contamination at a site needs to be addressed, a number of factors are taken into account.

The purpose of each phase of the land contamination assessment process is to provide the information required to inform this decision and to provide an explanation of how the decision has been reached.

It is important to understand what the risks are, if any, that could be caused by contamination and whether or not those risks need to be addressed.

It is not always either reasonable or practicable to clean up land contamination completely but by the time that the assessment process is complete, risks should have been identified, anticipated and assessed and one or more solutions to address them should have been identified.

In the context of land contamination, there are 3 elements to any risk but the risk may only be considered to be present if each of the 3 elements is present.

The 3 elements are

1. **Contaminant (or source of contamination)** - a substance that is in, on or under the land that has the potential to cause harm or to cause pollution of controlled waters (for example rivers, streams, lakes, groundwater).
2. **Pathway** - a route or way in which a receptor could be exposed to, or affected by a contaminant.
3. **Receptor** - Something or someone that could be affected by a contaminant.

Where all 3 elements are present, this is known as a pollutant linkage. There may be more than one pollutant linkage present at a site and some pollutant linkages may be connected. For example, one contaminant may affect more than one receptor along more than one pathway.

Developing a site may introduce pathways and receptors to a site where those elements would not have been present if the development did not take place.

In developing a site, it is the responsibility of the developer to demonstrate that contamination present at the site may reasonably be addressed and that once developed, the site is suitable for the use proposed.

Phase 1 - The desk based study (Preliminary Risk Assessment)

The purpose of this phase of the investigation is to use a variety of sources of information to identify potential contaminants, pathways and receptors so that the intrusive investigation can be designed to investigate the potential pollutant linkages.

Sources of information include for example;

- Historical maps
- Geological maps and memoirs
- Hydrogeological maps
- Coal authority records
- Local Authority records
- County records
- Mine plans
- Natural Resources Wales records
- Records of previous land uses
- Site plans
- Assessment of previous land uses
- Assessment of current land use
- Assessment of proposed land use
- Review of any previous assessments

This phase of the investigation also provides an opportunity to identify any constraints or restrictions that may affect subsequent phases for example,

- Access points
- Location of drains, tanks, water pipes, cables and gas mains
- Nature and extent of old hardstandings or foundations
- Presence of protected species or protected geology
- Overhead cables
- Archaeology
- Permits, consents and licences needed for the work
- Presence of buildings awaiting demolition

Once the potential contaminants, pathways, receptors and potential links between them have been identified, these are used to put together a Conceptual Site Model.

The Conceptual Site Model is a compilation of all the potential links and risks. It is a very important part of the land contamination assessment process and although it can be expressed as a table, using diagrams or both, it is important that it is presented in a format that can be easily followed through and back through each phase.

It is used to understand and identify potential interactions between contamination and receptors, potential risks and to design and inform the other phases of the assessment.

Phase 2 - The intrusive assessment (Detailed Risk Assessment)

It is expected that an intrusive investigation will be carried out when Phase 1 of the land contamination assessment has found that there are potential pollutant linkages and potential risks present.

This phase of the assessment should be designed to look into the potential risks. The following information, for example, should be included in the report that is submitted to the Council.

- Phase 1
- Methodology (e.g. explanation of what was done and why)
- Plans showing locations of exploratory points (e.g. boreholes, wells and trial pits)
- Plan showing locations of exploratory points and proposed development
- Explanation of what was found and where
- Discussion of results
- Revised Conceptual Site Model
- Detailed risk assessment (based on Conceptual Site Model)
- Justification of any risk assessment method or tool used
- Copies of regulatory permits, consents and licences
- Copies of correspondence from other organisations such as Natural Resources Wales
- Recommendations for further assessment

Phase 1 of the assessment must be sufficient to show that the potential risks have been thoroughly understood and this means that a high level of confidence in the preliminary risk assessment is required to demonstrate that any other outcome is acceptable.

Reports of the findings of Phase 1 and Phase 2 reports can be submitted together but Phase 2 reports submitted without a Phase 1 report will be rejected.

Sometimes, the detailed risk assessment will conclude that although some contamination is present, the levels of contamination do not pose a particular risk. In these cases, remediation is unlikely to be required.

Where the levels of contamination are found to be unacceptable then remediation will be necessary and the Council will expect a remediation scheme to be submitted. General references to remediation made in Phase 2 reports will not be accepted as a substitute for a remediation scheme.

To avoid delays, having your reports rejected or your application refused, it is important to ensure that each phase of the land contamination assessment is carried out with regard to up to date UK risk assessment tools, best practice and guidance documents and provides at least the minimum information required.

Phase 3 - Remediation

The purpose of remediation is to address the specific risks found at Phase 2

A remediation scheme to provide a detailed explanation of which risks identified by Phase 2 of the assessment will be addressed and how, will be required. This should include, for example, the following information;

- Appraisal of remediation options
- Recommendations for remediation
- Explanation of why chosen method was selected
- How the scheme will be carried out and by whom
- How any stockpiles of materials will be kept separate
- Explanation of any permits, consents, exemptions or licences required
- Explanation of how remediation will be verified
- Approximate timescales
- Dust, odour and noise controls
- Control of surface water run-off
- Waste disposal and waste consignment notes

It is important to make sure that detailed records of the activities carried out during the remediation works are kept as it is this information that will be relied upon to verify that the work has been carried out.

Phase 4 - Verification

When the remediation works have been completed it will be necessary to provide a Verification Report to show that the remediation work has been carried out and has been successful. This information will need to be submitted for each plot within a development.

The report should include, for example, the following information,

- Remediation scheme
- Results of laboratory tests
- Monitoring results
- Plans showing areas that were remediated
- Details of who carried out the work
- Photographs
- Waste consignment notes
- Conceptual Site Model and cross-references with Phase 2
- Copies of permits, consents and licences
- Explanation of how the work was carried out
- Explanation of how remediation has been successful

It is important that the information provided to show that remediation was carried out is provided for each area where remediation was required. Where remediation was required at individual areas of a development then it is particularly important to make sure that information is provided for each of those individual areas. It is not sufficient to provide information that simply provides general information about the remediation work that was carried out.

For example, if 10 houses were built and gas protection measures were required to be installed in each house, then information to show that the gas protection measures were installed in each house is required.

If 10 houses were built and remediation was required in 5 of the back gardens, then information to show that each of the 5 back gardens were remediated is required.

For example, if 10 houses were built and gas protection measures were required to be installed in each house, it is not sufficient to provide information to claim that gas protection measures were installed in each house but that shows evidence of gas protection measures in only 3 of the houses.

Verification reports are required on a Plot by Plot basis

If general statements are made in a Verification Report without evidence to show that remediation has been carried out in each individual area, building or plot, the Contaminated Land Officer can have no confidence that the statements are true and will reject the report. Your application to discharge your planning condition will not be discharged and selling the finished development, moving in or securing a mortgage for it is likely to be very difficult.

Where can I find out more about land contamination?

www.flintshire.gov.uk

Pollution Control
Community and Business Protection
Ty Dewi Sant
St David's Park
Ewloe
Flintshire
CH5 3FF

pollution.control@flintshire.gov.uk

Checklists

The following checklists will assist you with submitting reports to the Council. The lists suggest the information that should be provided but they are not exhaustive and the information required may vary from one site to another, depending on the circumstances.

Failure to provide sufficient information at the required times will result in delays, expense, refusal of planning permission/refusal to discharge a condition, enforcement, or could make a planning permission invalid.

Phase 1 - Preliminary (Qualitative) Risk Assessment

Information (Include copies of information referred to)	✔	✘
Purpose of report and Council's reference numbers		
Objectives of report		
Credentials of persons preparing report		
Site address, description and National Grid Reference		
Plan of site showing site boundary		
Historical maps - with copyright details and reproduction permissions		
Geological maps and memoirs		
Archaeological information		
Hydrogeological maps		
Water abstraction points		
Private Water Supplies		
Coal Authority records		
Local Authority records		
Natural Resources Wales records		
Environmental Designations such as SSSI, SAC, RAMSAR		
Copies of consultations with other organisations such as Natural		
Resources Wales, Clwyd Powys Archaeological Trust		
Records of previous land uses		
Review of surrounding land uses and potential sources of contamination		
Aerial photographs/photographs - with reference point and annotations		
County Record Office searches		
Pollution incidents - with details		
Assessment of previous land uses		

Assessment of current land use	✔	✘
Assessment of proposed land use		
Review of previous investigations and remediation schemes		
Conceptual Site Model		
Sources/Contaminants		
Pathways		
Receptors		
Explanation of individual pollutant linkages		
Diagram and table showing individual pollutant linkages Cross-sectional drawings, plans, diagrams		
Explanation of constraints or restrictions that may affect subsequent phases of the assessment.		
Mine shafts, entries and adits		
Planning constraints such as; finished site/floor/ridge height levels, Tree Preservation Orders, septic drainage systems, drainage fields (soakaways)		
Proposals for Phase 2 - detailed risk assessment		
Detailed scope (including justification) - detailed risk assessment		

Phase 2 - Detailed (Quantitative) Risk Assessment

Information (Include copies of information referred to)	✔	✘
Assessment of proposed land use		
Review of previous investigations and remediation schemes		
Conceptual Site Model		
Sources/Contaminants		
Pathways		
Receptors		
Explanation of individual pollutant linkages		
Diagram and table showing individual pollutant linkages Cross-sectional drawings, plans, diagrams		
Explanation of constraints or restrictions that may affect subsequent phases of the assessment.		
Mine shafts, entries and adits		
Planning constraints such as; finished site/floor/ridge height levels, Tree Preservation Orders, septic drainage systems, drainage fields (soakaways)		
Proposals for Phase 2 - detailed risk assessment		
Detailed scope (including justification) - detailed risk assessment		

Phase 3 - Remediation

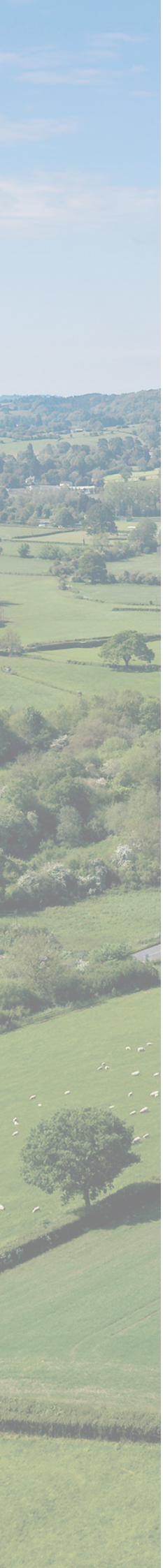
Information (Include copies of information referred to)	✔	✘
Purpose of report and Council's reference numbers		
Credentials of persons preparing report		
Explanation of objectives of the remediation		
Detailed description of the works to be carried out		
Description of ground conditions (soil and groundwater)		
Details of contamination to be remediated		
Plan of areas to be remediated		
Remediation methodology including; • Implementation Plan • Site location and current layout plans (appropriately scaled and annotated) • Review and summary of all previous reports with references • Confirmation of liaison with regulators • Information from Phase 1 - description of ground conditions including geology, hydrology and hydrogeology • Remediation objectives; criteria for relevant pollutant linkages and overall site criteria • Zoning/phasing with timescales • Preparation works and operational constraints • Detailed site plans/drawings (appropriately scaled and annotated) showing areas requiring remediation, locations and phasing of works, stockpiling, monitoring and sampling points • Verification Plan - including performance testing methods and actions to be taken if verification show failure of remediation		

Information (Include copies of information referred to)	✔	✘
Site plans/drawings		
Explanation of phasing of works		
Approximate timescales		
Consents, permits, agreements and licences		
Copies of correspondence with other agencies and regulators		
Appraisal of remediation options		
Recommendations for remediation		
Explanation of why chosen method was selected		
Explanation of any permits, consents or licences required		
Explanation of how and when remediation will be verified		
Approximate timescales		
Dust, odour and noise controls		
Control of surface water run-off		
Waste disposal		
Site management procedures and environmental control to protect site neighbours, environment and amenity during works, should include where appropriate: • Health and safety procedures • Dust, noise and odour controls • Control of surface water run-off • Details of how any necessary variations from the approved remediation statement arising during the course of works will be dealt with		
Details of how the works will be verified to ensure that the remediation objectives have been met; to include details of; • Sampling strategy • Chemical analysis • Proposed standards that remediation has been judged against • Monitoring - with substantiating data • Verification Plan		

Phase 4 - Verification

Information	✔	✘
Purpose of report and Council's reference numbers		
Credentials of persons preparing report		
Remediation Strategy		
Monitoring results with substantiating data		
Results of laboratory tests with substantiating data		
Plans showing areas that were treated and justification for any deviation from the remediation strategy (including verification plan).		
Credentials of who carried out the work		
Photographs - with reference points an annotations		
Waste consignment notes		
Conceptual Site Model		
Copies of permits, consents, licences & exemptions and correspondence with other agencies or regulators		
Explanation of how work was carried out		
Explanation of how remediation has been successful and how objectives have been met - with substantiating data.		
Description of final site conditions at completion with details of any permanent installations that form part of the remediation strategy and/or which are to be left in-situ		
Evidence that redundant boreholes and monitoring wells have been appropriately decommissioned		
Confirmation of post-completion monitoring/ maintenance requirements including;		
A monitoring and maintenance plan: • details of future monitoring and or maintenance requirements in a Monitoring and Maintenance Plan (where necessary) once remediation has been completed, including details of : • objectives • scope of sampling and monitoring and / or maintenance, methods, frequency and type of equipment to be used • statement and justification for end-point for monitoring programme		

Information	✔	✘
• proposed assessment criteria and justification		
• measures for ensuring required monitoring / maintenance is undertaken		
• timescale of submissions to regulators		
Performance testing methods e.g. for containment barrier (cut off wall, gas membrane) and capping layer. Confirmation from independent consultant that remediation measures proposed have been incorporated/ constructed as planned or as per manufacturers specification. Justification of any deviation.		
Evidence to show of how remediation has been successful and how objectives have been met		



References and Guidance

This list is not exhaustive but indicates some of the reference and guidance documents that developers and their advisors should refer to.

- British Standards Institution (2017) Investigation of Potentially Contaminated Sites, Code of Practice, BS: 10175:2011+A2
- British Standards Institution (2020) Amendment 2: Code of Practice for Site Investigation, BS5930:2015+A1:2020
- British Standards Institution (2015) Specification for Topsoil and Requirements for Use, Code of Practice, BS: 3882:2015
- British Standards Institution (2018) Soil quality. Sampling. Guidance on sampling standards Series, BS ISO: 10400:100-107 and 201-206
- British Standards Institution (2019) Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings, BS:8485:2015+A1:2019
- British Standards Institution (2013) Guidance on Investigations for Ground Gas. Permanent Gases and Volatile Organic Compounds (VOCs), BS: 8576:2013
- CIRIA Report C665 (2007) Assessing Risks Posed by Hazardous Ground Gases to Buildings
- CIRIA Report C682 (2009) The VOCs Handbook, Investigating, assessing and managing risks from inhalation of VOCs at land affected by contamination
- CIRIA Report C735 (2014) Good practice on the testing and verification of protection systems for buildings against hazardous ground gases
- CL:AIRE (2020) Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration
- CL:AIRE (2011) Definition of Waste: Development Industry Code of Practice Version 2
- CL:AIRE (2017) Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies
- CL:AIRE (2021) Good Practice for Risk Assessment for Coal Mine Gas Emissions
- Department of the Environment (1995) Industry Profiles
- Environment Agency (2021) Land Contamination Risk Management (LCRM)
- Environment Agency (2004) Guidance on the management of landfill gas
- Environment Agency (2006) Remedial Targets Methodology, Hydrogeological Risk Assessment for Land Contamination

- Environment Agency (2002) Technical Advice to Third Parties on Pollution of Controlled Waters for Part IIA EPA 1990
- Environment Agency (2005) Science Report P5-080/TR3, The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons for Soil
- Environment Agency (2018) MCERTS Performance Standard for Laboratories Undertaking Chemical Testing of Soil
- Environment Agency (2009) Science Report SC050021/SR2, Human Health Toxicological Assessment of Contaminants in Soil, Background to the CLEA Model
- Environment Agency (2009) Science Report SC050021/SR3, Updated technical background to the CLEA model
- Environment Agency (2009) CLEA Software Handbook version 1.05
- Health and Safety Executive (1991) Protection of Workers and the General Public during the Development of Contaminated Land
- Raybould JG, Rowan DL & Barry DL, 1995, CIRIA Report R150, Methane Investigation Strategies
- Welsh Government (2012) Statutory Guidance on Contaminated Land
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Welsh Local Government Association/Welsh Land Contamination Working Group (Version 4, September 2022) Development of Land Affected by Contamination - A Guide for Developers

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