

Community and Business Protection  
Contaminated Land

# Contaminated Land Inspection Strategy

Revision 6 | October 2023

## Foreword

This Contaminated Land Strategy describes how Flintshire County Council is required to identify sites within its administrative control that may be affected by land contamination. ~~The document~~ It also explains the statutory guidance, legislative provisions, processes, and procedures that the Council will follow in order to investigate those sites, to identify ~~statutory~~ Contaminated Land where necessary and to remediate Contaminated Land.

The Council last published its Contaminated Land Strategy in February 2013 ~~2019~~. Since then a number of ~~investigations to assess~~ land contamination ~~assessments~~ have been carried out and significant changes to legislation and guidance documents have taken place.

This revision of the Strategy has taken these changes into account and amendments have been made where necessary.

This revision of the Strategy replaces all previous revisions of Flintshire County Council's Contaminated Land Strategy.

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Flintshire County Council

Community & Business Protection

Pollution Control

Ty Dewi Sant

Ewloe

Flintshire CH5 3FF

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## Executive Summary

Land can be affected by contamination in the environment as a result of human activity and as a result of natural processes. The presence of contamination may cause harm or present risks to health, animals, buildings or the environment. However, just because contamination is present does not mean that the land is Contaminated Land or that there is a problem.

On 1st July 2001, legislation requiring land contamination to be investigated and addressed was enacted in Wales. The legislation is known as Part 2A of the Environmental Protection Act 1990 and it introduced a detailed way by which land contamination could be regulated. It charges each Local Authority with a duty to identify and investigate land which may be affected by contamination. It also requires Local Authorities to secure the remediation of land contamination where necessary.

The investigation and identification of land which may be affected by contamination is to be carried out in an ordered manner and each Local Authority, including Flintshire County Council, is required to publish a Contaminated Land Strategy to explain how this will be done.

A large number of sites may be identified as potentially affected by land contamination and Part 2A of the Environmental Protection Act 1990 requires the Council to investigate each one in a prioritised manner. This means that sites where the greatest harm is or is more likely to be taking place are to be investigated first. The prioritisation process takes into account the individual circumstances at each site and it will take place in 3 stages.

When the prioritisation process is complete, each site will be investigated in turn to understand the relationships, if any, between contamination and receptor.

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

1. Desk Study (preliminary risk assessment) **Preliminary Risk Assessment**
2. Intrusive Investigation (detailed risk assessment) **Detailed Risk Assessment**
3. Remediation
4. Verification

The outcome of the assessments carried out at each stage will determine if it is necessary to progress to the next stage. For example, if the ~~Desk Study~~ **stage 1** finds that there are likely to be unacceptable levels of contamination present then it will be necessary to carry out an ~~intrusive investigation~~ **stage 2**. If the ~~intrusive investigation~~ **stage 2** finds that there are unacceptable risks to receptors as a result of the presence of the contamination then ~~remedial works to remove or reduce those risks to acceptable level~~ **address those risks** will be necessary and the site may formally be determined as Contaminated Land.

The 'Polluter Pays' principle applies to Part 2A of the Environmental Protection Act 1990, and the responsibility for land contamination rests with those who caused it, the owner or occupier of the land or the person developing the land. The Council will make reasonable enquiries to identify and trace

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those responsible for causing the contamination and each individual link between contamination and receptor and will offer them an opportunity to carry out remedial works voluntarily.

Land contamination at some sites may be found to be affecting Controlled Waters such as Rivers, Lakes, Streams and Groundwater. These sites are known as Special Sites and will be referred to Natural Resources Wales.

If the remedial work will not be carried out voluntarily, the Council and in the case of Special Sites Natural Resources Wales, may decide to take formal action against those responsible to secure the work.

A significant number of sites identified as a result of the prioritisation process will be put forward for development and investigated through the planning process.

The Council's development control 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 it must be taken into account by the Council when assessing an application for planning permission and when deciding whether or not to grant 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 investigate and address those risks and to restore the beneficial use of the land.

The Council has produced an advisory guide 'The Development of Land Affected by Contamination – Reports to Support Planning Applications' to complement this Strategy.

Where there is a possibility that the site intended for development is affected by contamination, the developer will be required to demonstrate that contamination present at the site may will reasonably be addressed and that once developed, the site is suitable for the use proposed and is incapable of being formally determined as statutorily Contaminated Land in accordance with the provisions of Part 2A the Environmental Protection Act 1990.

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The Council will carry out regular reviews of its the Contaminated Land Strategy and each site that the prioritisation process has identified. If the circumstances at a site have changed, its priority may

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change and it may be inspected for the first time or it may be inspected again.

## 1.0 | Introduction

Land can become affected by contamination as a result of human activity, a previous use of the land or natural processes which leave behind contamination that may or may not reduce or disappear over time.

Wales has a long and varied industrial history. Industrial activities, pollution and waste disposal have left Wales with a legacy of contamination.

It is not only Wales' industrial past that has contributed to land contamination, some natural process have also played their part. The varied and complex geology that underlies Wales is rich in minerals and metals which over time have found their way into shallower ground and it is common to find high levels of some in the soil.

In some cases, the levels of contamination present may be capable of causing unacceptable risks of harm to human health or the environment and be sufficient for the land to be considered Contaminated Land.

Every Local Authority, including Flintshire County Council, has a duty imposed on **upon** it by Part 2A of the Environmental Protection Act 1990, to identify and investigate **inspect** land **that may be affected where there is reasonable ground to suspect that it may be affected** by contamination. A large number of sites may be identified as potentially contaminated and the legislation requires that these sites are investigated **assessed** in a prioritised manner. Sites where the greatest harm is occurring or is likely to occur are investigated **assessed** first.

This Contaminated Land Strategy describes how Flintshire County Council is required to identify sites within its administrative control that may be affected by land contamination and it explains the steps that the Council will take to investigate **assess** the land and secure the remediation of contamination.

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## 2.0 | Objectives

This Strategy has a clear aim to promote, support and complement legislative requirements, Government, Welsh Government and the Council's own policies and priorities to protect and improve Public Health and the environment in which we live.

### The key objectives of the Strategy are;

- To identify and remove unacceptable risks to human health and the environment reduce the amount of land contamination in Flintshire,
- To ensure compliance with legislation, regulations and guidance,
- To ensure that enforcement action is taken if necessary,
- To encourage the redevelopment of previously developed land and to promote the principles of sustainable development,
- To ensure that where redevelopment takes place, land contamination is addressed,

- To explore and address the Council's own liabilities,
- To minimise new liability to the Council from the sale and purchase of land,
- To minimise unnecessary costs of dealing with land contamination to taxpayers, businesses and individuals.
- To enhance and protect the natural environment and biodiversity
- To take account of the effect of climate change on the lifespan of remediation measures
- The objectives of the Strategy support not only the themes, improvement objectives and priorities within the Council's Corporate Plan Council Plan 2019-2023 and Well Being Objectives 2017 but also deliver the Welsh Government's Enforcement Priorities for Wales, National Well Being Goals as set out in the Well Being of Future Generations Act 2015, the Environment Act Wales 2016, and the Flintshire Public Service Board's Well Being Assessment and shared priorities.

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### 3.0 | Regulatory Context

On 1st July 2001, Part 2A of the Environmental Protection Act 1990, statutory guidance and

Regulations (The Contaminated Land (Wales) Regulations 2001) associated with it were enacted in Wales to replace Section 79 of the Environmental Protection Act 1990 to provide Local Authorities and the Natural Resources Wales with a means of identifying and addressing unacceptable risks to health or the environment from land contamination.

Before Part 2A was enacted, the provisions of Section 79 of the Act were very limited and meant that action could only be taken where land contamination was found to be causing a statutory nuisance in terms of human health.

There was little known about how land contamination could cause a statutory nuisance and as a result, action was rarely taken.

The introduction of Part 2A meant that action could be taken where land contamination was found to be a risk to human health, the natural or the built environment and it encourages the remediation of land to make it suitable for use and avoids unnecessary blight.

In April 2012, new statutory guidance (Welsh Government (2012), Contaminated Land Statutory Guidance) was published by the Welsh Government to replace the previous statutory guidance which was published to support the introduction of Part 2A in 2001.

Investigations Assessments may be carried out in accordance with the provisions of Part 2A where there is reasonable ground for the Council to suspect that the land may be affected by contamination, where there is no other identifiable breach of other pollution prevention controls and where there is no other appropriate alternative solution or where the land has not been put forward for development.

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There are other regulatory controls in place which complement Part 2A and prevent new contamination from being caused.

Other regulatory regimes such as the Environmental Damage (Prevention and Remediation) Regulations 2009 and the **regulatory** regimes for water resources, waste and environmental permitting also provide a means of addressing some land contamination issues.

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Changes were made to Part 2A in Wales in 2006, to extend it to include radioactive contamination of land (The Radioactive Contaminated Land (Modification of Enactments) (Wales) (Amendment) Regulations 2007). Further changes were made in 2007, to include radioactive contamination from nuclear installations.

Although legislative provision has been made for action to be taken it is considered unlikely that many sites satisfying the criteria that it sets out will be found.

## 4.0 | Role of the Regulator

Land contamination is a highly complex interdisciplinary field involving the analysis of chemical, physical, biological and legal interactions between soil, rocks, water, nature and society.

The Council fulfils the primary regulatory role for Part 2A and is responsible above any other for ensuring that the requirements of Part 2A are met and where appropriate, enforced.

Land contamination at some sites may be found to be affecting Controlled Waters such as Rivers, Lakes, Streams, the Sea and Groundwater. These sites are known as Special Sites and will be referred to Natural Resources Wales, the Regulator responsible for the regulation of Special Sites.

As Local Planning Authority (LPA), the Council is required to ensure that land contamination is given due consideration where land is put forward for development. The development of land is discussed in more detail in Section 7.1.2 of this Strategy.

## 4.1 | The Council's Role

As primary regulator, the Council has a duty to identify and inspect land in Flintshire that **where there is reasonable ground to suspect that it** may be affected by contamination and to secure **remedial remediation** works to address unacceptable risks that this may present.

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### Part 2A requires the Council to;

- Produce and publish an inspection strategy (Contaminated Land **Inspection** Strategy)
- Implement and review the Contaminated Land **Inspection** Strategy
- Identify and inspect land which may be affected by contamination
- Decide what, if any, remediation is required
- Identify and trace those who should bear responsibility for remediation
- Ensure that remediation is carried out
- Take enforcement action for all Contaminated Land sites that are not Special Sites
- Refer Special Sites to Natural Resources Wales

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- Keep, maintain and publish a Public Register of **specific** regulatory actions

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The Council's Public Protection **Community and Business Protection** service employs a **full-time** Contaminated Land Officer to lead on and deal with land contamination issues.

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## 4.2 | Natural Resources Wales Role

Natural Resources Wales is responsible for the protection of Controlled Waters such as Groundwater, River, Lakes and Streams.

Land contamination at some sites may be found to be affecting Controlled Waters. These sites are known as Special Sites and will be referred to Natural Resources Wales by the Council.

### Part 2A requires Natural Resources Wales to;

- Assist the Council where the pollution of Controlled Waters is a concern
- Provide advice to the Council where the pollution of Controlled Waters is a concern
- Take enforcement action for Special Sites
- Publish periodic reports on the condition of the environment

Natural Resources Wales employs a Contaminated Land and Groundwater **specialist** team.

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## 5.0 | Definitions and Principles

Land may only be considered as statutorily Contaminated Land if it meets the definition given in Part 2A **of the Environmental Protection Act 1990.**

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The principles of risk assessment are applied when considering whether or not the definition has been met. This means that the probability and frequency of the exposure to the contamination are assessed with the magnitude and seriousness of the consequences.

To make a decision as to whether or not land meets the statutory definition, the person charged with responsibility for land contamination must understand not only the investigation process but also the scientific principles involved. They must also understand the complex risks associated with land contamination assessments and so to carry out the assessment itself, that person must be appropriately qualified, **professionally accredited** and competent to undertake the work and have sufficient expertise and relevant experience.

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## 5.1 | Pollutant Linkages

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.

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

The Conceptual Site Model is a compilation of all the potential pollutant linkages. It is a very important part of the land contamination assessment process and although it can be expressed as a table, a diagram 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 pollutant linkages and interactions between them, to design the intrusive investigation, to inform the detailed risk assessment and to design and verify remedial works.

### 5.1.1 | 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 is acceptable, 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 are acceptable.

It is not always either reasonable or practicable to clean up 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 remove or reduce unacceptable risks to acceptable levels should have been identified.

## 5.2 | Definition of Contaminated Land

Land can be affected by contamination in the environment as a result of human activity and as a result of natural processes. The presence of contamination may cause harm or present unacceptable risks to health, animals, buildings or the environment. However, just because a piece of land has been developed in the past does not mean that it is contaminated and just because contamination is present does not mean that the land is Contaminated Land or that there is a problem.

Some sites that are affected by contamination are affected to the extent that the receptors are being affected or that risks to the receptors are too great. This land could be considered **statutorily** Contaminated Land as defined by Part 2A of the Environmental Protection Act 1990.

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The definition of Contaminated Land is given in Section 78A(2) of the Environmental Protection Act 1990 as;

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

## 5.3 | Harm

When deciding whether or not land contamination found to be present is capable of causing an effect on receptors, the Council will consider the categories and forms of harm that are illustrated in the statutory guidance.

### 5.3.1 | Harm to Non-human Receptors

The term ‘harm’ is explained in Section 78A(4) and it means harm to the health of a living organism or organisms or other interference with the ecological systems of which they form part and, in the case of humans, includes harm to their property.

The effects of contamination on non-human receptors are explained in Table 1 and Table 2 as follows;

**Table 1: Ecological system effects**

Relevant types of receptor	Significant harm	Significant possibility of significant harm
<p>Any ecological system, or living organism forming part of such a system, within a location which is:</p> <ul style="list-style-type: none"> <li>• a site of special scientific interest (under section 28 of the Wildlife and Countryside Act 1981)</li> <li>• a national nature reserve (under s.35 of the 1981 Act)</li> <li>• a Marine Conservation Zone*</li> <li>• an area of special protection for birds (under s.3 of the 1981 Act)</li> <li>• a “European site” within the meaning of regulation 8 of the Conservation of Habitats and Species Regulations 2010</li> <li>• any habitat or site afforded policy protection</li> </ul>	<p>The following types of harm should be considered to be significant harm:</p> <ul style="list-style-type: none"> <li>• harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or</li> <li>• harm which significantly affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.</li> </ul>	<p>Conditions would exist for considering that a significant possibility of harm exists to a relevant ecological receptor where the local authority considers that:</p> <p>Significant harm of that description is more likely than not to result from the contaminant linkage in question; or</p> <p>there is a reasonable possibility of significant harm of that description being caused, and if that harm were to occur, it would result in such a degree of</p>

\* Marine Conservation Zones upon commencement of Part 5 of the Marine and Coastal Access Act 2009

**Table 2: Property Effects**

Relevant types of receptor	Significant harm	Significant possibility of significant harm
<p>Property in the form of:</p> <ul style="list-style-type: none"> <li>• crops, including timber;</li> <li>• produce grown domestically, or on allotments, for consumption;</li> <li>• livestock;</li> <li>• other owned or domesticated animals;</li> <li>• wild animals which are the subject of shooting or fishing rights.</li> </ul>	<p>For crops, a substantial diminution in yield or other substantial loss in their value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage. The local authority should regard a substantial loss in value as occurring only when a substantial proportion of the animals or crops are dead or otherwise no longer fit for their intended purpose. Food should be regarded as being no longer fit for purpose when it fails to comply with the provisions of the Food Safety Act 1990. Where a diminution in yield or loss in value is caused by a contaminant linkage, a 20% diminution or loss should be regarded as a benchmark for what constitutes a substantial diminution or loss. In this Chapter, this description of significant harm is referred to as an “animal or crop effect”.</p>	<p>Condition would exist for considering that a significant possibility of significant harm exists to the relevant types of receptor where the local authority considers that significant harm is more likely than not to result from the contaminant linkage in question, taking into account relevant information for that type or contaminant linkage, particularly in relation to the ecotoxicological effects of the contaminant.</p>

<p>Property in the form of buildings. For this purpose, “building” means any structure or erection, and any part of a building including any part below ground level, but does not include plant or machinery comprised in a building or, buried services such as sewers, water pipes or electricity cables.</p>	<p>Structural failure, substantial damage or substantial interference with any right of occupation. The local authority should regard substantial damage or substantial interference as occurring when any part of the building ceases to be capable of being used for the purpose for which it is or was intended. In the case of a scheduled Ancient Monument, substantial damage should also be regarded as occurring when the damage significantly impairs the historic, architectural, traditional, artistic or archaeological interest by reason of which the monument was scheduled. In this Chapter, this description of significant harm is referred to as a “building effect”.</p>	<p>Conditions would exist for considering that a significant possibility of significant harm exists to the relevant types of receptor where the local authority considers that significant harm is more likely than not to result from the contamination linkage in question during the expected economic life of the building (or in the case of a scheduled Ancient Monument the foreseeable future), taking into account relevant information for that type of contaminant linkage.</p>
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### 5.3.2 | Harm to Human Health

So far as human health is concerned, there is no absolute set of circumstances in which or thresholds above which land is considered Contaminated Land and so making an informed decision is highly complex.

Health effects that will always be considered as causing significant harm are;

- life-threatening diseases such as cancers,
- diseases that are likely to have a serious impact on health,
- serious injury caused by chemical and biochemical properties of a substance but not its physical properties for example, if it is hard or sharp, birth defects, impairment of reproductive function and death.

Other health effects that may be considered as causing significant harm are;

- physical injury,
- gastrointestinal disturbances,
- effects on the respiratory tract,
- effects on the cardio-vascular system,
- skin ailments,
- effects on the central nervous system,
- effects on the organs
- a range of other impacts on health.

Explanations of what should be taken into account in reaching a decision on what is 'significant harm' and what is the 'significant possibility of such harm' are provided in Section 4 of the statutory guidance.

## 6.0 | The Council's Policies

The Council has a large number of policies, strategies and plans which affect the way in which the Council carries out its business and which shape the way in which it provides services. ~~to its customers.~~

**A number of those policies, strategies and plans have relationships and synergies not only between each other but also with the Contaminated Land **Inspection** Strategy including,**

- ~~The 'County Vision' and Community Strategy 2009-2019~~
- ~~Flintshire County Council Annual Improvement Plan 2019-2023~~
- ~~Flintshire Unitary Development Plan~~
- ~~Public Protection **Community and Business Protection** Enforcement Policy~~
- ~~Public Protection Service **Community and Business Protection** Strategy and Action Plan **Strategic and Operating Plan**~~
- ~~Flintshire Biodiversity Action Plan~~
- ~~Environment Directorate **Community and Business Protection** Plan~~
- Flintshire Regeneration Strategy

There are also direct relationships with Government policies and the Contaminated Land **Inspection** Strategy has particular regard to the following Welsh Government policies;

- Welsh Government, Local Better Regulation Office, National Enforcement Priorities for Wales
- Welsh Government, Environment Strategy for Wales
- Priority 2: Ensuring the safety and quality of the food chain to minimise risk to human and animal health
- Priority 4: Improving the local environment to positively influence quality of life and promote sustainability
- National Well Being Goals, Well Being of Future Generations Act 2015.

The Contaminated Land Strategy has been produced in consideration of relevant policies and plans.

## 7.0 | Characteristics of Flintshire

As this Strategy explains, land contamination assessments will be carried out in an ordered manner and individual sites will be ~~investigated~~ **assessed** according to their priority. The process that will be followed to prioritise sites is explained in Section 9.3.

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To begin to identify and organise the sites which may need to be assessed, it is important to understand the particular natural and man-made features and history of the County so that each can be taken into account.

It is important to understand where people live, where they work, what they have built, what they have used, what happened in the past and what may have been left behind as a result.

## 7.1 | Geographical Location

The County of Flintshire is situated in north east Wales and is one of the 6 unitary authorities of North Wales. It is shown on the map below.

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The County of Denbighshire and the Clwydian Range are found at Flintshire's western border and the County of Wrexham is found to the south.

The English County of Cheshire is found at Flintshire's eastern border and the northern area of Flintshire is bordered by the tidal estuary of the River Dee and the Irish Sea.

The English counties of Wirral and Merseyside are found across the Estuary.



## 7.2 | History

Until the Welsh Local Government Reorganisation that took place in 1996, Flintshire was a part of the North Wales County of Clwyd and 2 councils; Delyn Borough Council and Alyn and Deeside District Council, were primarily responsible for its administration.

Clwyd County Council was formed in 1974 and incorporated most of the original County of Flintshire. The current extent of Flintshire is very different to the ancient County of Flintshire.

Before 1974, Flintshire was one of few counties in Britain to retain exclaves. Exclaves are detached areas of a County, surrounded entirely by other Counties. The administrative area of Flintshire comprised the borough of Flint, the urban districts of Buckley, Mold and Connah's Quay, the rural and urban districts of Holywell, the rural district of Hawarden, the district of Rhuddlan and the exclave rural district of Maelor.

During the reorganisation, the district of Rhuddlan was incorporated into Denbighshire and the rural district of Maelor was incorporated into Wrexham.

Since 1996, Flintshire has been a unitary authority and is administered by Flintshire County Council.

## 7.3 | Population Size and Distribution

Flintshire covers an area of 43,464 hectares. Including the River Dee Estuary, it covers an area of 49,891 hectares.

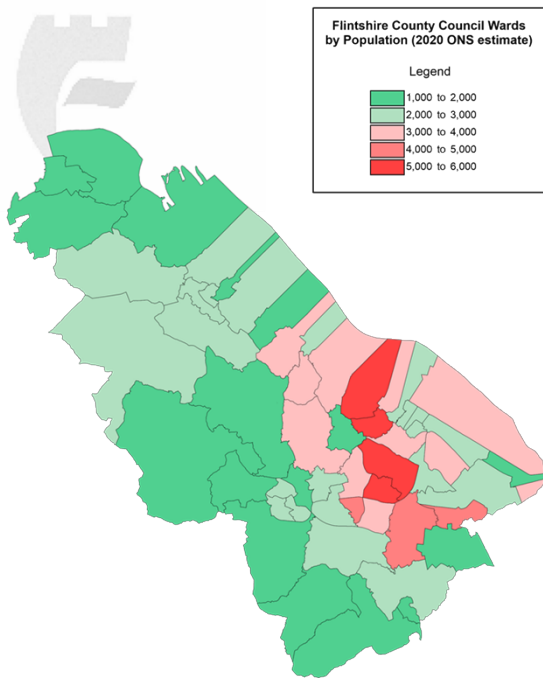
According to the Office for National Statistics, the population of Flintshire was c157,000 in 2020.

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There are 9 principal settlements in Flintshire and residential areas are concentrated along the coastal areas of the County. Most residents live in and around the towns of Connah's Quay, Shotton, Queensferry, Mold, Buckley, Holywell, Bagillt and Hawarden.



The map below illustrates the way in which the population of Flintshire is distributed.



A large area of Flintshire is rural and there are many smaller settlements and villages dispersed across the County, a number of which include environmental conservation areas, listed buildings and scheduled ancient monuments

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## 7.4 | Geology

The geology of Flintshire is complex and varied as it is comprised from a succession of rocks from the

Silurian (the period from about 444 to 420 million years ago) to the Triassic (the period from about 250 to 200 million years ago) age. Many of its features have been exploited to support local mines and quarries over centuries.

The high moorlands of the Clwydian Range are formed from Silurian grits and shales and the upland area of Halkyn Mountain is formed of Carboniferous Limestone deposits.

The outcrop of limestone is about 4 miles wide in the North and narrows to about 1 ½ miles wide as it approaches Flintshire's border with Denbighshire at Loggerheads.

The limestone deposits continue to be quarried today and are crossed by many metalliferous and calcite veins which have been extensively mined in the past.

Several lead and zinc and lead and silver mines were operated where the veins are present, particularly in the area of Halkyn Mountain.

The limestone is overlain by Millstone Grit; coarse-grained sandstones and Holywell Shales; sometimes called 'black limestone', which outcrop from the north to the south, immediately east of the Limestone at Halkyn Mountain and Nercwys Mountain.

In most areas, the Millstone Grit is formed from silica sandstone but towards the north it is formed by chertstone, a fine-grained rock containing silica and quartz. These features have also been quarried over time.

The eastern area of Flintshire is underlain by coal measures known as the Flintshire Coalfield, which ranges from Point of Ayr in the north to Caergwrle in the south.

The Flintshire Coalfield is made up from many different seams and has been mined extensively in the past. Some seams are present in the north, some are present in the south and some are present across the whole area and some extend underneath the River Dee Estuary.

Where the land lies below approximately 600ft above sea level, the bedrock is overlain by other deposits such as glacial boulder clay, sands and gravels.

These deposits have been widely exploited and used to support local industries, particularly brick and pottery making. Sand and gravel deposits continue to be quarried today.

Triassic rock formations, including sandstones are found toward Higher Kinnerton in the south east.

More recent geological deposits such as tufa, a type of limestone, are found at Caerwys.

## 7.5 | Hydrology

Flintshire has a variety of rivers, streams and pools including the River Dee and its estuary, the River Wheeler, the River Alyn and the River Terrig.

The flow and path of the rivers are strongly influenced by mine spoil, workings and drainage tunnels, and other features such as caverns within the limestone.

## 7.5.1 | River Dee and River Dee Estuary

The River Dee rises in Dduallt in the Snowdonia National Park in Gwynedd. It flows through Snowdonia to and through Bala Lake and to Llangollen in Denbighshire. It then flows to the east of Wrexham and along the border between England and Wales. It flows into England and through Chester until passing through Cheshire's border with Flintshire and back into Wales at Saltney.

It then flows on through Sealand and Queensferry before reaching its estuary with the Irish Sea at Connah's Quay.

The lower section of the River Dee is influenced by the tide.

A stretch of the River Dee has been canalised and flows along a manmade channel which alters its natural course.

Before the River was canalised it flowed past Parkgate and followed the west shore of the Wirral Peninsula. After it was canalised, it followed the North Wales Coast and the areas of Sealand, Shotton and Queensferry were reclaimed from the Estuary.

The River Dee was especially important historically as it provided an inexpensive means of transporting products from local industries and producers. It also provided access to the Irish Sea and made the Docks at Liverpool, Ellesmere Port and Manchester easily accessible creating opportunities for world trading.

Today **More recently**, the River Dee is **has been** used to transport A380 aircraft wings on a barge from the Airbus factory at Broughton to the Port of Mostyn.

**Commented [RD40]:** Substitute words

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The River Dee Estuary is of great environmental importance internationally and its extensive salt marshes are especially important to waterfowl, birds and other wildlife. It is a designated Site of Special Site of Scientific Interest (SSSI) and Ramsar site.



## 7.5.2 | River Alyn

The River Alyn rises at the southern end of the Clwydian Range and flows in a southerly direction through the Alyn Valley, part of the Clwydian Range Area of Outstanding Natural Beauty (AONB).

It flows through carboniferous limestone from Halkyn Mountain, through the Alyn Gorge between Loggerheads and Rhydymwyn and toward and through Loggerheads at Flintshire's border with Denbighshire, it then flows through Mold to Cefn y Bedd where it meets and joins the River Dee just over Flintshire's border in Wrexham.

During the summer, the River Alyn flows underground through subterranean caves and potholes that have been formed in the limestone as a result of the flow of water over time. For several months a year, the river bed is dry in places.

The flow of water over the limestone surface has also caused many swallowholes to be formed.

The flow in the River Alyn is affected by drainage from historical metal mines, in particular the Milwr Tunnel which was built to drain water from and prevent flooding in mine workings in Halkyn Mountain centuries ago.

The Milwr Tunnel diverts water away from the River Alyn catchment and carries it directly to the River Dee where it discharges into the River Dee Estuary at Bagillt.

A stretch of the River Alyn in Rhydymwyn was canalised just before the Second World War broke out to allow for the construction of the Valley Works, a munitions storage and manufacturing complex. More information about this site can be found in Section 7.10.7 of this document.

## 7.5.3 | River Terrig

The River Terrig rises at Llyn Cyfynwy in Denbighshire, a short distance from the place where the River Alyn rises, and flows north and east toward Flintshire and between the Flintshire villages of Treuddyn and Nercwys. It eventually joins the River Alyn at Pontblyddyn.

## 7.5.4 | River Wheeler

The River Wheeler rises a short distance from Afonwen and flows in a northerly direction through Ysceifiog and Melin y Wern before it flows across Flintshire's border with and into Denbighshire toward the River Clwyd before flowing into the Irish Sea at Rhyl.

## 7.6 | Hydrogeology

Hydrogeology involves the study of the distribution and movement of groundwater (water found in soil pore spaces and in geological layers), in the soil, underlying geological layers, features and aquifers.

An aquifer is made up of underground layers of water-bearing geological features such as rock, gravel and sand from which groundwater can be abstracted using a well or a borehole.

Groundwater is a valuable source of water, provides flow to rivers and is very vulnerable to pollution.

Groundwater moves slowly through the ground and does not necessarily follow the direction or topography of the ground at the surface. The movement of groundwater is often dependant on pressure gradients which means that in the ground, water does not always flow downhill and can flow uphill.

In April 2010, the Environment Agency and Natural Resources Wales made changes to the aquifer designations in their Groundwater Vulnerability Maps to make them consistent with the Water Framework Directive. Major and minor aquifers are now called principal and secondary aquifers respectively.

Commented [RD42]: Insert 'Natural Resources Wales'

There are 4 secondary aquifers in Flintshire, found within the following geological features:

- Kinnerton Sandstone Formation
- Carboniferous Limestone
- Sandstones in the Halkyn Formation
- Sandstones in the Westphalian Strata

The most important aquifer in Flintshire is the Kinnerton Sandstone Formation which is used to support public drinking water supplies.

The second most important aquifer in Flintshire is the Carboniferous Limestone. The movement of groundwater in this aquifer is restricted to fissures and natural features which have been created by the movement of water through the rocks. It is also influenced by mine workings from historical lead mines and drainage tunnels serving the mines.

The soils which overly the aquifers are different and range from soils with a high leaching potential, where contamination can move through the ground easily, to those with a low leaching potential, where contamination does not move quite so easily through the ground.

Aquifers overlain by soils with a high leaching potential are more vulnerable to pollution than those with lower leaching potentials.

Areas which are particularly vulnerable to pollution and at risk of contamination are protected by zones imposed by the Environment Agency. Natural Resources Wales. Industrial operations and activities which could potentially cause pollution are subject to restrictions and pollution prevention measures to minimise risks to the groundwater, wells, springs, boreholes and water supplies. There are 5 Groundwater Source Protection Zones in Flintshire. Large areas of Flintshire are also protected by the Conservation of Habitats and Species Regulations as the many of the designated environmental conservation sites including the River Dee, are sensitive to the presence of phosphorous.

Commented [RD43]: Insert 'Natural Resources Wales'

Commented [RD44]: Insert reference

## 7.7 | Water Resources

The River Dee is an important source of drinking water. Three water companies take water from the River at 3 abstraction points above the weir in Chester. Water for drinking water is only abstracted above the weir as the stretch of the River below it is tidal and the water brackish.

The water, once it has been treated and made potable (suitable to drink), is distributed to northeast Wales, Cheshire and Merseyside. The demand for drinking water in Merseyside is greater than local supplies can support and water from the River Dee is used to meet the demand.

Water is not only taken from the River for drinking water but is also taken to be used by industry. Industries which abstract water from the River Dee include a papermill, Connah's Quay Power Station and the Shropshire Union Canal (British Waterways).

A large amount of water is taken from the River Dee and during the summer months the flow of the River is reduced. Water accumulated and stored in reservoirs in Denbighshire and Gwynedd during the winter is released into the River to support the abstractions.

The abstraction of water from the River is very closely regulated by the Environment Agency [Natural Resources Wales](#) and a consortium of water companies in accordance with the River Dee Regulation Scheme. The Scheme includes the management of abstractions, flow, water quality monitoring and pollution alerts.

Groundwater is another very important source of drinking water in many areas. It is found deep underground and can be used for large scale public supplies and for smaller private supplies.

There are 132 [around 150](#) private water supplies in Flintshire. Most of these are used by people in rural areas.

Water companies are required by law to test the water that they supply to ensure that it is safe to drink but those people that use a private water supply do not have to test the water that they use in the same way and so it is very important that any potential sources of contamination such as oil leaks or spills are reported.

Groundwater for public drinking water supplies is abstracted from 2 boreholes drilled deep into the aquifer in the sandstone between Bretton and Kinnerton in the southern area of Flintshire.

The River Dee is also an important fishery. The Estuary supports large Cockle beds and Salmon and Sea Trout can be found along its entire length.

The River has a high amenity value and is a popular place for coarse fishing, sailing and bird watching.

## 7.8 | Protected Habitats and Areas of Conservation

There are many common place and rare plant and animal species which can be found in Flintshire and there are an increasing number of designated wildlife and conservation sites in place to protect them.

**Commented [RD45]:** Insert 'Natural Resources Wales'

**Commented [RD46]:** Updated statistic

In Flintshire, there are 25 <sup>28</sup> sites Special Sites of Scientific Interest (SSSI), 6 Special Areas of Conservation (SAC), 1 Ramsar (Ramsar Convention – Wetland of International Importance) site, 1 Outstanding Area of Natural Beauty (AONB). 4 <sup>2</sup> Special Protection Areas and several more potential sites for designations.

Commented [RD47]: Updated statistic

More information about designated conservation sites is available from Natural Resources Wales and more information about protected species is available from the County Ecologist.

Where land contamination assessments are required at any of these sites, Flintshire County Council will have regard to and will take account of the designation and features of each one and will consult Natural Resources Wales.



## 7.9 | Sites of Historic Importance

Flintshire is rich in natural resources which have been exploited since at least the Roman era and have supported local industries for hundreds of years.

This has rewarded the County with distinctive landscapes ranging from the beaches and sand dunes at Talacre, the shores and coastal salt marches of the River Dee Estuary, Common Land, woodlands, rolling farmland and the Clwydian Range. Most of these areas are designated conservation sites.

Historical activities have also given Flintshire an abundance of historical features and buildings and archaeological remains such as Iron Age hill forts, Roman remains, mine workings, castles and ancient pilgrimage sites.

There are 34 <sup>32</sup> conservation areas; areas of special architectural or historic interest, the character of which it is desirable to preserve and enhance, 868 <sup>1032</sup> listed buildings, 400 <sup>133</sup> scheduled ancient monuments and many sites where there may be archaeological remains and 1 <sup>Landscape of Outstanding Historical Interest</sup> in Flintshire.

Commented [RD48]: Updated statistics

## 7.10 | What types of Contamination may be found?

The types of contamination that are likely to be found depends on the activity that took place on the land. Different substances are used by different industry and the type of contamination likely to be found is usually associated with the particular substances that were used, stored and produced.

Some materials, substances and wastes are commonly associated with particular processes and are more likely to be found at a site than others.

When assessing land contamination, it is very important to understand what to look for, where to look for it and why. It is important to carry out a thorough and detailed assessment of the processes which took place at a site including what was used, stored and produced and where.

Practices and processes can change over time and it is important to take this into account too as changes like this can affect the type of contamination that is likely to be found.

Flintshire has a long and varied industrial past and so there are many types of contamination that could be found.

Not all land contamination is caused by industrial activity. Some comes as the result of natural processes, such as the weathering of rocks and mineral veins in the ground, and takes place over a long time.

It is common to find elevated levels of lead and other metals in the soil around the lead mines and in areas where lead veins are present in underlying geological features.

Flintshire's industrial past follows its geological and geographical features. Industrial areas were concentrated, as they are today, around areas where minerals can be found and the River Dee and its Estuary.

Road and rail links with the rest of the Country- **Wales and the UK** were well developed and the River Dee allowed local products to be transported by river and sea to docks in Liverpool, Ellesmere Port and Manchester and made World trade possible.

The principal industries which have taken place in Flintshire are discussed in more detail in Sections 7.10.1 to 7.10.9 and it is likely that the land contamination assessments that will be carried out will be focussed in the areas where industrial processes have taken place.

**Commented [RD49]:** Insert specific reference to Wales



## 7.10.1 | Lead Mining

Lead is a heavy metal, an element which has metallic properties and which is usually toxic. It has a blue white colour which tarnishes to a dull grey when exposed to the air. When molten, it has a shiny, chrome like appearance.

Lead is also malleable and can be hammered or rolled into a thin sheet. It is this property which makes it particularly useful. It is commonly used in roofing products, bullets and shot, solders, radiation protection and batteries. Historically, it was commonly used to line coffins and storage tanks, in cosmetic products, as fishing line weights and as a fuel additive.

It is also toxic, causing damage to the nervous system and the brain and can accumulate in plant and animal tissues and the environment. For this reason, it is no longer used in many products.

Lead ore is found in metalliferous veins in limestone and lead deposits are often associated with deposits of zinc and silver.

The lead mines were concentrated in areas where limestone is present. The majority of Flintshire's lead mines were concentrated around the areas of Halkyn Mountain and Brynford.

In some areas of Flintshire, particularly around Trelawnyd and Pantybuarth, lead bearing veins can be seen in limestone outcrops at the surface of the ground.

Archaeological evidence shows that lead deposits in Flintshire have been exploited since the Roman era and historical records show that lead was mined in Flintshire from the early 13th Century, during the reign of King Edward 1st.

The lead in Flintshire was of particularly good quality and the lead mining industry in Flintshire boomed during the 1720s. To meet demand, skilled workers were brought from lead mines across the British Isles, in particular from the Peak District, Derbyshire and Cornwall to work under close supervision in Flintshire's lead mines.

The industry eventually went into decline during the late 19th Century as cheap lead and lead products became available from South Wales and international markets.

At this time, new industry prospered and a new Alkali factory in Flint opened offering employment to hundreds of local workers.

As the lead mines were extended deeper and deeper under the ground they became plagued by flooding. The industry was rejuvenated when a sea-level drainage tunnel was constructed to drain excess water from the mines beneath Halkyn Mountain.

The tunnel has been extended over time and reaches from Bagillt, by the River Dee Estuary to Cadole, close to Flintshire's border with Denbighshire. It is known as the Milwr Tunnel.

The original sea-level tunnel was extended by the Halkyn District United Mines Limited; an amalgamation of 9 mining companies and 2 drainage companies, to drain excess water from a number of lead mines to allow the mines to continue to operate and to allow them to be deepened to exploit ore contained in deep veins.

The tunnel intercepts a number of caverns, including a large cavern called Powell's Lode, formed naturally in the limestone by water beneath Halkyn Mountain. The caverns are popular with cavers and potholers and still contain some of the equipment that was used in the mines.

Today, the Milwr Tunnel is maintained by 2 water companies, United Utilities and Dwr Cymru (Welsh Water).

Evidence of Flintshire's lead industry is abundant today and although few structures remain on the surface, the landscape in some areas, particularly those around Halkyn Mountain is strongly influenced by abandoned mine shafts, spoil heaps and tailings.

Tailings are made up of the left over materials after the valuable part of the ore has been separated from the materials with little value.

Spoil heaps are piles of overburden and other wastes. They are not the same as tailings.

Overburden is term used to describe the rock and soil overlying the ore that is to be mined.

Lead mining has left behind not only physical evidence of past times but also a legacy of land contamination.

Land can be affected by contamination in the environment as a result of human activity and as a result of natural processes. The presence of contamination may cause harm or present risks to health, animals, buildings or the environment. However, just because contamination is present does not mean that the land is contaminated or that there is a problem.

If there is no way for the contamination to reach receptors (something or someone that would be sensitive to or whose health could be adversely affected by the presence of contamination) then there would be no way for the receptors to be affected.

It is very likely that some sites will be found to be affected by contamination to the extent that receptors are being affected or that risks to the receptors are too great. This land could be considered statutorily Contaminated Land as defined by Part 2A of the Environmental Protection Act 1990.

The revised Statutory Guidance, published in 2012, allows regulators to take 'normal' levels of contamination into account in their assessment of a site.

It is common to find elevated levels of lead and other metals in the soil around the lead mines and in areas where lead veins are present in underlying geological features.

This does not mean that the land is Contaminated Land nor does it mean that the levels are acceptable, may be dismissed or that there is no potential risk to receptors. Detailed assessments or investigations in these areas will be necessary.

In some of these areas, concentrations of lead and other metals are exceedingly high and are capable of causing adverse health effects.

To assess the potential extent of land contamination associated with lead mining activities, the Council is in the process of carrying out a detailed study and preliminary risk assessment. This will be used to develop and implement a supplementary strategy to assess, prioritise and investigate sites in and around the former lead mining areas. This will complement the Contaminated Land Strategy.

## 7.10.2 | Coal Mining

Coal is abundant across the World and was formed during the Carboniferous period (approximately 360 million years ago), the same period which saw the evolution of early reptiles.

It is a sedimentary rock formed over time from prehistoric vegetation which has become buried, heated and compressed.

The Ancient Greeks and Romans are known to have used coal and archaeological evidence shows that coal was used as a fuel by Romans in Britain.

Coal was not used extensively as a fuel until the industrial revolution and the invention of the steam engine which meant that coal was easier to mine.

Until then, coal was dug by hand from shallow bottle-shaped holes called Bell Pits and was brought to the surface using a bucket and chain on a hand-operated winding mechanism. Bell Pits can still be found in some areas of Flintshire including Ewloe.

The steam engine meant that large amounts of coal could be brought to the surface from deep in the ground. This turn meant that large mines could be extended to reach deep coal seams.

Coal mined from deep underground was brought through the mine on sledges or in small trucks pulled or pushed along roads and rails inside by miners or mules to be lifted to the surface up a shaft by a winding mechanism powered by an engine.

Historical records show that coal was being mined in Flintshire as early as the 13th Century, around the time that Flint Castle was built for King Edward 1st in 1277 and continued until the ~~open-cast~~ coal mine at Point of Ayr closed in 1996.

Over time, coal mines became established in Flint, Bagillt, Greenfield, Buckley, Mold, Pontblyddyn, Point of Ayr at Ffynnongroyw, Hawarden, Oakenholt, Leeswood and Coed Talon.

The coal mining industry in Flintshire was also important to its lead mining industry. Coal extracted from mines around Bagillt was used as fuel to heat the many lead smelters nearby.

The chimney from the lead works at Llanerch y Mor can still be seen. Its buildings have long been restored and are occupied by a haberdashery and craft centre.

### 7.10.3 | Clay, Pottery and Brick making

Areas of Flintshire, particularly around Ewloe, Buckley and Padeswood, are rich in high quality clays which have been extensively quarried and used to supply many brick works and potteries. The fireclays of Buckley were of exceptionally high quality and the town is famous for its brick and pottery products.

The first clay products were made commercially in Buckley during the 17th Century. The industry gradually grew over the years and boomed during the industrial revolution when engine power meant that large volumes of clay could be extracted from the ground and larger kilns could be operated.

As the industry grew, tramways were replaced with main gauge rail lines providing links with the rest of Wales, Chester and the docks along the River Dee. The canalisation of the River Dee in 1737 allowed products to be transported by river and sea to docks in Liverpool, Ellesmere Port and Manchester and made World trade possible.

The clay was used to make firebricks, tiles, kitchenware, drainage pipes and fittings, acid resistant bricks and silica bricks which were used as a lining in kilns, high temperature furnaces and metal smelters.

Quarrying the clay from the ground left behind enormous depressions in the ground. Some of these have filled with water and are used as fishing ponds and are protected wildlife sites. The remaining pits have been used as landfills to dispose wastes.

The last pottery operating in Buckley closed in 1946 and the last brickworks in 2003.

Many of the features of the historical brick works and potteries can still be seen along the Buckley Heritage Trail.

### 7.10.4 | Steel

Steel is an alloy made from iron, carbon and other materials such as titanium, chromium, manganese and vanadium.

At its time, the steel industry was one of the largest industrial processes operating in Flintshire. The Hawarden Bridge Steel Works was built by J. Summers and Co. Limited in 1896 and began producing steel in 1902. The company increased in size to such an extent that during the 1930s, it produced the greatest quantity of steel sheets in the country.

The works produced high grade steel sheets, steel sheets for vehicle bodies and corrugated roofing sheets. The company was eventually absorbed into British Steel.

Steel making in Shotton ceased in 1980, which saw 6,500 employees made redundant in one day.

The office building from the Hawarden Bridge Steel Works is still present and is a listed building.

British Steel was taken over by Corus in 1999 and continued to manufacture steel products.

The steelworks in Shotton is now operated by Tata steel and produces galvanised products, coated roofing and cladding products and other speciality items.

Smaller works operating at the time manufactured products including steel cables and chains, ferromanganese, spiegeleisen (a ferromanganese alloy with a distinctive rainbow colouring), window frames and tin plated products.

## 7.10.5 | Textiles

In 1777, a cotton spinning industry was founded in Holywell. The Yellow Mill was the first to open and the 2 more mills, the Upper and Lower Mills were constructed very soon afterwards during the 1780s. The Crescent Mill was opened shortly after in 1790.

The mills in Holywell prospered for a while but were unable to compete with larger mills in Manchester and Lancashire and as a result went into liquidation around 1841.

In 1848, the Crescent Mill was taken over and Wales' first power loom was installed there and was used to weave flannel.

The Welsh Flannel Manufacturing Company operated both the Crescent and Upper Mills and continued to produce flannel into the 1980's.

During the early 1900s, artificial silk was being produced by the British Glanzstoff Manufacturing Company at its factory in Flint. The factory was purchased and taken over by Courtaulds in 1917 and became the Aber Works.

Courtaulds manufactured viscose rayon from cellulose (a fibre found in the cell walls of green plants and algae), at the Aber Works and expanded production in Flint following the purchase of the old Muspratt Alkali Works by Flint Castle.

The Courtaulds Castle Works began producing viscose rayon in 1922.

Courtaulds also purchased the Holywell Textile Mill in Flint, which became the Deeside Mill and was used to produce yarn.

The viscose rayon industry in Flintshire was expanded further by Courtaulds when 2 more factories, Number 1 and Number 2, were constructed and opened in Greenfield.

The manufacture of viscose rayon ceased in Flintshire when Courtaulds factories in Greenfield closed in 1978.

The wastes from the factories were disposed at landfill sites close by. Since then, the landfills have been used to dispose other wastes too.

Extensive site investigations to assess the condition of the landfill sites that were used by Courtaulds to dispose wastes have been carried out in accordance with the provisions of Part 2A of the Environmental Protection Act 1990. None of the sites were found to be statutorily Contaminated Land.

## 7.10.6 | Quarries

There is an abundance of mineral resources in Flintshire which have been exploited for centuries.

Sands, gravels, clays, chert and limestone have been quarried extensively to be used in products including pottery, bricks, road stone, building materials and cement.

There are many quarries operating in Flintshire today recovering sands, gravels and limestone to be used as road stone, in tarmac, building materials, lime and cement products.



## 7.10.7 | Munitions

During the First World War, a munitions factory was established in Queensferry. The factory operated between 1915 and 1918 and manufactured Guncotton (a type of explosive) and TNT to be used in ammunition to be used by the armed forces.

The factory continued to operate on a smaller scale when the War was over. When the Second World War began, a second factory was built at Sandycroft.

In 1939, the Government's Ministry of Supply instructed a factory and storage facility for weapons to be built. The site was called Valley Works and was constructed in some of the tunnels left behind as a result of lead mining in Rhydymwyn. Some new tunnels were also excavated by Halkyn District and United Mining Company who were chosen to carry out the work as they had a great deal of experience of constructing local lead mines and had the equipment required to do the job.

The factory was used to manufacture mustard gas and the extensive tunnels were adapted so that ammunition, weapons and weapons filled with mustard gas could be safely stored inside. Mustard gas manufacture ceased in 1945.

A national and military secret at the time, the tunnels also included a specially adapted section where gold from the Bank of England could be evacuated to and kept safe during times of conflict.

The tunnels no longer contain any weapons or mustard gas and the site is managed by DEFRA and the Ministry of Defence - Defence Estates.

During the years between 1942 and 1945, the site was also used to research the potential for atomic weapons to be produced commercially to be used during WWII and for the development of atomic weapons and atomic power. The work was code named 'Tube Alloys'. Research into atomic technology continued into the 1990's. Some of the atomic scientists' notes and calculations can still be read from writing on the walls of some of the buildings remaining at the site.

The site is now protected and includes a wildlife refuge. It has a visitor and education centre and its buildings and tunnels can be visited by arrangement.

## 7.10.8 | Aircraft

There is a long history of aircraft manufacture in Flintshire which extends from the around the time of the Second World War to the present day.

An aircraft factory was built at Broughton to manufacture the Wellington Bomber between 1937 and 1945. After this time, aircraft manufacture was suspended and the factory was used to build prefabricated aluminium housing to help recover after the War was over.

Aircraft manufacture was resumed in 1948 and continues today.

The factory is now operated by Airbus and is used to manufacture the wings for all Airbus civil aircraft, including the A380. The wings for the A380 are so large that they, unlike the wings for other aircraft, cannot be transported by air. Instead, the A380 wings are transported from the factory along the River Dee on a specially constructed barge to the docks at Mostyn where they are loaded onto ferries to be transported to other factories by sea.



### 7.10.9 | Other Industries

Many other industries have played their part in Flintshire's history, including soap manufacture, chemical manufacture, meat processing, gas works, oil works, brass manufacture, paper production and recycling and ship building.

Historical maps are a useful and interesting record of what took place and how the landscape looked in the past.

### 7.11 | Current Uses of Land

Flintshire is predominantly rural and approximately 80% of the County is within the rural area and the majority of land is used for agriculture.

A number of sand, gravel and limestone quarries operate in the rural areas of Flintshire, including Halkyn Mountain, Cadole and Hendre.

Industrial activity in Flintshire continues to take place in along the coastal areas of the County as it has in the past. Large scale industrial processes are concentrated along the River Dee and its Estuary, including Airbus, Tata Steel, ~~United paper mills~~ at Shotton, Toyota and Connah's Quay Power Station.

There are a number of industrial parks in Flintshire including Flint, Mold, Buckley and Deeside.

Deeside Industrial Park is the largest industrial park in the County and is of national importance. ~~Proposals to extend~~ **Extensions to** Deeside Industrial Park ~~to include~~ **including** areas of the former RAF Sealand military base ~~have recently been approved~~ **are currently underway.**

**Commented [RD50]:** Amended industry name

**Commented [RD51]:** Updated tense

**Commented [RD52]:** Substitute word

**Commented [RD53]:** Updated tense

### 7.12 | Development History and Controls

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 and is incapable of being formally determined as statutorily Contaminated Land in accordance with the provisions of Part 2A of the Environmental Protection Act 1990.

Where there is a possibility that the site put forward for development is affected by contamination, usually as a result of something that has taken place on or next to the site in the past, land contamination assessments may be required to determine the nature and extent of and the degree of risk associated with land contamination.

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.

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.



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 investigate and address those risks and to restore the beneficial use of the land.

The Council's development control 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 it must be taken into account by the Council when assessing an application for planning permission and when deciding whether or not to grant planning permission. The Public Protection Service is consulted by the Planning Department over applications for planning permission and the discharge of planning conditions.

Commented [RD54]: Removed word

Since the last revision of the Contaminated Land Strategy was published in 2013 ~~2019~~, the Council has received approximately 6500 applications for either planning permission or for planning conditions to be discharged. Approximately 1300 of those applications have resulted in land contamination assessments and approximately 1300 of the planning permissions granted have included conditions requiring land contamination assessments or remediation works to be carried out.

Commented [RD55]: Updated statistics

By comparison, over the last 5 years, approximately 250 sites, including 5 historical landfill sites, have been formally investigated ~~inspected~~ or remediated as a direct result of this Strategy and Part 2A.

Commented [RD56]: Updated statistics

Commented [RD57]: Updated terminology

Once the development is complete or is occupied, unacceptable risks associated with land contamination should have been removed or reduced to an acceptable level and the land should not be capable of being determined as Contaminated Land in accordance with Part 2A of the Environmental Protection Act 1990.

Involving the Contaminated Land Officer as early as possible and continuing discussions as the application progresses creates an excellent opportunity to provide the Council with as much good quality information as possible in support of the application. It also provides an opportunity for the Council to provide you with as much information and advice as possible and can minimise delays and other problems at later stages. It can reduce the number of conditions imposed on the planning permission and can reduce the time it takes the officers dealing with the application to provide you with a response.

A guidance document has been prepared to ~~provide these~~ assist anyone applying for planning permission or those with planning permission with conditions requiring land contamination assessments and their representatives with an explanation of the information that the Council requires when considering applications for planning permission and the discharge of planning conditions.

Commented [RD58]: Substituted words

It also provides a summary of the information that is likely to be required, checklists and the answers to some frequently asked questions.

Commented [RD59]: Insert word

The document is available to download free of charge in the Contaminated Land pages of the Council's website. [www.flintshire.gov.uk](http://www.flintshire.gov.uk)

Commented [RD60]: Updated reference to website

Practices and processes can change over time and it is important to take this into account too as changes like this can affect the type of contamination that is likely to be found.

## 8.0 | Who deals with land contamination at the Council?

The Councils Environment Directorate **Community and Business Protection service** is responsible for ensuring that the Councils duty to identify, inspect and secure the remediation of land contamination is fully discharged.

**Commented [RD61]:** Update service area name

### 8.1 | Public **Community and Business** Protection

The Councils Public **Community and Business** Protection service is a part of the Environment Directorate **Planning, Environment and Economy portfolio** and is directly responsible for **dealing with land contamination related work**. This includes duties imposed on the Council by Part IIA **2A** of the Environmental Protection Act 1990 and other land contamination related legislation such as the Environmental Damage and Liability Regulations 2009 and the Environmental Permitting Regulations 2010.

**Commented [RD62]:** Update service area name

**Commented [RD63]:** Update service area and portfolio names

**Commented [RD64]:** Replace 'Part IIA' with 'Part 2A'

Land contamination is a highly complex interdisciplinary field involving the analysis of chemical, physical, biological and legal interactions between soil, rock, water, nature and society.

This is reflected in both statutory and non-statutory guidance which require that land contamination assessments are carried out by competent, accredited specialists. This means that land contamination assessments are specialist pieces of work and so the Public **Community and Business Protection service** employs a Contaminated Land Officer to lead on and direct land contamination issues.

**Commented [RD65]:** Update service area name

The Environment Directorate **Community and Business Protection service** and wider Council have a large number of policies, strategies and plans which have relationships and synergies not only between each other but also with the Contaminated Land **Inspection** Strategy.

**Commented [RD66]:** Update service area name

The Contaminated Land Officer works on the Contaminated Land **Inspection** Strategy, **including dealing with land contamination through the planning system** full-time, is responsible for the projects that are undertaken and provides specialist advice to other services within the Environment Directorate **Planning, Environment and Economy portfolio** and the wider Council.

**Commented [RD67]:** Insert word

**Commented [RD68]:** Insert reference to planning system

**Commented [RD69]:** Update portfolio name

None of the guidance or reference material applicable to land contamination provides a definitive test or value that may be applied to decide when risks are significant or when land may be considered as Contaminated Land.

The decision as to whether or not the possibility of significant harm being caused is significant is a regulatory decision to be made only by the Local Authority. It cannot be made by consultants, **agents** or any other person acting on its behalf.

**Commented [RD70]:** Insert word

Contact details for Environment Directorate **the Planning, Environment and Economy portfolio**, including the Contaminated Land Officer can be found in Appendix 1.

**Commented [RD71]:** Update portfolio name

## 8.2 | Planning

The Council's development control and planning function **already** plays a key role in many aspects of pollution prevention and control. Land contamination is a material planning consideration and must be taken into account when assessing an application for planning permission. For this reason, the Contaminated Land Officer works closely with the Councils Planning Service.

Commented [RD72]: Remove word

## 8.3 | Building Control

The potential for land to be affected by contamination and the measures required to protect developments and their occupiers against the adverse effects of land contamination are taken into account by Building Inspectors when assessing plans and inspecting construction work.

Specific conditions requiring work to be carried out can be imposed when passing building regulations plans.

## 9.0 | How will the Council deal with land contamination?

There are many organisations outside Flintshire County Council and many service areas within the Council whose work is directly affected by the Contaminated Land **Inspection** Strategy. This includes:

Commented [RD73]: Insert word

- Environment Agency
- Natural Resources Wales
- Welsh Government
- Cadw: Welsh Historic Monuments
- Clwyd-Powys Archaeological Trust (CPAT)
- North Wales Wildlife Trust
- Welsh Water
- Food Standards Agency
- Other Local Authorities

To ensure that the implementation of the Contaminated Land **Inspection** Strategy is consistent and effective, the Council has a number of established procedures and agreements in place which assist with the following tasks:

Commented [RD74]: Insert word

- Consultation
- Information Collection

- Prioritisation of site inspections
- Individual site inspections
- Reviews

## 9.1 | Consultation

### 9.1.1 | Consultation with Public Bodies

It is important that those with an interest in the Strategy are given opportunity to express their views and provide information.

Consultation with organisations affected by the implementation of the Strategy is important and close working relationships have become established with each one since the original strategy was first published in 2002.

### 9.1.2 | Consultation with private organisations and individuals

It is not only public organisations that are affected by the Contaminated Land Strategy. Many areas of land that may be affected by contamination are privately owned.

Land contamination has the potential to affect people's health and well-being, properties and financial situation and it is very important that this is understood. Changes to the Contaminated Land Statutory Guidance have been made so that regulators may take this into account when making their decisions.

Different people have different circumstances and different concerns. Their concerns are often based on their personal situations and perceived risks driven by fear, rather than actual risks. There are usually competing priorities between interested parties and each is likely to have a different perception of risk as a result of their own individual situation. For these reasons and others, no two site investigations are ever the same and communicating about land contamination, the investigation process and solutions can be emotionally charged and very complex.

The Council will have particular regard to this when assessing land contamination and individual strategies to direct how risks will be communicated to interested parties will be devised for each investigation.

Privately owned sites that have been identified for further inspection will be discussed with the individual owners who will be provided with detailed information and kept fully informed by the Contaminated Land Officer at every stage.

Those with an interest in a particular site will be notified of the Councils intention to investigate at the earliest opportunity. Early discussions will allow all parties to exchange information. This may resolve a number of issues raised by the prioritisation process and any desire to investigate or remediate the site voluntarily will be supported.

Consideration will only be given to securing the remediation of the land formally through the enforcement of Part 2A where it becomes apparent that necessary works will not be carried out voluntarily or within agreed timescales.

### 9.1.3 | Consultation with other service areas within the Council

The work of many of the service areas within the Council is affected by the Contaminated Land **Inspection** Strategy, particularly those responsible for land management and the maintenance of land including:

**Commented [RD75]:** Insert word

- Property and Estates
- Valuation and Assets
- Planning strategy
- Planning enforcement
- Development Control
- Regeneration
- Housing
- Waste management
- Legal
- Conveyancing
- Ecology and conservation
- Countryside Services

Communication between the individual service areas is essential as each one may be able to provide important information to another and a number of service areas may be involved when an investigation is planned and during an assessment.

The work of one service area may have implications for the Strategy and the conversely the Strategy may have implications for the work and future work of other service areas.

The Contaminated Land Officer meets regularly with representatives from other service areas to discuss on-going and planned work in each of their work areas.

### 9.1.4 | Council owned property

Flintshire County Council owns large areas of land and many buildings and other assets which may be affected by the Contaminated Land Strategy.

The **Public** **Community and Business** Protection service is not responsible for the management of Council owned land or property.

**Commented [RD76]:** Update name of service area

The Strategy will be applied impartially and sites in the Council's ownership will be considered in the same way that other sites will be.

It is likely that the Council will be responsible to bear the cost of any investigative or remedial work required at its own sites. The Council should also bear the cost of remedial works required at 'orphan' sites, where liability for land contamination cannot be attributed or apportioned to anyone else.

The cost of site investigations **land contamination assessments** and remediation depends on a number of factors including the size of the area affected and the type of contamination present and so can vary greatly from one site to another.

Commented [RD77]: Updated terminology

Private companies, individuals and property owners wishing to carry out voluntary assessments and voluntary acts of remediation will be encouraged and supported to do so, to **both** assist them and to reduce financial burdens on the taxpayer.

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## 9.2 | Collection of information

A great deal of information has been gathered and recorded since the introduction of Part 2A of the Environmental Protection Act 1990 in 2001 and since the Contaminated Land **Inspection** Strategy was first published in 2002.

Commented [RD79]: Insert word

The information has been used to identify historical, natural and geological features, past land uses, areas which do not require any further assessment and some areas which will require further consideration.

The information has been gathered from a number of sources including:

- Historical maps
- Geological maps and memoirs
- Hydrogeological maps
- Coal authority records
- Local Authority records
- Environment Agency records
- Natural Resources Wales records
- Flintshire Record Office and County Archives
- 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 investigations
- Anecdotal records
- Photographs
- Aerial photographs

The information is used to identify potential contaminants, pathways and receptors so that individual sites can be prioritised and subsequent stages of investigation can be planned and investigations to assess the potential pollutant linkages can be designed.

Some sites were investigated many years ago and some remedial works were carried out at others. In some cases, the information may be sufficient and in other cases it may not. It is important to remember that legislation, guidance, best practice and industry standards are updated and changed frequently. This means that investigations and reports from some time ago may 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.

### 9.2.1 | Complaints to the Council

The Council regularly receives complaints concerning land contamination and pollution. Most complaints concern escapes of fuel and domestic heating oil and some concern pollution caused by commercial premises or industry.

A guidance document explaining what to do if an oil leak is suspected is available free of charge on the Council's contaminated land webpages or from the Contaminated Land Officer.

In cases where land contamination has taken place at a point in the past or has recently taken place but does not continue, the Contaminated Land Officer may, after investigating the complaint, decide to take action in accordance with Part 2A of the Environmental Protection Act 1990.

In cases where land contamination has taken place and is continuing, the Contaminated Land Officer may, after investigating, decide to take action in accordance with other legislation for example, the Environmental Damage and Liability Regulations 2009 or other sections of the Environmental Protection Act 1990.

In any case, any person wishing to make a complaint will be asked to provide their name, address and telephone number, in accordance with the Public **Community and Business** Protection Enforcement Policy. This information will not be disclosed unless exceptional circumstances require it to be.

The Public **Community and Business** Protection Service does not accept or investigate anonymous complaints for a number of reasons not least that it reduces to reduce the number of malicious complaints that are received and . The Contaminated Land Officer cannot investigate allegations of statutory nuisance **relating to land contamination** where there is nobody identifiable for a nuisance to affect.

**Commented [RD80]:** Update name of service area

**Commented [RD81]:** Update name of service area

**Commented [RD82]:** Insert word

**Commented [RD83]:** Insert description

## 9.2.2 | Information volunteered to the Council

The Council uses a variety of sources to find information to use to inform land contamination assessments.

Sometimes, useful and important information is not revealed by these sources and sometimes the most useful information is held by other organisations and individuals.

Anecdotal and photographic information can provide context that other sources cannot. It is often information held by individuals who live and have lived and worked in a particular area and can remember important detail about a particular site, provide photographs and recall stories, memories and other informative and fascinating details.

One of the objectives of the Contaminated Land **Inspection** Strategy and the Part 2A regime is to provide a means of addressing unacceptable risks posed by land contamination to health and the environment.

Investigations will only be carried out where, following an assessment of risk, there is reasonable ground to suspect that unacceptable risks exist.

Any assessment or other action that the Council takes as a result of the implementation of the Contaminated Land **Inspection** Strategy and Part 2A will seek to ensure that the burdens faced by individuals, industry, commerce and society as a whole as a result are proportionate, manageable and compatible with the principles of sustainability and sustainable development.

Current and past owners and occupiers of land are able to carry out investigations voluntarily and the Contaminated Land Officer will encourage and support voluntary assessments and voluntary acts of remediation.

Commented [RD84]: Insert word

Commented [RD85]: Insert word

## 9.2.3 | How will the Council manage the information it collects?

Since the introduction of Part 2A **of the Environmental Protection Act 1990** in 2001, an extensive amount of information has been gathered and generated as a result of the prioritisation process, development of land, investigations and remedial work. The information includes historical maps, reports, records, photographs, paper and electronic records.

The management, storage, recording and disclosure of the information is coordinated and directed by the Contaminated Land Officer.

### Storage of information

Historical information such as plans, maps, anecdotes and photographs, site investigation reports, engineering plans and notes are usually retained as paper records. Some of the information held includes copies of records available at the County Record Office in Hawarden.

Contemporary and historical maps are stored electronically on a Geographical Information System (GIS).

Commented [RD86]: Insert full title of primary legislation



Some of the information held in paper records and gathered as a result of the prioritisation of sites is also recorded on the GIS. The information is recorded as points on the maps, for example closed landfill sites and historical features, with annotations, for example a grid reference or an explanation of the type of waste disposed, where necessary. The annotations do not include and personal, private or commercially sensitive data.

Each piece of information recorded on the GIS can be retrieved, overlain and compared with other information recorded on the GIS. The GIS is used to assist the prioritisation process and to identify and assess any potential pollutant linkages.

### Access to information at the Council

Access to the information recorded on the GIS in connection with the Contaminated Land Strategy is restricted and can only be edited and updated by the Contaminated Land Officer and the GIS manager.

Information stored on the GIS may be viewed, but not edited or changed, by a small number of officers working in other service areas within the Environment Directorate. For this reason, personal, sensitive and confidential information is not recorded on the GIS.

Other information about land contamination, including complaints is recorded in a separate electronic database that is used by Public **Community and Business** Protection. There are restrictions imposed on the database to limit who has access to the information that has been stored. Access to view and edit the information is limited to the Contaminated Land Officer and Pollution Control Officers and their administrative support staff who are aware of the requirements and implications of data protection legislation.

Some of the information held in paper records is confidential, commercially sensitive or legally privileged.

Access to this information is restricted to the Contaminated Land Officer and the Council's legal representatives.

Information stored on the GIS may be viewed, but not edited or changed, by a small number of officers working in other service areas within the Environment Directorate **Community and Business Protection service**. For this reason, personal, sensitive and confidential information is not recorded on the GIS.

Any requests to view paper or electronic records held in respect of land contamination and as a result of any stage of the implementation of the Contaminated Land **Inspection** Strategy will be directed to the Contaminated Land Officer. Personal, sensitive or confidential information will not be disclosed except in circumstances where there is a legal obligation to do so.

### Access to information by the Public

The Council has a duty to keep a Public Register of Contaminated Land which the public can view.

The Public Register includes information about land which has been investigated **specific regulatory actions, including land** formally determined as Contaminated Land and remediated. **The Register is**

**Commented [RD87]:** Update name of service area

**Commented [RD88]:** Update name of service area

**Commented [RD89]:** Insert word

**Commented [RD90]:** Update terminology

not a list of land where there is reasonable ground to suspect that land may be affected by contamination. It can be viewed free of charge on the Councils contaminated land web pages or at County Hall in Mold at [www.flintshire.gov.uk](http://www.flintshire.gov.uk) or by appointment at Ty Dewi Sant, Ewloe between the hours of 9am and 5pm by making an appointment with the Contaminated Land Officer.

Commented [RD91]: Insert updated address

For reasons of national security or commercial confidentiality, Part2A of the Environmental Protection Act 1990 sets out restrictions on the information that can be placed on the Public Register of Contaminated Land.

Other information is also available from the Council, for example environmental information which is not held on the public register. Any requests for the provision of information should be made in writing to the Council [FOI@flintshire.gov.uk](mailto:FOI@flintshire.gov.uk). Where possible and to avoid disappointment, delays and requests for further information, requests should include as much information about a site as possible for example, grid reference, address and specific questions. It is not necessary to explain; and the Council should not ask, why the information has been requested. There is not normally a charge for this service.

Commented [RD92]: Insert email address

It is important to understand that some information, as explained in the Environmental Information Regulations 1992 and the Freedom of Information Act 2000 will not be disclosed. The reasons why information has not been disclosed will be given.

### Buying and selling property and conveyancing

Commented [RD93]: Insert heading

When buying, selling or re-mortgaging a property, it is common to request information and to make enquiries about aspects of its history, events and features of its surroundings which may have or have had an effect on it.

Environmental searches usually rely on information such historical maps and trade directories to find out what the land has been used for in the past but without assessing risks to health or the environment.

Whilst during the sale or purchasing process, vendors or purchasers may be keen to secure a mortgage or please mortgage lender, it is important to remember that these issues may be raised again when the property comes to be sold or re-financed in future.

The Council can't tell someone whether to buy a property or not. The Council can provide factual information but not an opinion. Having done their research it'll be up to purchasers and vendors and their legal advisors to make such decisions.

The law in respect of land contamination, Part 2A of the Environmental Protection Act 1990, came into force in Wales in July 2001. This law introduced a detailed way by which land contamination could be regulated.

If a property was purchased before then, it is unlikely that the environmental searches carried out by a Solicitor would have included a search for potentially contaminated land.

If a property has been bought or sold since then and the purchaser or vendor was not told about any potential land contamination during the conveyance process or if the results of the environmental searches were not brought to their attention, they choose to contact a Solicitor for advice.

## 9.3 | Prioritisation

A large number of sites will be identified as land that may be affected by contamination. This does not mean that the land is affected by contamination or that the land may be considered as statutorily Contaminated Land.

Each site that is identified as potentially affected by land contamination will be considered for investigation in a prioritised manner to ensure that sites that pose the greatest risk to receptors are investigated first.

The prioritisation process will be followed to organise sites into the order that they are to be investigated **assessed** in. The process is flexible and allows for amendments to be made as the process is applied and develops. It also allows for sites to be investigated **assessed** as a matter of urgency should there be evidence that land contamination is causing actual harm. This applies to all sites regardless of their position in the prioritisation process. ~~and the list of prioritised sites.~~

**Commented [RD94]:** Updated terminology

**Commented [RD95]:** Updated terminology

**Commented [RD96]:** Remove end of sentence.

The prioritisation process will be carried out in 2 stages:

- Primary Prioritisation
- Secondary Prioritisation (Detailed Inspection)

At the end of the prioritisation process the sites that present the greatest potential risk to receptors will have been identified, risk assessed, scored and organised into an order for more detailed inspection so that sites with the highest risk are investigated **assessed** first.

**Commented [RD97]:** Update terminology

### 9.3.1 | Primary Prioritisation

At this stage, potential sources of contamination and potential receptors will be identified and the proximity of the receptors to the site will be considered.

The receptors will be organised into 3 categories:

- Terrestrial receptors
- Surface waters
- Groundwater

The terrestrial receptor group includes residential properties, allotments, schools, playgrounds, nursing homes, commercial and industrial properties, crops, livestock, non-aquatic ecosystems, domesticated animals and pets, wild animals subject to shooting or fishing rights and buildings of archaeological importance.

The surface waters group includes drains, streams, ponds, pools, canals, rivers and aquatic ecosystems.

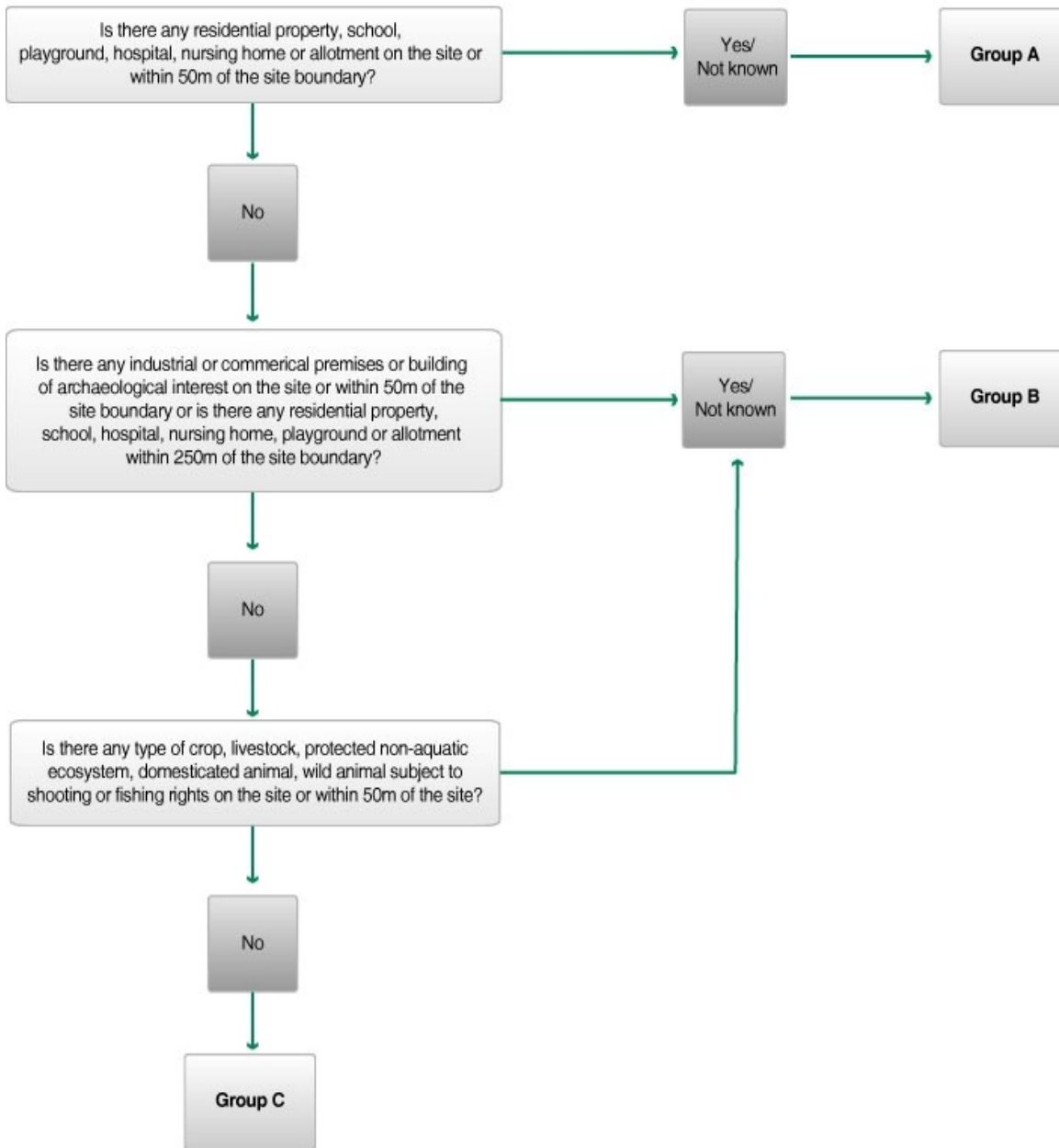
The groundwater group includes aquifers and source protection zones.

Other receptors may be taken into account at a later stage in the assessment process.

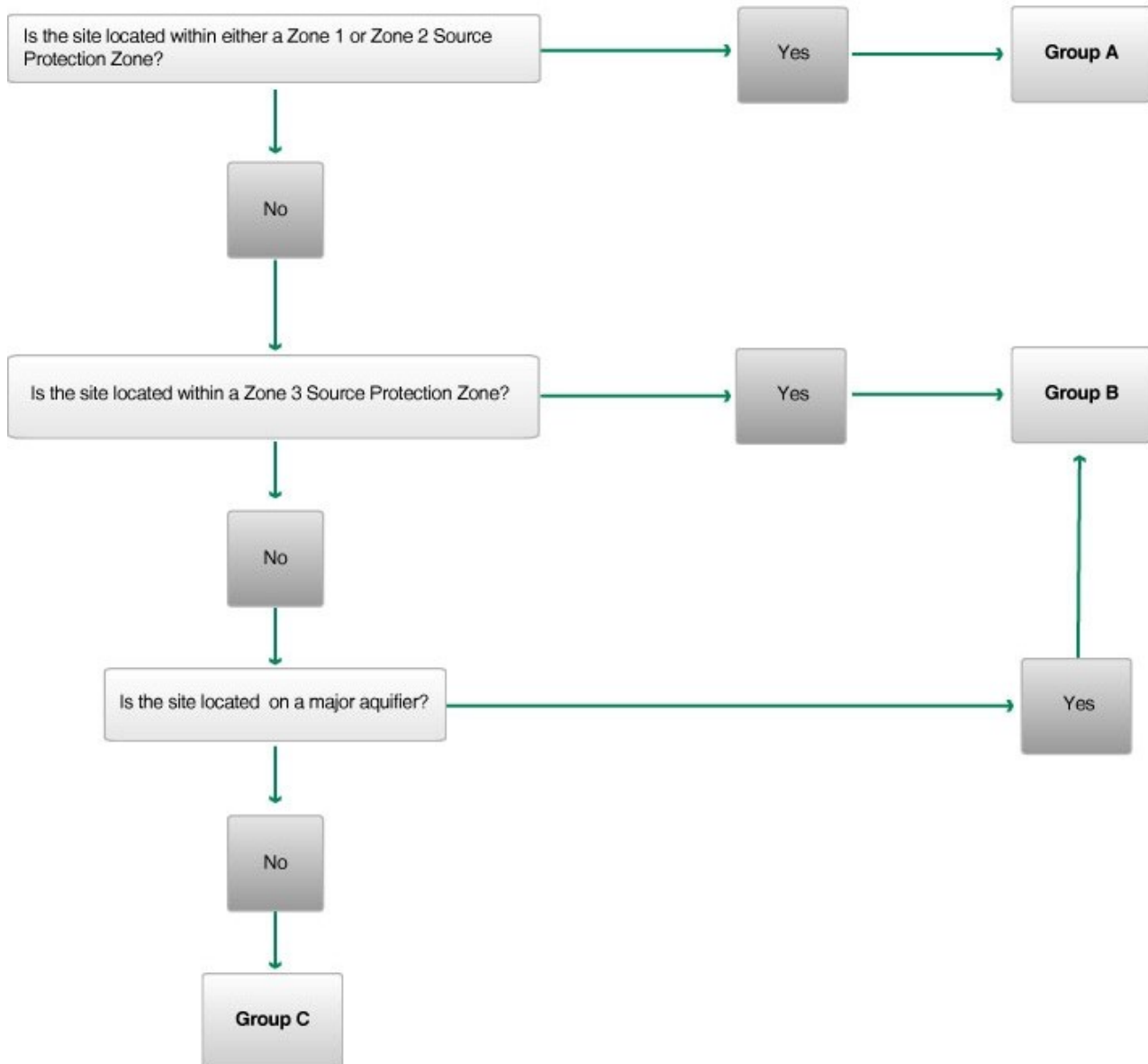
The following diagrams explain how the proximity of the receptors will be considered and how this stage of the process will organise the sites into groups to be considered at the next stage.

For the purpose of the prioritisation process, where the answer to the questions is not known or is uncertain, the worst case will be assumed. Where the process places a site into one group for one category of receptor and into a lower group for another, the site will be placed into the higher priority group.

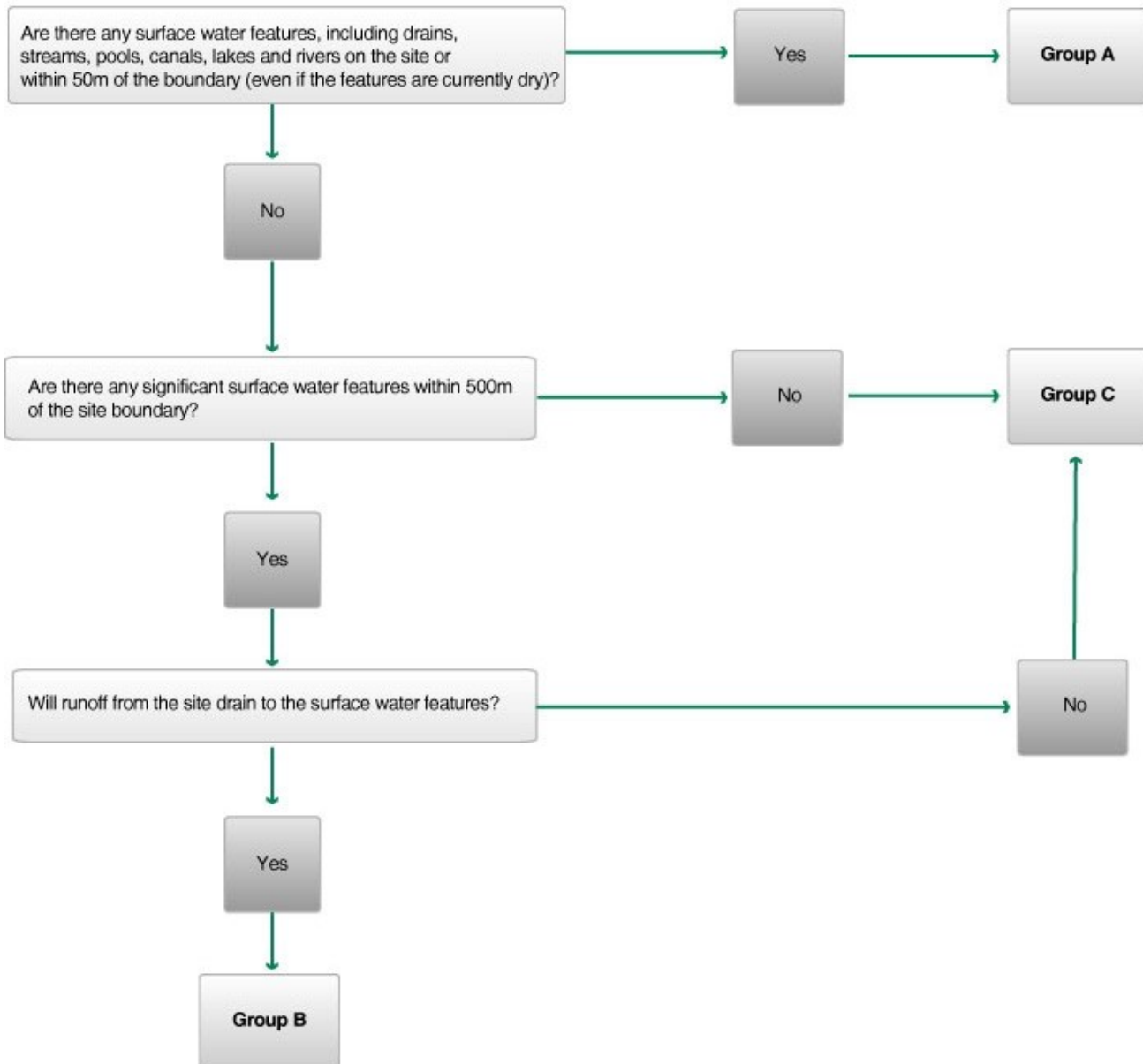
# Primary Prioritisation - Terrestrial Receptors



# Primary Prioritisation - Groundwater



## Primary Prioritisation - Surface Water



### 9.3.2 | Secondary Prioritisation (Detailed Inspection)

At this stage a more detailed assessment will be carried out.

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

1. Desk Study (preliminary risk assessment)
2. Intrusive Investigation (detailed risk assessment)
3. Remediation
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 the Desk Study finds that there are likely to be unacceptable levels of contamination present then it will be necessary to carry out an intrusive investigation. If the intrusive investigation finds that there are unacceptable risks as a result of the presence of the contamination then it will be necessary to carry out remediation.

The purpose of this phase of the assessment is to use a variety of sources of information to identify potential contaminants, pathways and receptors so that each site can be assessed and assigned a score depending on the significance of the receptors and an 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
- Environment Agency records
- Natural Resources Wales records
- Flintshire Record Office and County Archives
- 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 investigations

Each individual site will be considered on its own merits. The individual characteristics and combinations of characteristics will be taken into account, including the significance of the receptors.

Most of the more highly populated areas of Flintshire are found around the same area as industry and it is likely that sites with greater potential risks to receptors will be found in these areas.

Surface waters and groundwater are valuable sources of potable water and are important to the economy. Surface waters also have economical importance and are valuable to leisure and amenity.

Protected ecosystems, wildlife and habitat sites, livestock, crops and wild animals subject to shooting or fishing rights are usually found in rural areas and areas away from settlements and industry. In some cases plants, animals and ecosystems themselves are reliant on the



contaminants in the ground. Some of the protected sites in the lead mining areas of Flintshire have been awarded protection because of the plants that grow there are rare and depend on elevated levels of lead and metals in the soil to thrive.

This has been taken into account and the following order of significance will be applied when considering receptors:

- Humans, pets, buildings, schools, allotments and playgrounds
- Controlled Waters – surface water and groundwater
- Protected ecosystems, crops, wild animals subject to shooting and fishing rights, livestock, and ancient monuments.

## 9.4 | Detailed inspection of individual sites

When the prioritisation process has been completed and an organised list of sites requiring more detailed inspection has been compiled; investigations to look into the potential risks to receptors can begin.

Detailed investigations and the assessment of risk will be carried out in stages. There will usually be 2 stages.

1. ~~Desk Study (preliminary risk assessment)~~ Preliminary Risk Assessment
2. ~~Intrusive Investigation (detailed risk assessment)~~ Detailed Risk Assessment

The outcome of the assessments carried out at each stage will determine if it necessary to progress to the next stage. For example, if the ~~Desk Study~~ preliminary risk assessment finds that there are likely to be unacceptable levels of contamination present then it will be necessary to carry out an ~~intrusive investigation~~ a detailed risk assessment. If the ~~intrusive investigation~~ detailed risk assessment finds that there are unacceptable risks as a result of the presence of the contamination then it will be necessary to consider whether or not the land will be formally determined as Contaminated Land and it may be necessary to carry out remediation.

Commented [RD98]: Update terminology

Once the detailed inspection is complete the Council will have sufficient understanding of the risks to receptors attributable to the presence of land contamination to be able to make regulatory decisions.

### 9.4.1 | Desk 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
- Environment Agency records
- Natural Resources Wales records
- Flintshire Record Office and County Archive
- 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 investigations

At this stage, a visual inspection of the site will also take place. Features on the surface of the ground can often be indicative of features and areas of contamination present under the surface for example:

- Areas of dead, dying or stressed vegetation
- Presence of plant species tolerant of particular substances
- Discolouration and staining of the ground
- Discolouration of water
- Abandoned structures
- Pipes
- Tanks
- Unusual odours
- Waste heaps

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

- Access points and emergency access
- Location of drains

- Location of water pipes
- Location of gas mains
- Nature and extent of concrete hard standings
- Old foundations
- Conservation designations such as SSSI, RAMSAR and SAC
- The presence of protected species, geology or archaeology
- Highway limitations or height restrictions
- Occupation of the site

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

The Conceptual Site Model is a compilation of all the potential pollutant linkages. It is a very important part of the land contamination assessment process and although it can be expressed as a table, a diagram 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 pollutant linkages and interactions between them, to design the intrusive investigation, to inform the detailed risk assessment and to design and verify remedial works.

#### 9.4.2 | ~~Intrusive Investigation~~ Detailed Inspection

It is expected that an ~~intrusive investigation~~ a Detailed Inspection will be carried out when the preliminary risk assessment has found that there are potential pollutant linkages and potentially unacceptable risks present.

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.

The ~~investigation~~ inspection itself will be designed on a site specific basis, taking into account the individual characteristics and relationships between them to look into the potential pollutant linkages and discover whether or not they exist.

Depending on the level of detail and risk assessment required, it may be necessary to carry the investigation out in phases. Some types of contaminants, for example gasses and vapours, are affected by temperature and weather conditions and so some investigations will also need to be carried out over many months to take account of seasonal variations in groundwater levels, air pressure, rainfall and temperature.

The scope of the investigation will depend on the contamination suspected to be present and the scale may range from the collection of a few shallow samples of soil to the continuous analysis and monitoring of potentially explosive vapours in boreholes drilled deep into the bedrock.

Commented [RD99]: Update terminology

Commented [RD100]: Update terminology

In any case, samples will be taken and sent to a suitably accredited laboratory for analysis. Depending on the type of contamination that the investigation **Inspection** is looking for, samples of soil, rock, made ground, water, gasses and vapours may be taken. All samples will be collected using the most appropriate technology or method. In some cases it will be necessary to use specialist equipment such as drilling rigs, probes and analysers to recover samples and install equipment such as monitoring wells. Where necessary, the services of specialist consultants with the equipment necessary will be purchased. The cost and availability of specialist equipment will be taken into account by the Contaminated Land Officer when designing the investigation **Inspection**.

**Commented [RD101]:** Update terminology

All samples will be handled, transported, stored and preserved correctly so that the quality of the samples and ultimately the results of the analyses performed on them are not compromised.

**Commented [RD102]:** Update terminology

Land contamination assessments at every stage, including the intrusive investigation stage, will be carried out in accordance with current UK guidance and best practice. See Appendix 2.

Current and past owners and occupiers of land are able to carry out investigations voluntarily and the Contaminated Land Officer will encourage and support voluntary assessments and voluntary acts of remediation.

### 9.4.3 | Powers of Entry

Privately owned sites that have been identified for further **Detailed** inspection will be discussed with the individual owners or occupiers who will be provided with detailed information and will be kept fully informed by the Contaminated Land Officer at every stage.

**Commented [RD103]:** Update terminology

In the event that an investigation **Inspection** will not be undertaken voluntarily or a landowner or occupier will not cooperate with the Council or refuses to allow access to their property, the Council will consider using formal means of carrying out the investigation **Inspection**.

**Commented [RD104]:** Update terminology

**Commented [RD105]:** Update terminology

The Environment Act 1995 (Section 108), allows the Council statutory Powers of Entry to enter property for the purpose of undertaking visual and intrusive site investigations **this**.

**Commented [RD106]:** Simplified sentence

The Council will consider using the powers of entry when other reasonable attempts to access a site have been unsuccessful and when,

- There is reasonable ground to suspect or where it is known that a pollutant linkage exists at the site,
- It is likely that the contaminant is present,
- The receptor is actually present or is likely to be present as a result of the current use of the land.

The powers of entry will not be considered when,

- Detailed information concerning the condition of the land has already been provided and the Council can make a decision as to whether or not the land meets the statutory definition of Contaminated Land,

- Information is offered and provided to the Council within a reasonable and specified time.

#### 9.4.4 | Risk Summaries

Once the ~~detailed assessment~~ **Detailed Inspection** of a site is complete, the Council may decide to produce a risk summary to explain the outcome of the assessment and the Councils understanding of the risks to receptors and any other issues associated with the site that are considered to be relevant.

**Commented [RD107]:** Update terminology

The risk summary will not be a technical document. It will be written so that the Councils understanding of the pollutant linkages and risks associated with the presence of contamination, the potential impacts and likelihood that the impacts may take place, the times over which the impact and risk may take place, an explanation of anything that the Council is uncertain about, an explanation of the context of the risks and an explanation of the potential solutions are set out and can be understood by the layperson.

#### The Council is unlikely to produce a risk summary where:

- The land will not be determined as ~~statutorily~~ Contaminated Land
- Land for which the prioritisation process has identified detailed inspection will be necessary but which has not yet been assessed
- Contaminated Land determined as such before the Contaminated Land Statutory Guidance 2012 was introduced.

Further information about land which has been ~~investigated~~ **inspected**, formally determined as Contaminated Land and remediated is recorded in the Councils Public Register of Contaminated Land. The Public Register can be viewed free of charge on ~~the Councils contaminated land web pages~~ [at www.flintshire.gov.uk](http://www.flintshire.gov.uk) or by making an appointment with the Contaminated Land Officer.

**Commented [RD108]:** Update terminology

**Commented [RD109]:** Update website link

#### 9.4.5 | Special Sites

Land contamination at some sites may be found to be affecting Controlled Waters such as Rivers, Lakes, Streams and Groundwater. These sites are known as Special Sites and will be referred to Natural Resources Wales.

If during any part of the prioritisation or assessment process it becomes apparent that a site may be considered a Special Site, the Council will notify Natural Resources Wales.

If it is the case that the site is considered a Special Site, the Council will make arrangements with Natural Resources Wales for Natural Resources Wales to proceed with the assessment of the site.

#### 9.4.6 | What happens when a contamination affects another County?

Flintshire shares its boundary with Cheshire, Wrexham, Denbighshire and Wirral. It is possible that the prioritisation process will identify sites that are at, cross or are very close to the border with other Counties.

If a detailed inspection of a site at, across or close to the boundary with another Local Authority is found to be necessary, Flintshire County Council will notify the Local Authority responsible for the area in which the affected receptor is located.

In the event that during the course of an assessment, pollutant linkages affecting receptors on both or either side of the boundary are found, Flintshire County Council will notify the Local Authority responsible for the area in which the affected receptor is located.

If it is the case that urgent investigations **assessments** are required, Flintshire County Council will notify the appropriate Local Authority without undue delay.

Commented [RD110]: Update terminology

In any case, the local authorities, including Flintshire County Council will cooperate and agree a mutually acceptable scope for each stage of the investigation **assessment** and where found to be necessary, for remedial works. Each local authority will identify and agree each of their individual responsibilities.

Commented [RD111]: Update terminology

For the purpose of regulation and enforcement, the Local Authority responsible for the area in which the contaminant is present will assume the role of regulator and enforcing authority, in agreement that the arrangement is without prejudice to statutory guidance, legislation and any legal advice received.

The same will apply to sites at, crossing or very close to Flintshire's border with Cheshire and Wirral. Although the Part 2A regimes and Contaminated Land Regulations and statutory guidance are separate for England and Wales the principles and processes are fundamentally and effectively the same.

In the unlikely event that there is a dispute, the Welsh Government will be asked to intervene. In the unlikely event that there is a dispute with a local authority in Cheshire or Wirral, the Welsh Government or the Secretary of State will be asked to intervene.

## 9.5 | How will the process be reviewed?

The implementation of the Contaminated Land **Inspection** Strategy is a continuous process and over time it is likely that some of the factors that were considered during the prioritisation process will change for some sites.

Commented [RD112]: Insert word

Where any changes are considered relevant to the Strategy and to the priority of the site, they will be taken into account and a review of the prioritisation of the site will be carried out.

The changes that may affect the priority of a site include:

- Proposed or actual changes to the use of the surrounding land
- Proposed changes, including development, to the use of the site
- Unforeseen events such as accidents, spillages, leaks and flooding
- Reports of health effects which could be connected with the site

- Verifiable reports of unusual or abnormal conditions on a site
- New information that comes to light about a site

In accordance with Part2A of the Environmental Protection Act 1990, the Council has a duty to make occasional inspections of the Flintshire area to identify land which may be affected by contamination.

The implementation of the Contaminated Land **Inspection** Strategy, including the prioritisation process is therefore continuous and will be reviewed at regular intervals to ensure that:

Commented [RD113]: Insert word

- Changes to legislation and guidance are taken into account
- The Strategy and procedures comply with legislation
- The prioritisation process is effective
- The objectives of the Strategy are met
- Any improvements that could be made are identified
- A satisfactory level of service is provided to customers

If a review finds that changes are necessary then the Council will publish a revised Contaminated Land **Inspection** Strategy to reflect them.

Commented [RD114]: Insert word

## 10.0 | When will this take place?

The implementation of the Contaminated Land Inspection Strategy is an on-going process and as new information becomes available or the circumstances at a particular site change, the priority awarded may also change.

During the prioritisation process, many sites will either be developed or investigated voluntarily and the list of prioritised sites will evolve.

For these reasons, it is not possible to state a date by which all sites will have been considered by the prioritisation process, investigated or remediated.

The following table explains how long it is anticipated that the most important stages of the Strategy will take to complete.

Commented [RD115]: Remove table to align with guidance

**Table 3: Tasks and Timescales**

What will be done?	By when?
Consultation— revision of Contaminated Land Inspection Strategy	March 2019— Completed
Adoption and publication of Strategy	June 2019

Review Public Register of contaminated Land and publish risk summaries where appropriate	June 2019
Identification of land which may be affected by contamination	On-going
Record data on GIS	On-going
Review Strategy	March 2019
Report to Cabinet	April 2019
Primary Prioritisation	Under review 2019
Secondary Prioritisation	Under review 2020
Site Investigations	On-going
Investigate sites posing imminent risk	On-going
Publish risk summaries	Within 3 months of completion of assessment
Review strategy and prioritisation process	On-going 2019-2020

To assist the planning process and to minimise delays in deciding whether or not planning permission may be granted, the Pollution Control section will respond to every consultations received from the Planning Department **service** within 19 working days.

Complaints alleging land contamination will be responded to within 1 working day **5 working days** and will be investigated in accordance with the Public Protection **Service Community and Business Protection** Enforcement Policy.

**Commented [RD116]:** Substitute word

**Commented [RD117]:** Substitute of number

**Commented [RD118]:** Update name of service area

## Appendix 1 | Useful Contacts

Contaminated Land Strategy Contacts	
Principle Contact:	Contaminated Land Officer
Address:	Pollution Control Flintshire County Council Ty Dewi Sant   Ewloe   Flintshire   CH5 3FF
Telephone:	01352 703400
Email:	<a href="mailto:pollution.control@flintshire.gov.uk">pollution.control@flintshire.gov.uk</a>



Contact:	
Address:	Community and Business Protection Pollution Control Section Flintshire County Council Ty Dewi Sant  Ewloe  Flintshire   CH5 3FF
Telephone:	01352 703330
Email:	<a href="mailto:pollutioncontrol@flintshire.gov.uk">pollutioncontrol@flintshire.gov.uk</a>
<b>Planning Department Contacts</b>	
Contact:	Development Control General Enquiries
Address:	Flintshire County Council Ty Dewi Sant   Ewloe  Flintshire   CH5 3FF
Telephone:	01352 703234
Contact:	Planning Strategy General Enquiries
Address:	Flintshire County Council Ty Dewi Sant   Ewloe  Flintshire   CH5 3FF
Telephone:	01352 703213
<b>Building Control Contacts</b>	
Contact:	Building Control General Enquiries
Address:	Building Control Flintshire County Council Ty Dewi Sant   Mold   Flintshire   CH5 3FF
Telephone:	01352 703647

## Appendix 2 | Reference material and Standards

None of the guidance or reference material applicable to land contamination provides a definitive test or value that may be applied to decide when risks are significant or when land may be considered as Contaminated Land.

The following list indicates a number of useful reference documents. The list is not exhaustive.

- British Standards Institution (2011) Investigation of Potentially Contaminated Sites, Code of Practice, BS: 10175:2011
- British Standards Institution (2010) Amendment 2: Code of Practice for Site Investigation, BS5930:1999+
- British Standards Institution (2007) Specification for Topsoil and Requirements for Use, Code of Practice, BS: 3882:2007
- British Standards Institution (2002) Soil Quality, Sampling. Guidance on sampling techniques, Code of Practice BS: 10381:2002
- CIRIA Report C665 (2007) Assessing Risks Posed by Hazardous Ground Gases to Buildings
- CL:AIRE (2011) Definition of Waste: Development Industry Code of Practice.
- Department of the Environment (1995) Industry Profiles
- Environment Agency (2010) Guiding Principles for Land Contamination
- Environment Agency (2004) Model Procedures for the Management of Land Contamination (CLR 11)
- Environment Agency (2006) Remedial Targets Methodology, Hydrogeological Risk Assessment for Land Contamination
- Environment Agency (2010) Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for Hydrogeological Risk Assessment
- 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 (2003) MCERTS Performance Standards 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
- Environment Agency (2009) CLEA Software Handbook Version 1.04
- Environment Agency, National House Building Council (2008) Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66:2008
- Health and Safety Executive (1991) Protection of Workers and the General Public during the Development of Contaminated Land
- Health and Safety Executive (2012) Lead and You—Working Safely with Lead
- Raybould JG, Rowan DL & Barry DL, 1995, CIRIA Report C150, Methane Investigation Strategies
- Welsh Assembly Government (2012) Statutory Guidance on Contaminated Land
- Wilson S, Oliver S, Mallett H, Hutchings H & Card G, 2007, CIRIA Report C665, Assessing Risks Posed by Hazardous Ground Gases to Buildings
  - British Standards Institution (2013) Guidance on Investigations for Ground Gas. Permanent Gases and Volatile Organic Compounds (VOCs), BS: 8576:2013

- Welsh Government (2012) Statutory Guidance on Contaminated Land
- Welsh Government (2021) Planning Policy Wales edition 11
- Department of the Environment (1995) Industry Profiles
- Environment Agency (2020) Land Contamination Risk Management Guides 1-4 (as applicable to Wales and Natural Resources Wales specification for the use of these documents in Wales). 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
- 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 (2021) Good Practice for Risk Assessment for Coal Mine Gas Emissions
- Department of the Environment (1995) Industry Profiles
- Environment Agency (2010) Guiding Principles for Land Contamination
- 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
- Health and Safety Executive (1991) Protection of Workers and the General Public during the Development of Contaminated Land

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## Glossary

**Hydrology** is the name given to the study of the movement and distribution of water around the World including, rivers, lakes, streams, seas and oceans. It is also a term used to describe surface water features and the way in which they move.

**Hydrogeology** is the name given to the study of water beneath the ground in soil and rocks and in aquifers. It is also a term used to describe groundwater features and the way in which water moves under the ground and in aquifers.

**Aquifer** is the name given to water-bearing layers of rock under the ground from which groundwater can be extracted. Aquifers can be classified according to their properties and how important a source of drinking water they are.

**Groundwater** is the name given to water found in layers of rock under the ground and in the tiny gaps between particles in the soil, called soil pore spaces.

**Tailings** are made up of the left over materials after the valuable part of the ore has been separated from the materials with little value.

**Spoil** heaps are piles of overburden and other wastes. They are not the same as tailings.

**Overburden** is the term used to describe the rock and soil overlying the ore that is to be mined.

**Remediation** is the process of addressing unacceptable risks associated with the presence of contamination. ~~The purpose of remediation is to either remove the risks or reduce them.~~