

# Cambridge City Council Contaminated Land Strategy 2009

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# 1 Introduction

Part 2A of the Environmental Protection Act 1990 (amended by Section 57 of the Environment Act 1995) came into force in April 2000, introducing a new regime for the identification and remediation of contaminated land. This strategy details how Cambridge City Council will fulfill their statutory inspection duty.

This document will provide detailed method statements for an ordered and logical course of inspection. It will also justify these procedures in terms of the geographic and historical constraints of the City. This will give transparency to the process and allow all interested parties a window on the rationale behind council decision making in this area.

The development of a contaminated land strategy is acknowledged by DEFRA (Department for Environment Food and Rural Affairs) to require a broad range of skills and has thus required a project manager and the support of other staff with relevant skills.

The production of this strategy has involved the review of numerous government and industry guidance documents: British Standards documents, Local plan information and information held in the City and County Council records, other draft strategy documents from pilot authorities, historical, geological and land use maps, and a wealth of information provided by the Environment Agency.

## 1.1.1 City Council Corporate Objectives

The Inspection Strategy is presented in the context of the City Council's Medium Term Objectives (July 2006):

- To promote Cambridge as a sustainable city, in particular by reducing carbon dioxide emissions and the amount of waste going into landfill in the City and sub-region.
- *Ensure that residents and other service users have an entirely positive experience of dealing with the Council.*
- *Maintain a healthy, safe and enjoyable city for all, with thriving and viable neighbourhood.*
- Lead the growth of Cambridge to achieve attractive, sustainable new neighbourhoods, including affordable housing, close to a good range of facilities, and supported by transport networks so that people can opt not to use the car.

(Those in italics are most relevant in the context of this document.)

The successful completion of the contaminated land inspection regime will show the City Council's active commitment to identify and deal with damaging pollution of the environment within the constraints of national legislation.

The schedules and procedures contained within this document will open to all the rationale behind regulatory decision-making.

Publication and consultation and adherence to this document will ensure the fair and equitable treatment of all those individuals, organisations, and companies with an interest under the new legislation.

Policies and consultation protocols adopted for voluntary remediation schemes will ensure involvement of people in seeking solutions to any contamination problems uncovered during the inspection programme.

## 1.1.2 The Council's Environmental Priorities

Within the Council's Medium Term Objectives, the following environmental issues are identified as priority areas for action.

- To tackle the cause and consequences of climate change.
- To encourage sustainable waste management.
- To promote more sustainable modes of transport.
- To raise awareness of environmental issues and promote sustainable lifestyles.
- To manage growth to achieve sustainable neighbourhoods.

- To provide attractive, clean streets, neighbourhoods and open spaces.

Conservation of the built environment in terms of our heritage in Cambridge will be a material consideration when addressing contamination issues. The process of inspection, designation and remediation of any contaminated sites will protect and improve the quality of our environment. The consideration of remedial schemes will take account of natural resource use.

### **1.1.3 Present Planning Policy**

At present any new development, which requires planning permission and involves previously used land, is referred to the City Council's Principal Scientific Officer in order to determine whether any actions, preconditions, information or regulatory action is required prior to the development of a site.

This is a robust ordered process and generally follows the following stages supported by current guidance and best practice:

- If there is any suspicion of a previously contaminative use upon a site, then a historical desktop study and site walkover survey, by a qualified environmental professional, is required by the City Council.
- Should the above survey suggest the existence of contaminated material on site then the City Council requires submission of results of a full intrusive site investigation to establish the nature and extent of hazardous material on site.
- Once a satisfactory site investigation and characterisation in terms of sources, pathways and receptors, has been performed the developer of a site must either produce a satisfactory quantitative risk assessment using a recognised methodology, which shows that no significant pollutant linkages exist or a remediation scheme designed to break any significant pollutant linkages must be submitted. These must take in to account the proposed end use of the site.

Provided this policy is adhered to no, recently developed sites will fall in to the category of Contaminated Land defined under Part 2A of the Environmental Protection Act 1990.

## **1.2 Regulatory context**

Contaminated land regulations have been under development since the early 1990s. Following consultation on a 1993 White Paper entitled "Paying for our Past". The Environment Act 1995 inserted a new section (Part 2A) into The Environment Protection Act 1990. Another period of detailed consultation followed this enabling legislation. The regulations and statutory guidance came into force in April 2000. The regime was extended to include radioactivity in August 2006 and further extended to include "land contaminated by a nuclear occurrence", with effect from December 2007. It is this regulatory legislation, generally referred to as the Part 2A regime, that has called for the production of this strategy document.

### **1.2.1 The roles of the District Council and the Environment Agency**

Local authorities have been given the primary regulatory role under the Part 2A regime as local authorities have historically had responsibility for dealing with any statutory nuisance caused by land contamination and are also the lead authorities on land use planning.

The local authority has a duty:

- To cause their areas to be inspected for contaminated land.
- To determine whether any particular site meets the statutory definition of contaminated land.
- To inspect land it considers that there are reasonable grounds for believing it to be contaminated by virtue of radioactivity.
- To act as the enforcing authority for all contaminated land, unless the site meets the definition of a "special site" (e.g. MOD land or contamination affecting controlled waters - where Regulation 3 of the Contaminated Land (England) Regulations 2000 are satisfied, in which case the Environment Agency will act as the enforcing authority). The Environment Agency has a secondary regulatory role in assisting local authorities,

providing site-specific local guidance, dealing with “special sites” and publishing periodic reports on the state of land contamination nationally.

- To inform the Environment Agency of any land suspected of being contaminated by radioactivity and have regard from any general guidance and advice given on the manner in which to carry out inspection and limited survey. Once designated a “special site” the Environment Agency then becomes the enforcing authority, unless the radioactive contamination is caused by an “off-site” nuclear occurrence when the Secretary of State is the sole appropriate person. Where contamination is caused by a mixture of radioactive and non-radioactive sources covered by Part 2A (excluding ‘off-site nuclear occurrences’) the Environment Agency is the enforcing authority for all pollutant linkages.

### **1.2.2 Defining contaminated land**

A legal definition of contaminated land is given in Section 78A(2) of Part 2A of the Environmental Protection Act 1990.

“Contaminated land is 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) with respect to radioactivity, harm is being caused or there is significant possibility of such harm being caused; or
- c) pollution of controlled waters is being, or is likely to be caused.”

(Controlled water is defined by Part III of Water Resources Act 1991, except that “groundwater” does not include waters contained in underground strata but above the saturation zone, CLAN 5/04). Section 78A(5) requires the regulatory authority to act in accordance with guidance issued by the Secretary of State in determining significance and likelihood.

### **1.2.3 Dealing with contaminated land**

If an area of contaminated land has been identified, the approach for dealing with it will be the same regardless of whether the local authority or the Environment Agency is the regulator. There are four main stages to this approach:

1. To establish who is the “appropriate person” to bear responsibility for the remediation (or “clean-up”) of the land.
2. To decide what remediation is required and to ensure that this occurs, through:
  - Reaching a voluntary agreement;
  - Serving a remediation notice, if agreement cannot be reached;
  - Carrying out work themselves, in certain circumstances in default;
3. To determine who should bear what proportion of the liability for meeting the costs of the work;
4. To record certain information about regulatory action on a public register.

### **1.2.4 Pollutant Linkages and Risk Assessment**

For a site to meet the definition of contaminated land, a pollutant linkage must be established. A pollutant linkage consists of three parts:

- A source of contamination in, on or under the ground (sometimes referred to as a Hazard);
- A pathway by which the contaminant is causing significant harm or harm, with respect to radioactivity (or which presents a significant possibility of such harm being caused);
- A receptor of a type specified in the regulations (sometimes referred to as a Target).

### 1.2.5 Receptors

- Human beings

Human beings are the only receptor considered where harm is attributable to radioactivity. Being confined to the lasting exposure of human receptors from the after-effects of a radiological emergency or a past practice or past work activity.

For all other sources of contamination covered by Part 2A regime the following receptors are also considered:

Ecological systems or living organisms forming part of a system within 5km of certain protected locations, including:

- Sites of Special Scientific Interest (SSSIs)
- National Nature Reserves
- Marine Nature Reserves
- Nature Reserves
- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)
- Candidate SACs
- RAMSAR sites ( See Glossary)
- Areas of special protection for birds
- CWS County Wildlife sites
- Legally protected species

Property in the form of buildings, including:

- Ancient Monuments
- Property in other forms
- Crops
- Livestock
- Home-grown produce
- Owned or domesticated animals
- Wild animals subject to shooting or fishing rights

Controlled waters, including:

- Surface waters ( e.g. rivers, lakes, streams)
- Drinking water abstractions
- Source protection zones
- Groundwater (except waters contained in underground strata but above the saturation zone)

If the three components of the pollutant linkage exist, a risk assessment will be undertaken to determine the likelihood of harm being caused and the likely nature and extent of the harm caused if the predicted event actually occurred. An area of land can only be designated contaminated land if a significant risk or harm with respect to radioactivity has been proven.

### 1.3 Development of the strategy

All local authorities are required to take a strategic approach to inspecting land in its area for contamination.

The statutory guidance requires that the approach adopted should:

- be rational, ordered and efficient;
- be proportionate to the seriousness of any actual or potential risk;
- seek to ensure the most pressing and serious problems are located first;

- ensure that resources are concentrated on investigating areas where the authority is most likely to identify contaminated land;
- ensure that the local authority efficiently identifies requirements for the detailed inspection of particular areas of land.

This strategy has been developed to meet these requirements. Particular reference has been made to “Contaminated Land Inspection Strategies - Technical Advice for Local Authorities” issued by the Department of the Environment, Transport and the Regions.



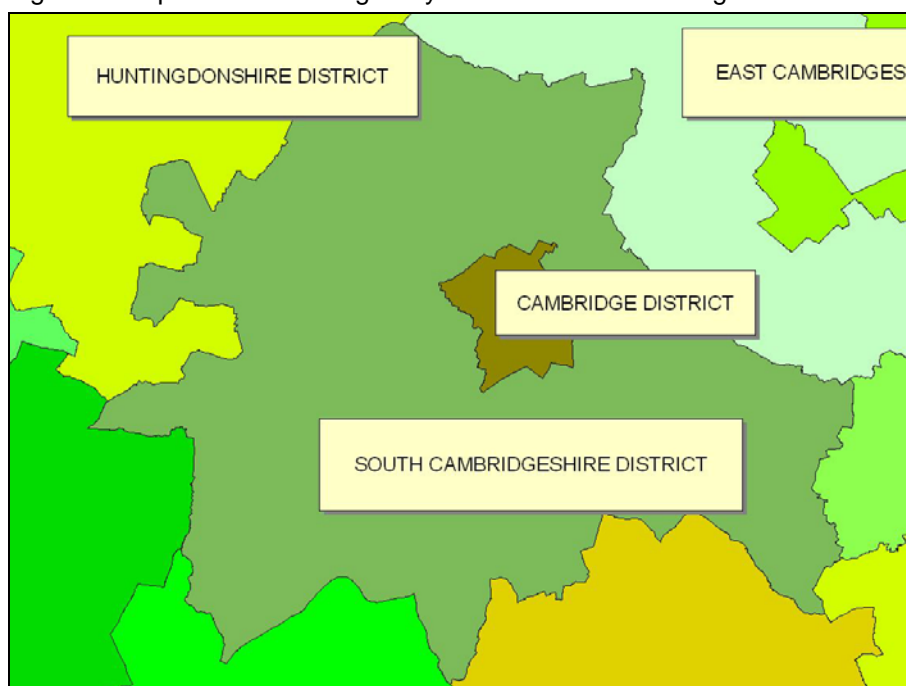
## 2 Characteristics Of Cambridge City

This section gives the background to Cambridge City and an explanation of how this influences the Council's approach to inspection for contaminated land. It will also enable fair comparison with other authorities.

### 2.1 Geographical Location

Cambridge City lies on the river Cam in the western part of East Anglia about 55 miles north of London (OS ref TL 545,258). The district is entirely surrounded by South Cambridgeshire District Council.

Figure 1: Map of the Cambridge City District and surrounding districts.



### 2.2 Brief Description

Cambridge became a city in 1951 developing from a market and university town. It is now a thriving centre of world-class educational excellence, high technology research and industry.

### 2.3 Size / Population Distribution

- The district area covers approximately 4070ha.
- The annual population survey completed by Cambridge City Council between January and December 2007 estimated the resident population was 120,000.
- The number of households within the district is estimated by the Office for National Statistics at 42658.

### 2.4 Land Owned By The District Council

The City Council has extensive land holdings in Cambridge, mostly held by the Council's Housing, Property and Leisure departments.

The Council's Housing department owns around 7500 (of 42658) homes spread throughout the District.

The City Council also owns 1845 garages as well as pieces of ancillary land which includes areas such as footpaths and un-adopted roads.

Major assets held at 31 March 2008 are listed in the following table.

<b>Category</b>	<b>Assets Held 2008</b>
Council Dwellings	7438
Shared Ownership	93
<b>Operational Properties</b>	
Operational Offices	10
Sports / Swimming	8
Depots	1
Car Parks	9
Community Centres	8
Concert Hall	1
Public WC's	10
Cemeteries	1
Crematoria	1
Sheltered Dwellings	728
Hostels	2
Other Dwellings	125
Weekly Let Garages	1845
Surgery	1
<b>Non - Operational Assets</b>	
Development Sites	3
Leased Property/ Land	371
Museum Heritage properties	1
<b>Infrastructure Assets</b>	
Private Roads	6
<b>Community Assets</b>	
Skateboard Ramps/Play areas	14
Pavilions	3
Allotment Site/Buildings	3
Nature Reserve	2
All weather facilities	4
WC's	4
<b>Area in Hectares</b>	
Commons	109
Allotments	34
Public Open Space	83

## 2.5 Current Land Use Characteristics

The main use of land in the District, other than for residential use, is for education (Cambridge University and the Colleges, being substantial property holders), common land and high-tech light industry and research. Cambridge Sewage treatment works also lies within the city boundary.

IT, electronics and pharmaceutical research companies form the majority of the light industry and occupy various commercial parks including the Addenbrookes Hospital Campus (notably the Cambridge Science Park lies just beyond the district border in South Cambridgeshire District Council).

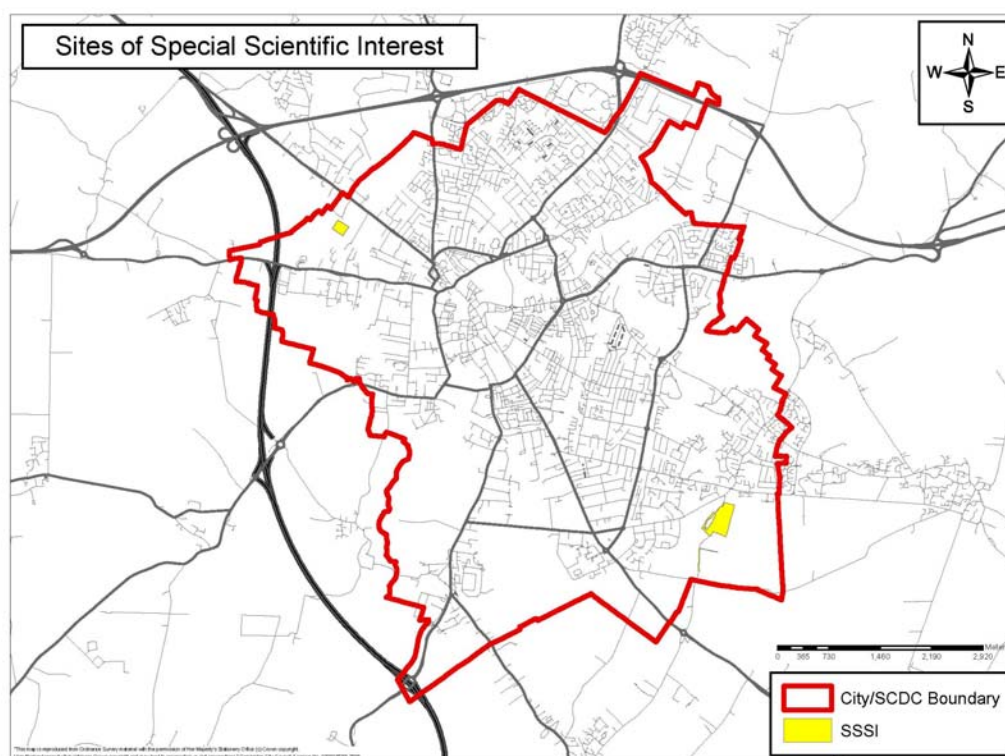
## 2.6 Key Property Types - Receptors

### 2.6.1 Protected Wildlife Areas

Protected wildlife areas occur within the city boundary and are important receptors in terms of risk management of contaminated land.

- Two Sites of Special Scientific Interest (SSSI) are Cherry Hinton Pits (2 sites) and the Traveller's Rest Pit.

**Figure 2 Sites of Special Scientific Interest**



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- There are no designated National Nature Reserves (NNR) in the District.
- Local Nature Reserves (LNR) can be found at East and West Barnwell road, Lime Kiln Close and West Pit, Paradise and Bramblefields (Source 2006 local plan).
- County Wildlife Sites (CWS) that are identified by local wildlife trust groups will also be considered, as will any habitats containing legally protected species.

## 2.6.2 Scheduled Ancient Monuments

Historic buildings are simultaneously visible evidence of the past, vital parts of the present character of Cambridge and functional resources for the future. They are finite and non-renewable resources. The principles of Planning Policy Guidance: Archaeology and Planning (PPGI6, 1990) apply to the vulnerability, interest and value of historic buildings. Their future survival depends on how the buildings are used and managed, on appropriate maintenance and repair and on alterations, which minimise the loss of historic fabric. However, it must be recognised that for most buildings survival depends on finding a viable use.

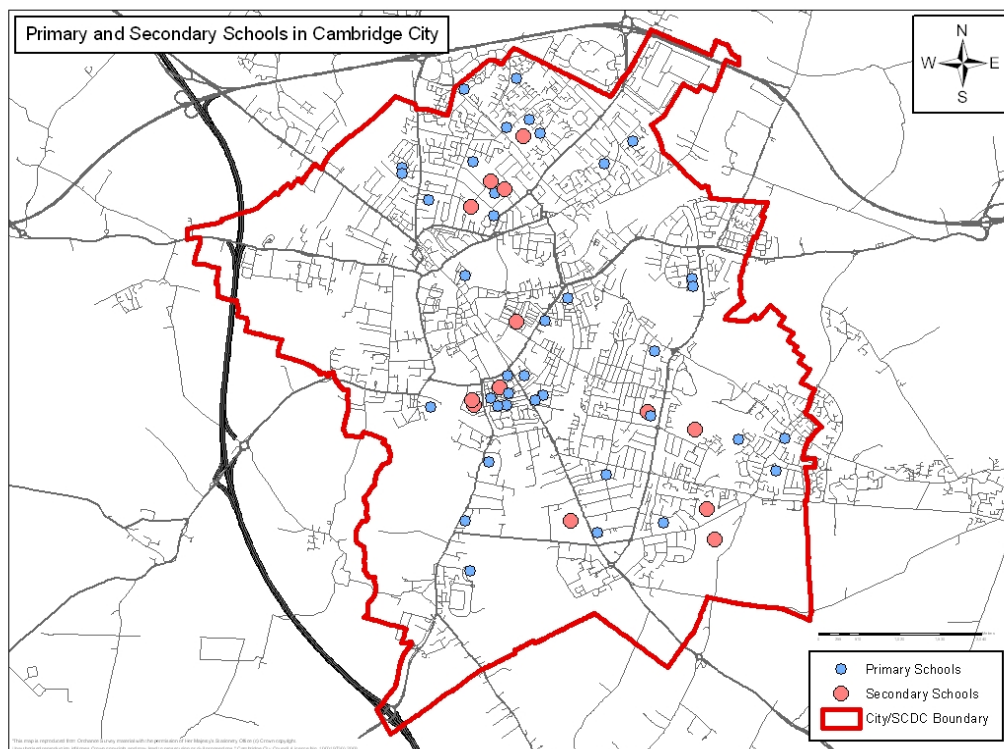
Cambridge has 1578 listed buildings, 173 of which are Grade I, 59 are Grade II\* and 1347 are Grade II. There are also an additional 1000 Buildings of Local Interest. The exceptionally high proportion of Grade I buildings reflects the legacy of outstanding Cambridge University and College buildings. The City also has 5 Scheduled Ancient Monuments and 11 Historic Parks and Gardens. Buildings listed for their architectural or historic Interest have statutory protection. These listed buildings were originally designated in 1972 and a review was conducted in December 2007.

Consent is required for the demolition in whole or in part of a listed building, or for any alteration, external or internal, which would affect character of buildings, objects or structures within (Source Planning (Listed Buildings and Conservation Act 1990)).

## 2.6.3 Schools

There are 30 primary schools, 10 secondary schools, 5 sixth form colleges and 1 special school within the Cambridge District.

**Figure 3 Primary and Secondary Schools in Cambridge Area**



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## 2.7 Key Water Resource / Protection Issues

Cambridge Water supply all of the District's drinking water.

The District Council is currently aware of one licensed private drinking water abstraction at Leys School (location 545046 257377) in its area (source Environmental Agency 2008).

It is known that Cambridge overlies two designated major aquifers: the Lower Chalk and Lower Greensands. For most of the District the Lower Chalk is a chalk marl with very low hydraulic conductivity and not suited to abstraction. It is thus not considered a sensitive receptor for contaminants. For the most part the Lower Greensand is protected by a thick layer of Gault clay. However, it is abstracted locally and is a sensitive receptor.

## **2.8 Residential**

Residential land is distributed throughout the city and will be treated as a sensitive receptor. Location of residential properties will be obtained from the City Council's property database.

## **2.9 Recreational land**

The City Council own a number of recreational spaces which will be considered as sensitive receptors with regard to contamination and exposure to children.

## **2.10 Known Information on Contamination**

The Council holds some information on contamination in the District, mostly submitted as part of the development control process. When development was proposed on an area of land where a past use may have resulted in contamination, the Council requested a historical desktop study as part of the planning condition. If development proceeded on these sites, remedial works are often carried out to improve the site conditions. Therefore planning records have formed a valuable resource during the investigation process.

## **2.11 Current And Past Industrial History**

Cambridge has never been the site of extensive heavy industry. However the growth of rail infrastructure and an expanding population in the 1800's did lead to chalk quarrying, clay extraction, engineering and energy provision, through town gas production, during the industrial age. The last century has also seen considerable land filling of voids left by clay and chalk marl extraction, electronics manufacturing and engineering.

### **2.11.1 Clay Extraction**

The Riverside and Newmarket Road areas were heavily exploited for clay brick making in the 1800s and in the first half of the 1900s the voids were filled with domestic refuse. The area along Riverside has been remediated as part of a residential development. The area north of Newmarket Road and west of the railway line has also been remediated under a commercial development and is now occupied by Cambridge Leisure Park. Other areas of Cambridge used less extensively as brick and tile works and therefore not subsequently filled are now occupied by recreational facilities.

### **2.11.2 Engineering and Aviation**

Marshalls Engineering have a long history in Cambridge and still employ a significant number of workers at their main airport site. The works has undertaken a number of authorised and unregulated manufacture processes and has the potential to be contaminated. Furthermore a significant amount of heating oil and diesel is stored on site as part of the operations. Marshalls Engineering is part of a wider area selected under the Cambridge East Area Action Plan for a mixture of residential and commercial development. This will result in the subsequent relocation of Marshalls Engineering.

### **2.11.3 Electronics Manufacturing**

Large-scale electronics manufacturing companies, such as Pye and Tyco, used to operate in York Street, St Andrew's Road and Cromwell Road. These areas are now occupied by residential dwellings after going through the planning process and subsequent remediation.

### **2.11.4 Landfills**

Two landfills operated in the area of Newmarket Road and Coldhams Lane.

- Coldham's Lane Landfill: Operation of three landfill pits between 1960s and mid 1980s. The type of waste accepted included industrial, inert and commercial waste as well as liquid sludge. The fill is known to be actively gassing.
- Newmarket Road Landfill: Following the completion of the brick and tiles operation in this area the site was subsequently used as a landfill between 1950s-1960s. As already mentioned above this area has been remediated and is now occupied by Cambridge Leisure Park.

### **2.11.5 Cement Batching from Chalk Marl**

Chalk Marl has been quarried and made into cement in the Coldhams Lane area for over 100 years. Three of the extracted pits are now water filled and form a local nature reserve. The other areas of the site have been used as a landfill as already described above. The remaining area, occupied by the worker's cottages (during the operation of the landfill), has been remediated for a commercial end use and is now occupied by a Fitness Centre and the Holiday Inn Hotel.

### **2.11.6 Military Land**

During World War II a large part of the area east of Milton Road was occupied by a US Army Depot. After the end of the war the depot was replaced by residential dwellings.

### **2.11.7 Scientific Research Area**

Woodhead Drive and George Nuttall Close were occupied by Laboratories from the mid 1960s and onwards. Part of Woodhead Drive was investigated in the 1980s as part of residential development. The rest of the Woodhead Drive and George Nuttall Close area is are present being redeveloped for housing under a planning application.

### **2.11.8 Sewage and Water Treatment**

A large area to the Northeast of Cambridge at Cowley Road has been occupied by Anglian Water Sewage Works since 1930. At present under policy 9/6 of the adopted Local Plan the sewage works have been allocated for a redevelopment (mainly residential dwellings). This would involve the subsequent relocation of the sewage treatment works and the investigation of the site.

### **2.11.9 Other Industries**

- Railways once networked the District, providing an infrastructure to transport the goods produced by industries. Some of the old railway lines have been converted to cycle paths, gardens, lie redundant or have been built upon. The railway corridors have historically been used for industrial activity -some sites have already been investigated and remediated for development purposes. The Station Area is allocated in the 2006 Local Plan (policy 9/9) for residential, employment, an integrated transport interchange and other uses (and will be subject to investigation).
- Metal Foundries once existed in across the city including the present location of the City Council Depot. These were small specialist enterprises.
- Electroplating is still carried out on Union Lane in the north of the city and there is some Council held information concerning impact upon the surrounding properties.

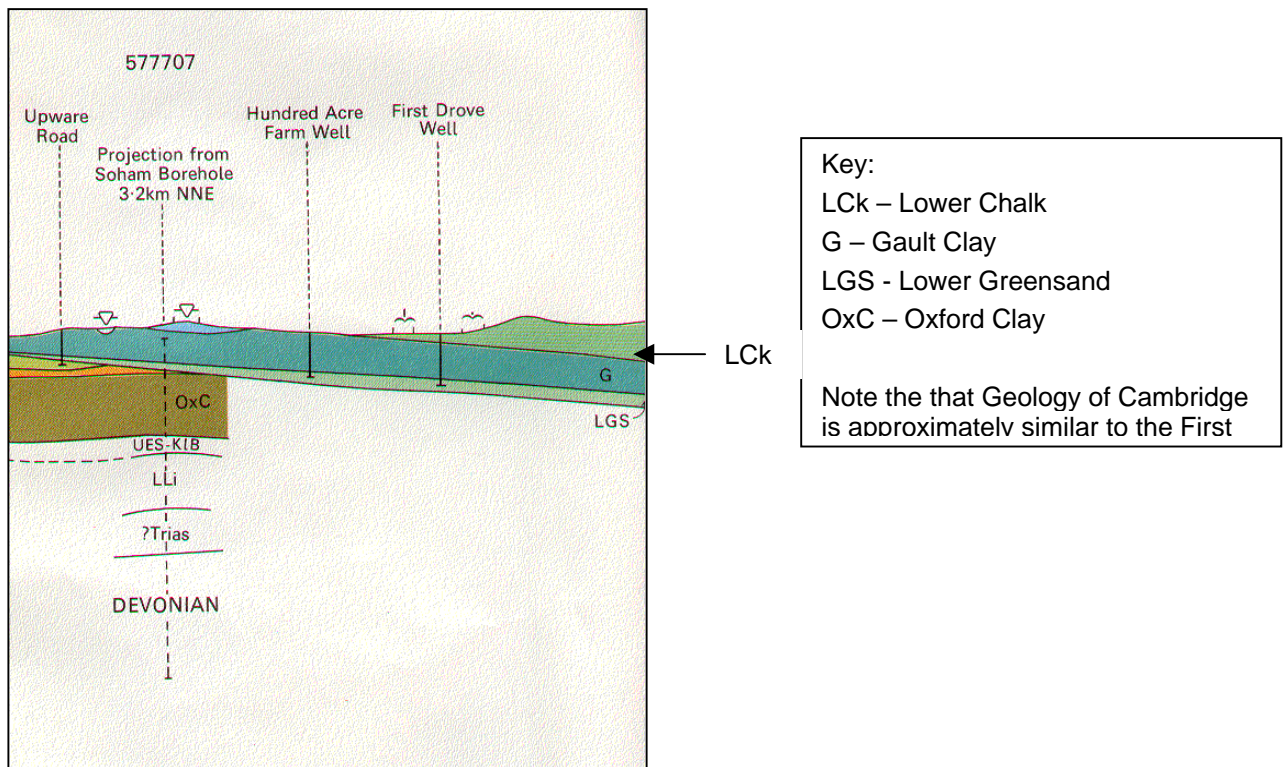
## **2.12 Cambridge University**

The University has extensive land holdings within the city boundary for education, research, residential, commercial and agricultural activities. Some of their processes are authorised by the City Council under LAPC. The City Council is also aware of the use of radioactive sources within university departments; these activities are regulated by the Environment Agency. There is also some information held by the City Council referring to past contamination of University properties.

## **2.13 Geological Characteristics**

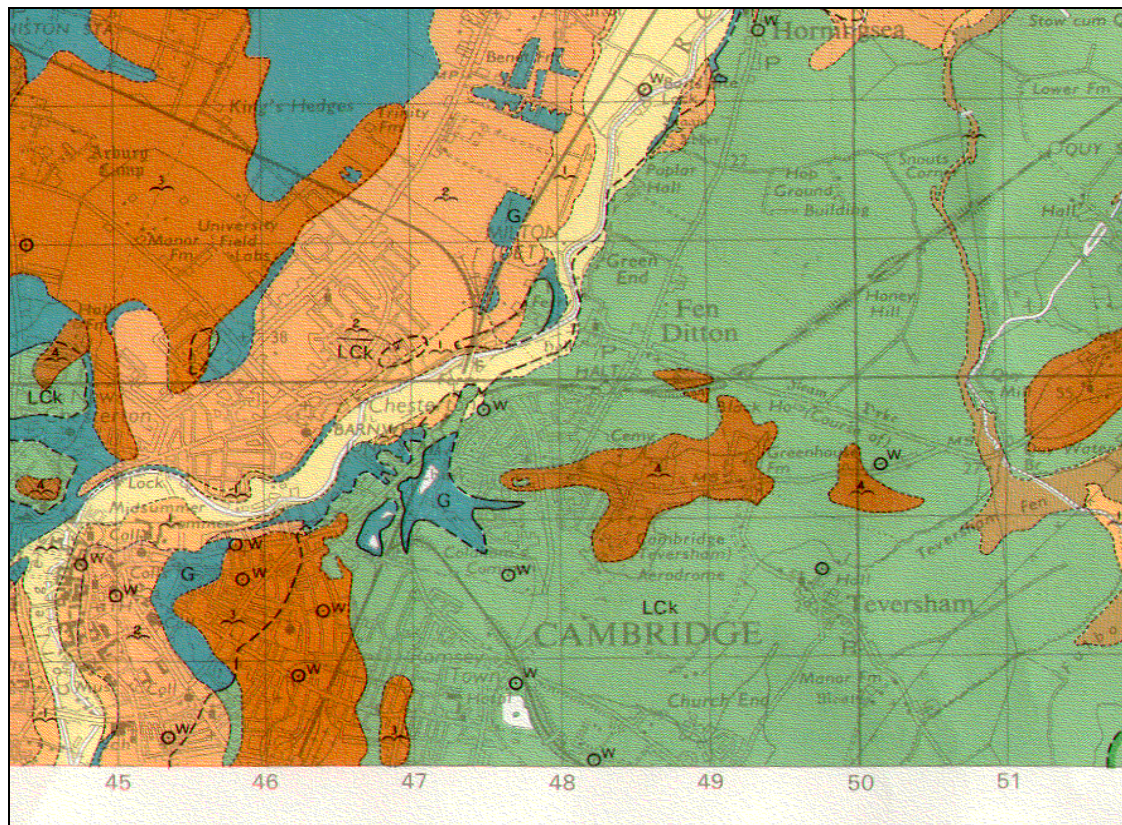
It is known that Cambridge overlies two major aquifers the Lower Chalk and Lower Greensand. These layers sandwich Gault Clay of variable thickness. The City Council will use a GIS mapping system to view detailed geological features across the District.

**Figure 4 Geological Cross section**



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**Figure 5 Geological Plan – Cambridge Solid & Drift**





## **2.14 Broad Hydrogeological Characteristics**

Diagrams of source protection zones are available from The Environment Agency, these show areas of protected groundwater where important abstractions occur. There are a number of these present within the District boundaries.

## **2.15 Areas Of Naturally Metal Enriched Soils**

We await the release of the geological data and borehole records relating to the Cambridge City area that will illustrate any areas of naturally metal enriched soils. It is known that levels of naturally occurring Arsenic are present in the district at levels that could present a problem.

### 3 Work completed to date

This Chapter includes a breakdown of work completed so far by the Council to progress the Contaminated Land Strategy.

#### 3.1.1 Review Guidance Documents and Existing Data Sources

A literature review of available guidance documents was conducted to support the generation of the strategy document. There have been a number of significant changes to the guidance material since the adoption of the Part 2A regime, resulting in the need to be aware of an extensive number of documents.

The list of documents consulted is given below.

DoE – CLR Reports Nos. 1-6, 11-15

(DoE – CLR Reports Nos. 7-10 WITHDRAWN August 2008)

DoE Tox reports 1 – 25

(DoE SGV reports 1, 3-5, 7-10, 15-16 WITHDRAWN August 2008)

CIRIA Remedial Treatment for Contaminated Land Volumes 1-12

CIRIA Assessing risk posed by hazardous gases to buildings C665

DEFRA Circular 01/2006 "Contaminated land"

DETR Control and Remediation of Radioactively Contaminated Land – Consultation Paper

DEFRA: Guidance on the Legal Definition of Contaminated Land, July 2008.

DEFRA: Outcome of the "Way Forward" exercise on soil guideline values. July 2008.

DEFRA: Environmental Permitting General Guidance Manual on Policy and Procedures for A2 and B Installations, July 2008

CLAN 3/04: Section 86 of the Water Act 2003

CLAN 5/04: "Ground Waters" and Section 86 of the Water Act 2003

CLAN 5/06: Extension of Part 2A to radioactivity

CLAN 1/07: Extension of Part 2A to radioactivity (CLAN 5/06) – further update

(CLAN 6/04: Update on the Soil Guideline Values Taskforce WITHDRAWN August 2008)

(CLAN 2/05: New advice on SGVs WITHDRAWN August 2008)

(CLAN 3/06: Soil Guideline Values Taskforce WITHDRAWN August 2008)

(CLAN 4/06: Defra update on SGVs WITHDRAWN August 2008)

(CLAN 6/06: Soil Guideline Values: the Way Forward WITHDRAWN August 2008)

CLAN 1/02: Withdrawal of ICRL Guidance Note 59/83 (2ND Edition)

CLAN 3/02: Withdrawal of ICRL Trigger Values

(CLEA update bulletin 3. EA April 2006 WITHDRAWN August 2008)

(CLEA update bulletin 4. EA October 2006 WITHDRAWN August 2008)

Science Report P5 069/TR1. Biological Test Methods for assessing Contaminated Land. EA 2004.

Science Report P5 091/TR1. Soil Screening Values for use in Ecological Risk Assessment. EA 2004.

Science report SC 70009/SR1: The overarching Ecological Risk Assessment framework for contaminants in soil referred to as ERA 1, 2008.

Science report SC 70009/SR2a: The Guidance on desk studies and Conceptual Site Models in Ecological Risk Assessment referred to as ERA 2a, 2008.

EA Science report SC 70009/SR2b: The Guidance on the use of Soil Screening Values in Ecological Risk Assessment referred to as ERA 2b, 2008.

Science report SC 70009/SR2c: The Guidance on the use of Bioassays in Ecological Risk Assessment referred to as ERA 2c, 2008.

Science report SC 70009/SR2d: The Guidance on the use of Ecological Surveys in Ecological Risk Assessment referred to as ERA 2d, 2008.

Science report SC 70009/SR2e: The Guidance on the Attribution of Cause and Effect in Ecological Risk Assessment is referred to as ERA 2e, 2008.

Science report SC 70009/SR3: The Standard Operating Procedures for Bioassays is referred to as ERA 3, 2008.

Science Report P5 035/TR01. Building Risk Assessment. EA 2000

Science Report SC050021/SR2: Human health toxicological assessment of contaminants in soil. EA August 2008.

Science Report SC050021/SR3: Updated technical background to the CLEA model. EA, August 2008.

Science Report SC050021/SR4: CLEA Software (Version 1.03 beta) Handbook. EA, August 2008.

Science Report SC050021/SR7 Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values.

JEFFRIES, J., 2009. A review of body weight and height data used within the Contaminated Land Exposure Assessment model (CLEA). Project SC050021/ Technical Review 1. Bristol: Environment Agency.

Technical Report P5 063/TR2. Application of sub-lethal eco-toxicological tests for measuring harm in terrestrial ecosystems. EA 2004.

Technical Report P331. Risks of contaminated land to buildings, building materials and services. EA 2000.

BS 10175:2001 Investigation of potentially contaminated sites. Code of practice (Generic Assessment Criteria for Human Health. LQM 2006 WITHDRAWN August 2008)

Technical Advice for Local Authorities – Contaminated Land Inspection Strategies – Judith Lowe 2001

DoE industry Profiles: Railway Land, Engineering works Etc.

Building Regulations C (2000) Site preparation and resistance to contaminants and moisture. Office of the Deputy Prime Minister.

PPS23 Planning and Pollution Control

PPG 16 Planning Policy Guidance Archaeology & Planning

PPG 15 Planning Policy Guidance Historic Environments

Circular 01/07: Revisions to Principles of Selection for Listed Buildings (March 2007)

PPS10 Planning for Sustainable Waste Management

In addition to the technical documentation listed, additional information sources were accessed including those from within the Council and those from external sources.

### **3.1.2 Internally Sourced Information**

- Sites known to contain hazardous material in, on or under the land collated by the Environmental Services in preparation for the now defunct s143 Environmental Protection Act 1990 Register of Contaminated Land (Source: Environmental Health pollution records).
- Cambridge City Local Plan 2006 and Monitoring Report – details and proposals for known previous industrial sites.
- The Cambridge City Council Environmental Priorities– objectives and practical details of how the Council will address a broad range of environmental issues.
- Cambridge City Council's Medium Term Objectives
- Environment & Planning Department Development Control records – details of remedial action already carried out on previously used sites
- Environment & Planning Department Heritage Section – details of historic buildings and Scheduled Ancient monuments.

- Property Services – details of City Council ownership of property and some previous use records.

### 3.1.3 Externally Sourced Information

Source of Information	Type & Format
Environment Agency	Pollution Incidents; Landfills; Abstraction Licences; Discharge Licences; Groundwater Boreholes; Catchment areas; Waste Management Areas; IPC/IPPC; Source protection Zones etc.
Natural England	Sites of Special Scientific Interest SSSIs, NNRs, SACs, SPAs and RAMSARs, CWS, Legally Protected Species
English Heritage	Scheduled ancient Monuments
MAFF	Environmentally Sensitive Areas; Burial of diseased animals
Cambridgeshire County Council	Petroleum Officer records (Database & paper records)
CADAC BIS	Historic OS Maps 1880-1932 (Scanned, Warped to National Grid GIS format)
Ordnance Survey	Landline and OS Rasters 1:10000 & 1:50000
British Geological Survey BGS	1:10000 & 1:50000 Solid, Drift and Man-made Ground (1:10000 only), And BGS Borehole survey locations and chemical analyses (80 Sites)
Landmark Information Systems	Historic Land-use Data sets attached to captured polygons
Groundwater Vulnerability Maps	The stationery office - digital

### 3.1.4 Purchase of Land use Database & Data Capture (February 2001- July 2002)

In order to generate a list of potentially contaminated sites in Cambridge a number of data collection sources were used.

- Initially the Council purchased a set of historic ordnance survey maps in a digital format for various separate time periods (or epochs). Aerial photographs from 1940, 1944 and 1948 (captured during the World War II from RAF and Luftwaffe) were also obtained. All these were used with the Council's Geographic Information System (GIS) and overlain onto current maps. This historic database was used to identify sites with past industrial uses that have the potential to be contaminated.

- Sites locations identified using historic maps and aerial photographs were compared against information held in Kelly's Trade directory for the city. This highlighted additional sites not always easily identifiable on maps such as coal storage facilities and builders yards.
- Further potentially contaminated sites were identified using paper records from Development Control, Property Services and records held by the County Council Petroleum Officer.

### 3.1.5 Final prioritisation (November 2003 – June 2006)

The statutory guidance requires the remediation of contaminated land sites to be prioritised. After all sites were identified, proprietary risk assessment software was used to assist with risk prioritisation. The following section summarises the main features of the software and its limitations.

#### Software's Main Features

In order to assist with the risk prioritisation the Contaminated Land Assessment Risk Analyst (CLARA) software was purchased from Conestoga Rovers and Associates.

The software assigns a score on each site based on the answers provided to twenty-three set questions. The questions are designed to assess the likelihood of the presence of a source-pathway-receptor linkage and can be grouped into two categories:

- Questions confirming the presence of receptors in close proximity to the site. This is addressed by enquiring about proximity of the site to residential dwellings, schools, recreational areas, surface waters and others.
- Questions confirming the presence of a contamination source. This is addressed by enquiring about the past industrial history of the site, the duration of the industrial use and the frequency of change of use.

It should be noted that the higher the frequency of changes of use and the longer the occupational period for the site, the higher the score that is assigned to these questions. Furthermore different types of industrial uses are assigned different scores.

After all twenty-three questions have been answered software algorithms calculate the final total score for each site (high ranking scores suggest high likelihood of source-pathway-receptor linkage present and therefore the site should be a priority).

#### Conclusions

Following the completion of the risk ranking process, the Council's Scientific Team reviewed the prioritisation list. The review revealed that despite CLARA being a useful software careful consideration should be applied if the inspections programme is undertaken based only on the total scores of the sites (and not in conjunction with local knowledge of the area). This conclusion was based on the following:

- The same twenty-three questions are asked for assessing each site, therefore CLARA provides a consistent approach in deriving the final score. In addition some questions are automatically answered ensuring consistency and uniformity in deriving the site's score.
- However there are a number of questions that require manual input and professional judgement from the software operator. Because three operators were involved with the completion of the risk ranking process, some of these questions might not have been answered in a consistent way throughout the whole process (i.e. the percentage of hard standing coverage on a site is subjective).
- Because of the way the software was initially set up by operators, when there is the likelihood of landfill gas generation on site from in filled material then the score assigned is quite high. This cautious approach is acceptable for the big landfills previously operating in Cambridge. However there are smaller sites in Cambridge (i.e. in filled ponds or ditches) that although they haven't been properly in filled and are not landfills, they have scored quite highly because of the gas generation potential. In these cases the likelihood of gas generation has resulted in **artificially elevated risk ranking scores**.

These artificially elevated risk scores could result in an inappropriate inspection programme being adopted in two ways.

1. Sites that in reality don't pose a significant threat (and therefore should not be investigated as a priority) are investigated first.
2. Sites that have scored highly, (despite landfill gas generation likelihood not being an issue, i.e. metal foundries) are ranked below sites with artificially elevated scores and as a result are not investigated as a priority.

## 4 Priorities and Work Programme

### 4.1 The Council's priorities

Dealing with contaminated land constantly throws up complex issues, often where limited amounts of information are available. For each site, the importance of these issues must be balanced in order to move forward in dealing with the problem. A prioritised list of the Council's aims has therefore been devised to aid decision-making.

The Council's priorities in dealing with contaminated land will be:

1. To protect human health
2. To protect controlled waters
3. To protect designated ecosystems
4. To prevent damage to property
5. To prevent any further contamination of land
6. To encourage voluntary remediation
7. To encourage re-use of brownfield land

This list is presented in priority order and in all cases will have regard to significance and likelihood, as required by the regulations.

#### 4.1.1 Scheduled inspection

In order to avoid adopting an inappropriate inspection programme, and with an awareness of CLARA's risk ranking limitations with respect the landfill gas generation, some verification of high scoring sites will be required. In addition, high scoring sites also need to be ordered in line with the Council's contaminated land priorities. Therefore a Conceptual Site Model (CSM) will be generated for each site to identify potential Significant Pollutant Linkages (SPL). This will establish the main receptors affected in each case and focus detailed investigation on those sites with the potential to cause harm to human health first. Areas will then be prioritised by population density and proximity to potentially contaminative features. Sites identified for inspection will be subject to the procedures outlined in Chapter 5.

#### 4.1.2 Council owned land and property services agreement

The Council has substantial land holdings within the district but also in some cases has owned areas within the district boundary where potentially contaminative uses have taken place. These sites will be included in the risk ranking process and prioritised as detailed in Section 3.1.5. An agreement has been made between Environmental Services and Property Services detailing the role and responsibilities each Service will take during the investigation and remediation of Council Owned land.

### 4.2 The Council's Liabilities under Part 2A EPA 1990

The Council may be liable for the costs incurred by remediation although in certain circumstances these may be recoverable.

The Council will be liable for the cost of remedial action where the Authority is shown to be the Appropriate Person or where urgent action is necessary (S.78 (3)a EPA 1990). Others are more policy related decisions, for example where the pollutant linkage causes an impact to controlled waters but no significant harm is occurring, the Local Authority may be liable depending on the status of the Appropriate person (S.78J (2&3) EPA 1990).

Further details of other examples can be found in the legislation.

Recovery of remediation costs is appropriate in a number of circumstances, where the local authority may initially have paid for remedial action. The Statutory Guidance also proposes some areas where cost recovery is at the discretion of the local authority.

**The City Council has taken a policy decision in this area having taken legal advice to pursue full cost recovery in all circumstances whether discretion is granted or otherwise.**

### **4.2.1 Applying for Capital Projects Funding**

The Council also has the opportunity to apply to DEFRA to receive financial assistance from the Contaminated Land Capital Projects Programme. This is a funding programme that aims to help local authorities in England cover the cost of implementing contaminated land legislation. The Programme funds two types of work:

1. Intrusive site investigations, which aim to find out whether a site is contaminated and, if so, to inform how it should be remediated; and
  2. Site remediation, which aims to ensure that contamination at a site will no longer pose a significant risk to people or the environment.
  3. The application procedure for financial assistance is briefly outlined below.
- A local authority applies to DEFRA for funding, explaining what a proposed project would involve, why it is necessary, and how much money it needs.
  - DEFRA sends each application to the Environment Agency, whose assessors check the proposed project on technical merit and value for money grounds, adjusting proposed work and costs if necessary. They also give the application a priority score to help prioritise bids if the Programme is oversubscribed.
  - DEFRA decides whether to pay (using priority scoring to sift bids if need be) and pays successful bids.
  - The local authority does the work, and reports back to DEFRA when it is complete.

(Further information can be found on DEFRA's web site at [www.defra.gov.uk](http://www.defra.gov.uk).)

It is up to the discretion of DEFRA, based on the evidence available, whether funding will be granted. However even when the grant has been approved the provision of money will probably be allocated in a 'phased approach' (i.e. provide sufficient funds for additional investigation and if/when remediation is proven necessary then provide further funding). Because the process for obtaining a capital grant can be time consuming and lengthy the council may have to undergo the remediation/investigation of the properties using its own resources and then try to claim money back from DEFRA retrospectively.

## **4.3 Available Resources**

This section presents the challenges the Scientific Team, within Environmental Services will face while trying to implement the Contaminated Land Strategy.

### **4.3.1 Financial**

The annual budget available for dealing with contaminated land is approximately £4500. Based on these resources an estimate has been undertaken to show how many sites can be investigated each year. Below is presented a table with timelines and potential costs for a basic site intrusive investigation undertaken by council officers.



#### Estimate of Site Investigation timeline and associated costs

<b>Issues for Consideration</b>	<b>Timeline/Costs</b>
Days required for sample collection	1 Day
Cost of chemical analysis/ soil sample (for basic suite of contaminants)	£150
Cost of chemical analysis/water sample (for basic suite of contaminants)	£28
Average time for turnover of results	10 Days
Minimum number of soil samples	10
Minimum amount of water samples	2
Minimum number of monitoring boreholes	2
Minimum number of fortnightly monitoring visits for ground gases	6
Average time required for completion of ground gas monitoring	3 months
Approximate cost/ borehole installation	£80
Sampling equipment	£115
Total cost of basic investigation	£1831

Based on the above figures and the available resources a maximum number of 2 sites per year can be investigated. It should be noted that the figures presented above are rough estimates. The huge variety of sites (in terms of size and complexity of uses) might result in some of them requiring a more resource intensive investigation, resulting in only one site investigation per year.

#### **4.3.2 Equipment**

It is assumed that council officers will undertake the initial intrusive investigation; therefore the cost of labour and renting of equipment has not been considered. The investigation will normally include setting up borehole monitoring locations and undertaking the subsequent ground gas and groundwater monitoring. This involves the use of specialist equipment for which the Council has purchased the 'Ergonomic Auger Set' from Van Walt Ltd, to generate boreholes. The set includes a wide selection of auger bits for use in variety of situations. However, additional consumables are required for the installation of monitoring wells and the collection of samples from the boreholes. These will include steel bailers (groundwater sampling tool), monitoring well pipe casings and well covers.

The Council also has the following equipment, for gas analysis:

- GA 2000 Gas Analyser, a portable handheld device used to detect and measure concentrations of landfill gases (mainly carbon dioxide, methane and hydrogen sulphide).
- Phocheck 3000 + PID, a handheld meter designed to monitor volatile organic compounds (VOCs) and other toxic gases.

#### **4.3.3 Staffing Issues**

The Scientific Team was allocated resources to finance a twelve-month contract (2008-9) to recruit one officer, tasked with progressing the Contaminated Land Strategy - Part IIA in particular. This was a successful posting and much progress has been made.

This contract ended in April 2009 (further funding was not secured), therefore the responsibility of progressing the site investigations falls to the three remaining permanently employed members of the Scientific Team. From April 2009 the team consists of the Principal Scientific Officer (PSO), the Scientific Officer (SO) and the Assistant Scientific Officer (ASO). All three officers have a demanding workload; the responsibility dealing with Part IIA duties will therefore need to be prioritised.

The Principal Scientific Officer is Team Leader for the Scientific Team. He is responsible for the strategic direction of the team and staff management. He also has overall responsibility for management of the air quality monitoring programme, Local Air Quality Management and the Contaminated Land inspection programme. He also has responsibility for scrutiny of the environmental impacts of planning applications with particular input to major growth sites.

The principal responsibility of the SO is to implement the air quality monitoring programme and local air quality management, which includes the day-to-day operation of the monitoring equipment, data collection, storage and reporting and in addition to conduct the air quality review and assessment. She also scrutinises planning consultations, for both air quality and land contamination issues.

The ASO is responsible for co-ordinating the scrutiny required for most planning consultations regarding contaminated land for sites in Cambridge and ensuring that future redevelopments in Cambridge provide a safe living environment. Other duties also include maintaining the Council's contaminated land database, drafting land use reports, reporting to queries from the public and assisting the PSO and SO in the delivery of the air quality programme.

The PSO and SO are able to assign 10% (half a working day) of their working week on Part IIA duties and the ASO will spend at least 20% (1 working day) of their time dedicated to Part IIA duties. The Team considers that this is the minimum required to continue to progress the Contaminated Land Strategy, but the maximum time available from each officer, considering their other workload and priorities.

## **4.4 What happens if we find a site?**

This section details the challenges the Team will face when the initial site investigation suggests a site may be contaminated under Part 2A.

### **4.4.1 Impact on Officer's Workload**

In order to fully characterise a site, further site investigation is required. A Scientific Officer would apply to DEFRA for Capital Grants Funding for this purpose. It is likely that further investigations would need to go ahead on site before a decision from DEFRA was known.

If, following the investigation there is enough evidence to suggest the site is 'contaminated' then the Council will make a formal determination of Contaminated Land under Part 2A. The determination and remediation of a site will generate a large additional workload for Officers. The following are just some of the tasks likely to impact on Officers time during this period.

- Ongoing briefing and consultations with the residents, property owners and the press. These could be in the form of monthly update letters, public meetings and one to one discussions (for the most adversely affected properties). For further details of resident communication challenges see Appendix B.
- Informing the Environment Agency (EA) of the determination, filling in all the appropriate documentation associated with it and keeping them up to date throughout the whole process.
- Identifying the person responsible for the remediation costs (i.e. appropriate person) and entering into an agreement, preferably on a voluntary basis. If this fails then the Council might have to pay for the remediation costs itself and then try to claim the money retrospectively from the appropriate person or apply to DEFRA for funding.

The process of determination and remediation, described briefly above, is lengthy, time consuming and challenging. It is estimated that if a member of the Team had sole responsibility for following it through this would account for 80% of his or her working hours, although this could be substantially more in a particularly severe situation. In this case the other two members of the Team will be required to undertake most (if not all) of his or her day to day duties and workload, which will be a significant challenge requiring ruthless prioritisation.

#### **4.4.2 Dealing with urgent sites**

If there is a verifiable report of a site causing significant harm the general approach to inspection will be secondary to dealing with such sites. Indeed, if there is a critical need, investigative and or emergency remedial work may have to begin immediately.

This approach has already resulted in the declaration of a site in Newmarket Road as 'contaminated land' and its remediation through Part IIA (in 2001). The inspection was triggered by an initial complaint from a resident, resulting in the investigation of a number of residential properties. Site investigation results confirmed the presence of contamination and the site was remediated as a matter of urgency.

It should be noted that the Council will continue to implement this approach.

#### **4.4.3 Inspection Capability**

Following a review of the allocated budget and availability of staff in the Scientific Team it has been concluded that the completion of one or two rudimentary site investigations a year is realistic. Achievement of this objective will depend on individual site findings and whether progression to a detailed site investigation or remediation is necessary. When a site requires further investigation financial resources will be diminished faster which may prevent a second site being investigated in the same financial year. The determination of a site will stretch both financial and staff resources. The Scientific Team has overseen the determination of a Part 2A site previously and knows it is not unusual for this process to last for years. Therefore, if a determination is made it is highly likely that no further site investigations will occur until its conclusion. In addition if a site is declared as 'Urgent' it will automatically supersede all other Part 2A work and therefore all routine site investigations would be suspended.

In conclusion, already limited financial and staff resources will be severely challenged, if during routine investigation a site requires determination under Part 2A EPA 1990.

## 5 Procedures

Procedures have been drawn up to describe how contaminated land issues will be handled within the Council and the technical procedure for examining sites. This section also details the level of service the business community and members of public can expect from the Council in dealing with these issues.

### 5.1 Internal management arrangements for inspection and identification

#### 5.1.1 Staffing

Within the City Council, the Environmental Services (ES) has responsibility for the implementation of Part 2A EPA 1990. As part of Environmental Protection, the Principal Scientific Officer is the lead officer on Contaminated Land, reporting to the Environmental Protection Manager and the Head of Environmental Services.

The Principal Scientific Officer is responsible for the day-to-day implementation of the strategy. The Principal Scientific Officer will also be responsible for preparing remediation notices, subject to consultation with the Environmental Services Manager and the Council's Legal Section. The Head of ES has delegated authority to serve remediation notices but the Director of Finance and the chair of Environment Committee will be kept informed of any formal actions.

Internal liaison between City Council departments will take the form of regular meetings between designated staff. The following staff have assisted in the production of this document:-

Department/Service	Staff	Position/Role
Environment & Planning	Stephen Miles Matthew Merry Tim Cliff  Sarah Dyer and Peter Carter Tim Haigh/Jack Alletson EHO's (Environmental Health Officers)	Planning Policy Officer GIS & Graphics Officer Geographic Officer (GIS) and OS Liaison Officer Principal (Development Control) Senior Administrator Env. Health Admin. (Searches)
Legal Services	Simon Pugh	Head of Service (Legal Advice)
Property Services	Philip Doggett Jonathan Hurst	Property Services Consultant Senior Design & Conservation Officer
City Services	Toni Ainley	Director of Service

The Head of ES will at the earliest opportunity inform the chair of Environment Committee and relevant directors of any plans to designate an area of Council-owned land, or land where the Council is the "appropriate" person and may be liable for remediation costs.

#### 5.1.2 Considering Local Authority interests in land

As indicated in Chapter 4, investigation of Council-owned land will be carried out in parallel with any urgent sites or previously identified areas of concern.

#### 5.1.3 Information collection

Many sources of information were required to identify potential sources of contamination and potential receptors and were presented in Chapter 3. The sources of information identified were considered to be adequate for fulfilment of a desk based, site investigation process and

have resulted in compilation of a comprehensive database of potentially contaminated sites in Cambridge. In addition to these, internal procedures and liaison with other departments in the Council are set up to ensure that potentially contaminated sites are properly dealt with or new sites are added to the list.

- Liaison with Development Control Department: After a new planning application is submitted to the Planning Department it is forwarded to the Environmental Health Department for consultation. If the proposed development is in an area where contamination is suspected, or close to sensitive receptors, the Council will expect a historical desktop study as part of a planning application before granting planning permission. If the development proceeds on these sites, remedial works may be necessary to improve site conditions.
- Liaison with Building Control Department: Liaison between Building Control and the Scientific Team has been recently set up. The Scientific Team review the weekly building control application list and the Building Control Case Officers keeping looking for any signs of contamination during site visits.
  - I. If the review of the list reveals a site of potential contamination for which no planning condition is present the Building Control Officers are informed. They are then requested to be aware that there may be signs of contamination and to consider this during site visits.
  - II. If the application list identifies a site of potential contamination for which there is a planning condition, but no information has been submitted by the developer, the Scientific Team will again inform the Building Control Case Officer. They will also inform the Planning Case Officer that the specific development is commencing without the appropriate information being submitted and that the developer needs to contact the Scientific Team for liaison.
  - III. During site visits the Building Control Case Officer might identify signs of contamination on a site where no past industrial uses have been recorded. In this case the officer will inform the Scientific Team. Who will update the list of potentially contaminated sites to include the new property. Following that the Scientific Team will contact Development Control and the developer informing them that a full historic desktop study needs to be undertaken and that remedial measures may be needed to improve the site conditions.

#### **5.1.4 Information Management (MVM Spatial Extension)**

MVM is the spatial extension software the Council uses to manage and store contaminated land information. It enables the site of interest to be identified on various OS maps (as well as an aerial photograph from 2002) and linked to a database holding details of past site uses. The data base entry system allows annotation of records and addition of relevant notes about the site from other sources. This system will be used to correlate all information and determine the proximity of potential receptors (residents, allotments, parks, controlled waters) to sources of contamination.

#### **5.1.5 Site Investigation**

The procedure adopted for desk studies, site walkover and conceptual risk models has been decided after a thorough review of the guidance available. The desk study will follow a similar procedure to that used by the City Council for development control purposes, previously described. Following the recommendations of the British Standards Institute Code Of Practice For Site Investigation (Appendix C) the Scientific Team produced a 'Site Investigation Protocol' document. This will be used to assist with identifying the main issues involved with site walkover/investigations (Appendix D).

##### **Site Walkover**

The site investigation protocol identifies the main areas to consider when completing a site walkover. These include; arranging access to the property; identifying ownership; health and safety considerations; current use and how to tackle accessibility issues. Recommended equipment and essential reference documentation to take on site is also listed. Once on site the completion of the site investigation questionnaire (based on guidance in DoE CLR2) helps

builds a comprehensive picture of the site. Key information is collected at this stage including:

- Weather conditions during site visit
- Accessibility and proximity of site
- Appearance of site
- Soil condition
- Surface water
- Vegetation cover
- Sensitive receptor information

(For more specific details see Appendix E)

This information can then be used to consolidate the Conceptual Site Model and confirm the presence of possible significant pollutant linkages.

### **5.1.6 Intrusive Investigation**

The outcome of the desk study and site walkover will indicate if further investigation is deemed necessary. The site investigation guide lists the equipment and sample processing techniques that may be required to complete an intrusive investigation. The importance of quality data collection and minimisation of cross contamination are emphasised. Results obtained from the intrusive site investigation can refine the site conceptual model and enable an informed decision to be made regarding the Part 2A status of the site.

### **5.1.7 Identification of Appropriate Persons**

Established internal procedures for identifying site owners such as interrogation of the land registry, electoral register, Council tax and business rate records will be employed.

Previous owners and occupiers will be identified by reference to local telephone, trade and yellow page directories. Where it is difficult to identify the current or previous owners, it may be necessary to approach people with local knowledge.

### **5.1.8 Prioritisation of remedial action**

The guidance laid down in DoE Document CLR 6 will be adopted for the categorisation and ranking of sites for remedial action priority.

## **5.2 Complaints and voluntary information provision**

From time to time, the Council may receive a complaint regarding contaminated land from a member of the public, business or community group. Interested residents may also voluntarily supply information relating to land contamination that is not directly affecting themselves, their families or their property. These complaints or acts of information provision may impact on the approach to inspection and so the procedures to be adopted are detailed here.

### **5.2.1 Complaints**

A complaint from the public regarding contaminated land will be dealt with following the same procedure as currently used by the Environmental Services – Environmental Protection section - to deal with statutory nuisance complaints. All complainants may expect:

- their complaint to be logged and recorded;
- to be contacted by an officer regarding their complaint within three working days of receipt; and
- to be kept informed of progress towards resolution of the problem.

Every effort will be made to resolve complaints quickly and efficiently. The legislative framework does, however, present a number of obstacles to speedy resolution of problems:

1. proof of a viable pollutant linkage before any formal designation as contaminated land is permissible, which might only be possible with detailed investigation;

2. prior consultation with interested parties before designation as contaminated land;
3. a minimum of a three month period between designation and serving of a remediation notice; and
4. the requirement for the enforcing authority to make every effort to identify the original polluter of the land (or “Class A” person).

The regulations allow conditions (2) and (3) to be waived in extreme cases, but not conditions (1) and (4).

### **5.2.2 Confidentiality**

All complainants will be asked to supply their names and addresses and, if appropriate, the address giving rise to the complaint. The identity of the complainant will remain confidential. The only circumstance in which this information might be made public would be in the case of a remediation notice being appealed in a court of law where an adverse effect on the complainant’s health was an important reason for the original contaminated land designation.

### **5.2.3 Voluntary provision of information**

If a person or organisation provides information relating to contaminated land that is not directly affecting their own health, the health of their families or their property, this will not be treated as a complaint. The information will be recorded and may be acted upon. There will, however, be no obligation for the Council to keep the person or organisation informed of progress towards resolution, although it may choose to do so as general good practice.

### **5.2.4 Anonymously supplied information**

The Council does not normally undertake any investigation based on anonymously supplied information, and this general policy will be adopted for contaminated land issues. This policy does not, however, preclude investigation of an anonymous complaint in exceptional circumstances.

### **5.2.5 Anecdotal evidence**

Any anecdotal evidence provided to the Council relating to contaminated land will be noted, but no designation of contaminated land will occur without robust scientific evidence. In all cases, the Principal Scientific Officer will use knowledge and experience to decide what, if any, further investigation is required following a complaint or a provision of information.

## **5.3 Risk Assessment**

All information on substances in, on or under the ground that may cause significant harm or pollution will be evaluated against current government and industry best practice guidelines. The Model Procedures for the Management of Land Contamination CLR 11, set out a national framework for risk assessment and the remediation of land effected by contamination.

### **5.3.1 Risk Assessment for Human Health**

In response to the recommendations made by DEFRA in the “Way Forward” exercise (DEFRA, 22<sup>nd</sup> July 2008) there have been a number of changes to the human health risk assessment guidance. The Environment Agency has just completed an extensive scientific review of existing toxicological and exposure research (CLEA Bulletin August 2008). The outcome of this review has led to the withdrawal of several documents including CLR 7-10, all CLEA bulletins, all Soil Guideline Value (SGV) reports and the software used to generate them, CLEA UK beta version 1.0 ([www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)). Generic Assessment Criteria for 31 contaminants of human health concern published by LQM and CIEH (2007) are also no longer valid.

Prior to withdrawal, SGVs released by the EA using CLEA UK beta version 1.0 acted as trigger values under the planning regime. It was hoped that DEFRA under the recommendations of the “Way Forward” exercise would provide a clearer definition of

Significant Possibility Of Significant Harm (SPOSH) and provide guideline figures as a trigger point for Part 2A. However DEFRA concluded that such a task was too radical and the scientific and legal difficulties were insuperable (DEFRA, 22<sup>nd</sup> July 2008). Further guidance released by DEFRA in 'Guidance on the Legal Definition of Contaminated Land' (July 2008) states "assessors can use the updated SGVs (although none are currently available) as screening thresholds for Part 2A decisions on SPOSH", "where contaminants on a site are at or below the SGV, it is very unlikely that SPOSH would exist". When an SGV is exceeded a detailed quantitative risk assessment is likely to be necessary to further characterise the risk, the LA must then make a judgement considering the result of the risk assessment and the existence and nature of any pollutant linkages. As a guide DEFRA released the following:

- For substances where there is an SGV, the more the SGV is exceeded, the more likely it is that an authority should consider the risks to be SPOSH.
- Generally, the cautious nature of SGVs means that local authorities may conclude that SPOSH is unlikely to exist at concentrations close to SGVs.
- In some cases, land with concentrations of contaminants which marginally exceed an SGV (say, up to a few times the SGV) might give rise to SPOSH if, for example, if the receptor is particularly sensitive; or if further assessment finds that exposure is higher than that estimated in the generic SGV; or if there is little uncertainty in the underlying toxicology and HCV.
- In other cases an SGV may be exceeded by tens of times and there might be no SPOSH (e.g. if further risk assessment found that exposure was much lower than that estimated using generic SGVs).

(DEFRA, July 2008, Guidance on the Legal Definition of Contaminated Land)

As part of the new framework for human health risk assessment the EA has released an updated toxicology guidance (Science Report SC050021/SR2, August 2008) that explains how to collate and review toxicological data and use them to derive Health Criteria Values (HCV). The technical background to Contaminated Land Exposure Assessment (CLEA) is explained in Science Report SC050021/SR3. CLEA 1.04 (handbook; SC050021/SR4) is now the most up to date software model currently available to generate generic or site specific assessment criteria (SSAC) to assess human health risk from long term exposure to contaminants in soil. The EA has stated its intention to release a new suite of SGV using CLEA 1.04, for a number of priority substances identified by members of the SGV Taskforce (CLEA schedule and publications, [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)) however until such values are available regulators are required to generate their own SSAC.

In addition to CLEA 1.04 there are a number of other risk assessment models that could be used to generate SSAC. A thorough understanding of the technical background and limitations of the model should be gained before use, in addition to ensuring the model of choice meets the requirements of the UK statutory guidance. A brief list of alternative models is given below:

- Risc Human 3.1, a deterministic model created as a commercial version of the Dutch Intervention Value Model.
- SNIFFER, developed as a research tool by Scottish and Northern Ireland forum for Environmental Research by LQM.
- RBCA, a deterministic computer version of ASTM paper standards marketed by GSI.
- RISC 4, risk generated software prepared for BP for clean up situations.

This document will be periodically updated to reflect current best practice.



### 5.3.2 Risk assessment for Radioactivity

The 'Radioactive Contaminated Land Exposure Assessment' methodology (RCLEA) is Defra's recommended approach for the first stage of a tiered approach to screening potentially radioactively contaminated land under the extension of the Part 2A regime (DEFRA 01/2006). It applies to long-term radiation exposure situations for humans (the only receptor considered with respect to radioactivity) that may require remedial action to reduce or avert individual doses ('intervention' situations). The use of RCLEA is supported by a Summary Guide which provides an overview of the methodology and its application within the context of Part 2A (CLR13), a Technical Report giving details of the mathematical models and data that are used within RCLEA (CLR14) and a Software Application – enabling the generation of generic or site-specific RCLEA assessments (CLEA 15).

Paragraph A41 of the Statutory Guidance says that (subject to the guidance in the rest of the chapter) the local authority should regard 'harm' as being caused where lasting exposure gives rise to doses that exceed one or more of the following criteria:

- An effective dose of 3 millisieverts per annum;
- An equivalent dose to the lens of the eye of 15 millisieverts per annum; or
- An equivalent dose to the skin of 50 millisieverts per annum.

There are limits to the use of RCLEA, for example, it can not be used on its own to calculate 'significant possibility of harm'. Reference should be made to CLR 13-15 guidance and relevant DEFRA updates to ensure correct application of the model and awareness of its limitations.

### 5.3.3 Risk assessment for Controlled Waters

Advice will be sought from the Environment Agency on risk assessment if controlled waters are the receptor in a particular pollutant linkage. It is anticipated that risk assessments and remediation will be carried out in accordance with Environment Agency guidance as laid down in 'The Remedial Targets Methodology: Hydrological Risk Assessment for Land Contamination' (2006) which supports CLR11.

### 5.3.4 Risk Assessment for Ecological Systems

The Ecological Risk Assessment (ERA) Framework for contaminated soils has been developed by the Environment Agency in collaboration with DEFRA, Natural England, Welsh Assembly Government, the Countryside Council for Wales, local authorities and industry.

It consists of a suite of six documents that set out a three tiered approach aimed to:

- establish whether pollutant linkages between the contamination and the designated ecological receptors are likely to exist;
- gather sufficient information for making decisions regarding whether harm to those receptors is, or could, occur.

If the completion of the Desk Study and Conceptual Site Model indicated a potential pollutant linkage exists the risk assessment process will progress to Tier 1 (EA Science report SC 70009/SR1, 2008). This involves an intrusive site investigation including a site walkover and sampling the soils for chemical analysis (EA Science report SC 70009/SR2a, 2008).

Progression to Tier 2 involves collection of evidence to indicate that significant harm or the possibility of significant harm is occurring or is likely to occur. Evidence is collected by the completion of ecological surveys or biological testing, the site circumstances and receptors potentially at risk dictate which method is most suitable (EA Science report SC 70009/SR2c, 2008 and EA Science report SC 70009/SR2d, 2008).

Tier 3 involves the reviewing and re-analysing of the data collated to assess the strength of the association between the cause and effect. It may be decided that further information is required to inform the decision making process, in such a case the risk assessor would return to Tier 2 (EA Science report SC 70009/SR2e, 2008). Risk management is required if the conclusions made at Tier 3 attributes the observed adverse effects to the presence of soil

contamination. No further action is required if no cause and effect link can be made (assuming sufficient evidence has been collected).

It should be noted that all published guidance describing the ERA framework is non-statutory and is provided only to aid the development of clear and auditable judgments. The guidance points assessors to specialist agencies for further assistance and makes it clear that consultation with a qualified ecological risk assessor may be necessary.

### **5.3.5 Risk Assessment for Property**

For the purpose of Part 2A property means: 'property in the form of: crops including timber; produce grown domestically, or on allotments for consumption; livestock; other owned or domesticated animals or wild animals which are the subjects of shooting or fishing rights' (DEFRA 01/2006).

In the case of agricultural land, the current agricultural use should not be taken to extend beyond the growing or rearing of crops or animals, which are habitually grown or reared on the land.

DEFRA guidance (01/2006) states that an 'animal or crop effect' is occurring when the following situations exist:

- A substantial diminution in yield or other substantial loss in value resulting from death, disease or other physical damage. For domestic pets the disease or physical damage must be categorised as serious.
- A substantial proportion of animals or crops must be dead or not fit for purpose for substantial loss to be considered.
- Food is not fit for purpose when it fails to comply with the Food and Safety Act 1990.
- 20% diminution of yield or loss should be regarded as a benchmark for what constitutes a substantial diminution or loss.

No further guidance is current available for a detailed risk assessment.

### **5.3.6 Risk Assessment for Buildings**

Property in the form of buildings for the purpose of Part 2A means "any structure or erection, and any part of the building including any part below ground level" (DEFRA 01/2006). Harm to buildings (building effects) can arise from the following:

- migration and accumulation of combustible gas e.g. landfill gas (although site specific consideration needs to be given as to whether or not this could constitute a human health effect);
- subterranean fires (e.g. spontaneous combustion of underlying colliery spoil leading to creation of underground voids and subsidence);
- expansive slags (leading to ground heave); and
- chemical attack (the performance of building materials used in contaminated ground may be adversely affected by a wide variety of aggressive chemicals, including alkalis, acids organic solvents and inorganic salts such as sulphates and chlorides). (P5 035/TR01 EA 2000)
- In the case of a scheduled monument, substantial damage should 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 (DEFRA 01/2006).

Whilst research and guidance has been developed over the past few years there is, to date, little in the way of Part 2A specific guidance on how to go about determining building effects. The CIRIA report C665 (2007) provides up-to-date advice on assessing risks posed by hazardous ground gases to buildings. The report was aimed at new buildings, however it is relevant to existing buildings and structures that may have been built on potentially hazardous gas sites. The report can be used to guide the collection of valid data from site investigations

and monitoring programmes for use in risk assessment following the guidance given in CLR 11. Additional information provided by EA in Technical Report P331 (2000) provides information to develop a risk assessment framework for a particular site.

## **5.4 Interaction with other regulatory regimes**

There are other regulatory actions that can be taken to deal with contamination on land. Overlaps with Planning, Water Pollution, Environmental Permitting Regulations, Waste on Land and Radioactivity Legislation are considered the most important and are addressed here. Any issues of land contamination that may previously have been dealt with under the statutory nuisance regime will now be dealt with through Part 2A processes.

### **5.4.1 Planning**

The vast majority of contaminated land issues are currently addressed through the planning regime, where contamination is a material consideration. The Planning Policy Statement 23 outlines the developer's responsibility for ensuring that any development is safe and suitable for the purpose for which it is intended. Therefore the developer must carry out an adequate investigation to determine:

- whether land in question is already affected by contamination;
- whether the proposed development will create new linkages; and
- what action is needed to break those linkages and avoid new ones being created.

The minimum requirement from a developer where contamination is suspected is a desk study and site walk over. If this is not sufficient to assess the risks further investigation will be needed before the application is determined. As a precaution PPS23 recommends that 'contamination should be assumed when considering applications for all land on or next to a previous industrial use'. Where remediation is required it is the developer's responsibility to complete the necessary work to satisfy the planning conditions. Enforcement is via the planning conditions and building control (Building Regulations C (2000). Site preparation and resistance to contaminants and moisture) and not Part 2A. PPS 23 clearly establishes the boundaries between new developments and Part 2A. Therefore where these guidelines are followed land on a new development should not be capable of being determined as contaminated land under Part 2A. While the introduction of Part 2A will undoubtedly lead to the problems of additional sites being addressed, it is anticipated that redevelopment of brownfield sites, and the associated planning controls, will remain the primary mechanism for dealing with contaminated land.

The full procedure has already been described in Chapter 1 – Present Planning Policy.

The CCC Environmental Protection team currently works closely with Development Control and Building Control on all issues relating to pollution and the current arrangements for inter-departmental consultation are believed to be sufficiently robust to encompass contaminated land issues.

### **5.4.2 Water Pollution**

The Water Resources Act 1991 (updated to provide a clear definition of groundwater in Water Resources Act 2003, CLAN 5/04) and Groundwater Regulations 1998 gives the Environment Agency powers to take action to prevent or remedy the pollution of controlled waters. While Part 2A legislation does not revoke these powers, DEFRA have indicated that such problems should now be dealt with under the new contaminated land regime. The following steps will be taken:- The Council will consult with the Environment Agency before determining any contaminated land as a result of risk to controlled waters and will take into account any comments made with respect to remediation. If the Agency identifies a risk to controlled waters from contaminated land, the Council will be notified to enable determination of the land and remedial action will be taken under Part 2A. In case where there is a historic pollution of groundwater and pollutants are entirely contained within a body of groundwater or the source can not be identified, Part 2A does not apply because the Water Resources Act enables the Environment Agency to act. Part 2A cannot be used to impede or prevent discharge into controlled waters for which a discharge consent has been issued.

Currently Groundwater Regulations 1998 do not apply to discharges composing or containing radioactive matter as this is currently controlled under the Radioactive Substances Act 1993. The Water Resources Act 2003 includes a provision, not yet commenced, to amend the current Part 2A definition of pollution of controlled waters to introduce a “significance” test for radioactive and non-radioactive substances (DEFRA 01/2006). Under current Part 2A guidance groundwater is only considered as a pathway and not a receptor with respect to radioactivity. This is expected to change when the significance test is available. This strategy document will be updated to reflect current guidance.

### **5.4.3 Environmental Permitting Regulations**

From April 6<sup>th</sup> 2008 the Pollution Prevention and Control Regulations 2000 and Waste Management Licensing regime were replaced by the Environmental Permitting (England and Wales) Regulations (EP Regulation 2008). The new regulations, as their predecessor, are made under the Pollution Prevention Control Act 1999. The new legislation provides a common platform for pollution and waste licensing (DEFRA: Environmental Permitting General Guidance Manual on Policy and Procedures for A2 and B Installations, July 2008). As with the previous regime Part A2 (LA-IPPC) and B (LAPPC) installations are regulated by the Local Authority and for Part A1 installations the Environment Agency is the enforcing authority. In the case where a site holding an Environmental Permit meets the definition of contaminated land under Part 2A the Local Authority needs to consider (along with any information provided by the Environment Agency with respect to such licences) whether all of the significant harm or pollution of controlled waters is due to:

- a breach of the conditions of the site licence;
- activities authorised by, and carried on in accordance with conditions of, the site licence; or
- the final disposal of controlled waste by the deposit in or on land.

If all of the significant harm or pollution of controlled waters falls into any of these categories, the land can not be identified as contaminated land under Part 2A (DEFRA 01/2006). The Environment Agency is the regulation authority acting under Part 2 of the Environmental Protection Act 1990 and the Pollution Prevention and Control Regulations 2000, now replaced by the Environmental Permitting Regulations 2008. Environmental Permitting Regulations may also be expanded to include radioactivity currently regulated by the Radioactive Substances Act 1993 by the Environment Agency (Issue 1, December 2006 Radioactive Substance Regulation. A strategy for 2006-2011). This document will be updated to reflect current guidance.

### **5.4.4 Waste on land**

Section 59 of the Environmental Protection Act 1990 applies where controlled waste has been deposited:

- without a waste management licence being in force authorising the deposit (except where regulations provide an exemption from licensing); or
- in a manner which is not in accordance with a waste licence.

The enforcing authority, Environment Agency or Local Authority (in consultation with the EA), may remove, require the removal or reduce the consequences of the waste deposit. The land can not be considered contaminated land under Part 2A where enforcement of section 59 EPA 1990 applies.

### **5.4.5 Radioactive Regimes**

Radioactive Substances Act 1993 (RAS 1993) outlines the regime for storing, using, and disposing of radioactive materials. The EA is responsible for the day-to-day authorisation and regulation of radioactive waste discharges and disposals to air, water (surface and ground) and land. Exemption from this includes some clocks and watches, illuminates, indicators and smoke detectors. It is the responsibility of the Environment Agency to monitor and enforce compliance with the licence conditions. Any breach of licence does not fall under the responsibilities of Part 2A.

The Ionising Radiation Regulations 1999 (IRR) control the exposure of radioactivity to workers and the general public from radioactive materials and radiation generators in work activities. The responsibilities of the IRR could overlap with Part 2A during the remediation of land contaminated by ionising radiation.

The extension of Part 2A to include land contaminated by nuclear occurrence only applies to “off-site” radioactive contamination from licensed nuclear sites, and certain other situations. The Nuclear Installations Act 1965 applies to radioactive contamination arising from “on site” nuclear installations including defence docklands and atomic weapons operated by contractors (CLAN 1/07).

## **5.5 Part 2A specific procedures**

Once land has been determined as contaminated enforcing authorities have four main tasks:

- to establish who should bear responsibility for the remediation of the land (the ‘appropriate person’);
- to decide after consultation, what remediation is required, ensure remediation takes place, or serve a remediation notice on the appropriate person, in certain circumstances undertake the work themselves;
- where a remediation notice is served, or the authority itself carries out the work, to determine who should bear the cost liability; and
- to record information about regulatory actions on a public register.

### **5.5.1 Determining an area of contaminated land**

There are six possible grounds for land to be determined as contaminated land under Part 2A, these are briefly listed below:

- significant harm is being caused; or
- there is significant possibility of significant harm; or
- pollution of controlled waters is being caused; or
- pollution of controlled waters is likely to be caused; or
- harm attributable to radioactivity is being caused; or
- there is significant possibility of harm attributable to radioactivity being caused. (For full details see appropriate section 78A(2) and section 78A(2) (modified) of the Environment Act 1990).

The current Part 2A definition applies to pollution of controlled waters under Section 78A(2)(b) but will be amended to apply to “significant pollution” of controlled waters commencing section 86 of the Water Act 2003.

Once a specific piece of land has been determined as contaminated land within the statutory definition the owner and/or occupier (‘appropriate person’) will be informed with a detailed summary of the reason for the determination. The summary determination will include a reference map or plan of an appropriate scale highlighting the area of contaminated land and the following:

- a description of the particular significant pollutant linkage, identifying all three components of pollutant, pathway and receptor;
- a summary of the evidence upon which the determination is based;
- a summary of relevant assessment of this evidence; and
- a summary of the way in which the authority considers that the requirements of the guidance have been satisfied.

There will then follow a period of three months from the date of the determination notification for negotiations between the ‘appropriate person’ and authority to find a mutual solution to the problem. Should these negotiations fail a remediation notice will be served to the ‘appropriate person.’

### **5.5.2 Serving a remediation notice**

The aim of remediation action required under Part 2A is to ensure the land is suitable for use and no longer able to be identified as contaminated land. If satisfactory action has not, is not, or will not be taken within the stated time a remediation notice will be issued. The remediation notice will be sent to the 'appropriate person' detailing the remediation action required. The owner/occupier of neighbouring properties and/or the complainant will also be informed the notice has been served. Any person served with a remediation notice has twenty-one days to appeal to the Secretary of State. If an appeal is made the remediation notice time period is suspended until the final decision is made or the appeal is abandoned. Part 2A makes it an offence for any person to fail to comply with a remediation notice. Any person convicted of non-compliance is liable to a fine (Section 78M(3)). Should an urgent designation of contaminated land be required, these steps will be observed as far as practicable although some deviation from the timescales specified is to be expected.

### **5.5.3 Powers of Entry**

Under Section 108(6) of the Environment Act, the Council has been granted powers of entry to carry out investigation. At least seven days notice will be given of proposed entry onto any premises, unless there is an immediate risk to human health or the environment.

### **5.5.4 Enforcement action**

The Council is in the process of adopting a cross-departmental enforcement concordat to ensure consistent, fair, and transparent practices are used when taking enforcement action. Contaminated land investigations will be carried out in accordance with this Council-wide policy.

### **5.5.5 Public Registers**

The Council has a duty to maintain a Register including details of all remediation notices served (with exclusions on the grounds of national security and commercial sensitivity (Section 78S 1-4)). After four years following the determination, information about a commercial site is no longer deemed sensitive and will be placed on the Register (Section 78T(8-9)).

## 6 Liaison And Communication

Much of the work proposed in this strategy will be collaborative and requires effective liaison with other bodies.

### 6.1 Consultees

#### 6.1.1 Statutory consultees

Contacts have already been established for officers of all statutory consultees. (Details are listed in Appendix G). Statutory consultees for the Contaminated Land Inspection Strategy are:

Consultee	Contact
Environment Agency	Richard Bowen
Natural England	Janet Nuttall
English Heritage	Jade Spencer
Department for Environment Food and Rural Affairs	Andrew Holden
Cambridgeshire County Council	David Nuttycombe
Food Standards Agency	Alan Dowding
Health Protection Agency	Dr Kate King

Each organisation was invited to comment on the consultation draft of the strategy.

### 6.2 Communicating with owners, occupiers and other interested parties

The City Council's approach to its regulatory duties is to seek voluntary action before taking enforcement action. This approach will be adopted for issues of land contamination, recognising that in many cases as much or more effective remediation can be achieved by agreement than by enforcement. The Statutory process provides an incentive to undertake voluntary action, in that any materials that require disposal as a result of voluntary remediation will be exempt from landfill taxes, until 1<sup>st</sup> April 2012 when this exemption will be phased out (Green Budget 20<sup>th</sup> March 2008). This exemption does not apply to the polluter or materials generated as a result of a remediation notice having been served. The Principal Scientific Officer will be the central contact point within the authority on contaminated land issues and as such will work to keep owners, occupiers and other interested parties informed at each stage of an investigation, regardless of whether there is a formal designation of contaminated land.

#### 6.2.1 Risk communication

The complex nature of contaminated land issues do not lend themselves to easy explanation to the layperson. Developing effective methods of risk communication is therefore essential.

When reporting to members of the public the following good practice should be followed:

- be prepared;
- be reassuring and take time to explain any areas of confusion;
- be sympathetic and truthful;
- know your audience and arrange linguistic aids if necessary;
- keeping meetings short; and
- follow up concerns.

The unfamiliarity of the topic and lack of control over the process means the member of the public may be very concerned and anxious. The Council will endeavour to communicate the

necessary science at an appropriate level of understanding for the member of the public. The Council will aim to observe the following when communicating key science concepts:

- ensure conversation is two way;
- be consistent with use of terms and units;
- use visual aids where possible;
- use analogies where possible;
- avoid the use of acronyms and chemical formulae; and
- point the member of public to alternative accredited sources of information.

These regulations grant only limited powers to local authorities to deal with materials present in, on or under the ground. Many members of the public believe that any material that is not naturally present in the ground should be removed, especially if it is in the vicinity of their own home. It will be critical to explain this can only be done where this is a risk of significant harm, and it is to be expected that some members of the public will have difficulty accepting this.

It is important to appreciate that the expectations of some members of the public will not be met by the powers local authorities may exercise under contaminated land legislation.

### 6.3 The Public Register

Under the regulations (Section 78R(1)), the Council is required to maintain a Public Contaminated Land Register. The Register will be held by the Environmental Services Council's office at Mandela House. It will be paper-based (rather than electronic) and be accessible on request by members of the public during office hours, Monday to Friday. The regulations clearly specify the information that can be recorded on this Register. This Register will therefore include:

- remediation notices;
- details of site reports obtained by the authority relating to remediation notices;
- any reference to information held in the Environmental Information Register 2004;
- details of the type of remediation required;
- remediation declarations;
- remediation statements;
- notifications of claimed remediation. Section 78R(3) states that the inclusion of such a claim does not translate to an endorsement or confirmation by the authority;
- designation of sites as "special sites";
- Agency site-specific guidance;
- any appeals lodged against remediation;
- any appeals against a charging notice; and
- any charging notice convictions made under Section 78M.

Restrictions apply to some sites on the basis of national security and commercial confidentiality under Section 78S and 78T.

Additional information also held in the Public Register includes:

- details of when land determined as contaminated is dealt with via other regulatory regimes;
- details of when no remediation notice can be served due to a permitted discharge into controlled water (Section 78YB(4)).

The Public Register will **not** include details of historic land use and other records used in the investigation of potentially contaminated land which are subject to the copyright held by external companies (e.g. Landmark information group). These are research documents and as such will not be made available to the public.

### 6.4 Provision of information to the Environment Agency

The Environment Agency is required (Section 78U) to prepare an Annual Report for the Secretary of State on the state of contaminated land in England and Wales.

This report will include:



- a summary of local authority inspection strategies, including progress against the strategy and its effectiveness;
- the amount of contaminated land and the nature of the contamination; and
- measures taken to remediate land.

As local authorities are the lead regulators on contaminated land, with the EA regulating only some categories of sites, the national survey will clearly be reliant on information provided by local authorities.

A memorandum of understanding has been drawn up between the Environment Agency and the Local Government Association that describes how information will be exchanged between the local authority and the Environment Agency. The Council will therefore provide information to the Environment Agency following the guidelines agreed through this national forum.

The local authority must also provide information to the Environment Agency whenever a site is determined as contaminated land, and whenever a remediation notice, statement or declaration is issued or agreed. The Environment Agency has provided standard forms allowing this information to be provided in a consistent format and the Council will adopt these to fulfil its reporting requirements.

## 7 Review Mechanisms

This strategy outlines the general approach to be taken in inspecting land in the District for contamination. This section will describe instances when inspections will occur outside this general inspection framework, circumstances under which previous inspection decisions should be reviewed and measures to be taken to ensure the strategy remains effective and up-to-date.

### 7.1 Triggers for undertaking inspection

The strategy has already recognised there may be occasions where inspections may have to be carried out outside of the general inspection framework.

Triggers for undertaking non-routine inspection will include:

- **Unplanned events** e.g. if an incident such as a spill has occurred as long as this is was not covered by any other regime.
- **Introduction of new receptors** e.g. if housing is to be built on a potentially contaminated site, designation of a new protected ecosystem, persistent trespass onto a site by young people.
- **Supporting voluntary remediation** e.g. a potentially liable party wishing to undertake clean-up before their land has been inspected by the local authority.
- **Identification of localised health effects** e.g. which appear to relate to a particular area of land.
- **Responding to information** from other statutory bodies, owners, occupiers, or other interested parties. While these occurrences may trigger non-routine inspections, if this strategy is to prove effective, they must not be allowed to significantly interfere with the milestones laid down in the general inspection framework. It will be important to consider this issue in all strategy reviews.

### 7.2 Triggers for reviewing inspection decisions

In addition there may be occasions where the findings of previous inspection decisions should be reviewed. This might occur, for example, if there were:

- significant changes in legislation;
- establishment of significant case law or other precedent; or
- revision of guideline values for exposure assessment.

It is important therefore that all decisions are made and recorded in a consistent manner that will allow efficient review.

### 7.3 Reviewing the strategy

It is important that the document reflects current guidelines to ensure the Council can fulfil its statutory duty. The Council will update the strategy as and when new guidance is released. In addition to these guidance related updates the strategy will be periodically formally reviewed following the standard procedure.

## 8 Appendix B: Communication Strategy

Step by step guide for Communicating with residents during the site investigation process: to be added to Appendix of Contaminated Land Strategy document.

*IDEA: Before you start the process of making contact with the public on a potential contamination issue, would it be a good idea to have a leaflet ready summarising the progressive risk assessment stages to be handed out at an appropriate time? May be this could be divided into risk assessment and risk management to avoid people getting too stressed early on!*

1. **Select a site:** from the risk ranked prioritisation list created in line with statutory guidelines.
  - a) Go to I drive/contaminated land/risk-ranked sites non-Council owned, to identify the next highest risk ranked site to be investigated.
  - b) Familiarise yourself with the site. Places to go for information: Site profile which contains: summary of site, breakdown of CLARA risk scoring, historic maps identifying main potential past contaminative uses, plan summary, CSM, identified SPL. As you progress down the list not all this information will be available. In this case you will need to gather it yourself.
  - c) Once you have formed as full a picture as you can from your desk, you will need to get on site to complete a site walk over.
  
2. **Before going on site.** Prepare to send a letter to the owner/occupier of the site to indicate the need for access allowing at least 7 days notice prior to intended visit.
  - a) You need to be very clear of the site boundary, and identify all property addresses within the site area.
  - b) Also need to identify who owns the site bearing in mind this may be several people. Do your research to find out who is the 'appropriate person' to bear the cost and responsibility for remediation should this be necessary.
  - c) Also be aware of DEFRA Capital Grants funding procedure. Have the application form to hand and complete relevant sections, as you are able through out the investigation process. This will enhance your chances of a successful bid and help avoid delays later on in the process should this financial avenue be necessary.
  - d) **Prepare for communication.** Need to consider all areas of communication and anticipate potential problems before they arise. This may involve: setting up a contact person to answer queries (ensuring all colleagues aware of the situation and consistent information is given), arranging residents meetings or small one to one sessions as appropriate.
  - e) Think carefully about what to communicate: don't try to hide what you are doing as this causes uncertainty, mistrust and fear and will make future communication difficult. Be clear yourself why you are going on site and what you expect to find.
  - f) It may also be useful to have a press release ready in case the story leaks. This should be discussed with colleagues and carefully prepared to avoid scaremongering. Avoid the use of emotive words such as: Toxic, Carcinogenic, Airborne, Cyanide and arsenic.
  - g) If a large number of residents are likely to be affected by the site it may be worth considering setting up a website forum page. This can be a fast method of two-way communication, for posting real-time progress reports and answering resident queries. It is good to set this infrastructure up early to ensure it is in place (and working effectively) for when it is really needed. To discuss this as an option contact the City Councils Web Development Team.

Methods to protect security of information exchanged will need to be discussed.

- h) Make contact with Cambridgeshire Primary Health Care Trust (PCT) and Health Protection Agency (HPA) for health related advice and guidance. Make them aware of the site features and potential contamination risk chemicals.

**3. Communication by letter and follow up.**

- a) See example letter 1.
- b) Prepare a frequently asked questions sheet. This could be included with the letter to address popular predicted concerns.
- c) Follow up letter with phone call, opportunity for residential meetings to discuss concerns, make health screening available if necessary following advice from Cambridgeshire PCT and HPA.
- d) Ensure owners/occupiers are aware that the Council is there to investigate and resolve the issue, while keeping residents fully informed and involved at every stage. Emphasise upon them that it is in no-one's interest to create media style 'panic'.

**4. Prepare for going on site.** Conduct the site walkover to complete the Desk Study information gathering.

- a) To prepare for the site walkover read through Site Investigation Protocol and Site Investigation Checklist. This will outline the equipment you will need to take and remind you of features to look out for when on site.
- b) Ensure you have completed all the necessary preparatory activities, including calibration of equipment before going on site.
- c) Think about your appearance on site; avoid the 'white lab coat' appearance and exposing any visible toxic symbols.
- d) It is also a good idea to ensure you have a copy of the original letter sent to residents and their reply agreeing to access, in case of any problems.
- e) Also ensure you have your Cambridge City Council identity tag on you and a mobile phone.
- f) **On site:** Be professional and consistent with the risk communication protocol.
- g) Be careful about discussing timelines with people. The Part 2A process always takes longer than expected. Be prepared for residents to question you and remember nothing is 'off the record'.

**5. Site walkover analysis.** Progression to Site Investigation if deemed necessary.

- a) Progression to a Site Investigation occurs when the Desk Study and site walkover indicate the site still has the potential to pose an unacceptable risk to human health, and further quantitative information is needed.
- b) Contact other regulators including the Environment Agency (EA) and Health and Safety Executive (HSE) for information about past work practices on site. The EA will hold information on waste management practices. The HSE will hold records of any dangerous work practices operated on site.
- c) Feed back results of findings so far to Cambridgeshire PCT and HPA.
- d) Take time to analyse the site walkover information and compare it with information collected during the desk study to pin point areas for sampling. Try to choose locations that will cause the least amount of disruption to residents, whilst maintaining maximum sampling value.
- e) Propose a targeted, justifiable and valid sampling strategy. Discuss your plan with a colleague for a second opinion.
- f) **Prepare for communication.** Once again you now need to carefully consider the owners and occupiers of the land you need to access. What is the best way to communicate your intentions? Is a letter or a face-to-face meeting more appropriate? How well is the relationship going so far? Most

- importantly how did you say you would next communicate? Do you have any soil analysis results collected at the site walkover phase to discuss as well?
- g) **Communication by letter.** See example letter 2. The addition of a frequently asked questions sheet may be useful. Addition of an Executive Summary of any previous analysis of samples from the site walkover could also be included here? However, be cautious about including actual laboratory results in letters, this could encourage comparison between neighbours and could potentially divide residents. Access to raw data may be better disseminated to householders individually via verbal communication.
  - h) Remember once again you must give the owners/occupiers at least 7 days written notice before you wish to access their property. See Letter 3. The Do's and Don'ts List may be included with letter.
  - i) Be prepared that some owners/occupiers may not be so keen to open their doors to you and may refuse access. This can cause delays, especially if you have to seek legal advice before proceeding.
  - j) **Prepare for Site Investigation.** Before going on site re-read Site Investigation Protocol. Are there any questions on the Site Investigation Check List that you were unable to answer during the site walkover that could be completed this time?
  - k) **Site Investigation.** When on site it is prudent to take extra samples, just in case, to avoid unnecessary disruption and delays. Remember be aware what sample conditions and containers are required for which chemicals. Contact the analytical laboratory prior to sample collection to check specifications for collection and storage. Also check the budget for site investigation sampling.

#### 6. Review Site Investigation data.

- a) Compare results to SPOSH guidelines. Draw conclusions and establish what further action is needed.
- b) **Prepare for communication.** Reproduce data in visual format for communication to residents. Produce diagrams that simplify the data but make clear the key findings from the results. However, be prepared to justify your interpretation to assure residents you have not 'modified' the results.
- c) Prepare an executive summary of the findings to be circulated or presented to residents.
- d) Consider your communication options: are only a small number of residents affected? If so would one-to-one sessions be appropriate or do you need to hold a more formal presentation to inform a larger group of residents. The choice of communication may be affected by the Site Investigation outcome. Positive results could probably be communicated to a larger resident group. However, less favourable news may be best communicated to small groups at a time to reduce distressed people feeding of each other a fuelling an already sensitive situation. Once again your communication decision should be based on the unique situation encountered and your judgement as the best way forward to achieve a favourable result, with the minimum amount of distress caused to all concerned.
- e) When offering to present results to residents make sure a number of dates and times are offered to allow everyone a chance to attend. Think carefully about the location of the meeting, it must be easy to reach by residents on foot or public transport. Keep presentations relatively short, free from technical jargon and allow enough time at the end for questions.
- f) Also be aware of the diversity of needs in the resident pool, do you need to offer specific assistance i.e. wheel car access, hearing loop, translator, Braille pack?
- g) When presenting data that identifies the need for remediation to residents you must be prepared at this stage to explain what this will involve. You need to be very clear yourself how these next stages will proceed, in order to

be viewed by the public as in 'control' of the situation, and worthy of their trust.

**7. Explaining remediation options.**

- a) Residents will want to feel involved with what is going to happen to their property, more anguish and concern will be caused if they feel things are out of their control and are being done 'to them'. Therefore it is very important that residents are consulted and given options for the next stage. Although all options presented will still need to be viable.
- b) **Preparing for communication.** Be prepared for questions related to compensation for damage or to reinstate garden features disrupted during remediation. Know the legal stance outlined by DEFRA.
- c) It may be a good idea to have a summary leaflet outlining the compensation situation to avoid repeated questions. It will also allow residents to process the information in their own time.
- d) Before a decision is made it may be a good idea to arrange to bring in remediation experts/ consultants to explain each process in more detail. This will also help residents feel fully informed.
- e) The final decision making process between residents will be different. It may be some residents decide not to proceed with remediation. You will need to resolve this issue since the Council is liable if no action is taken on land identified as 'contaminated' under Part 2A.
- f) Others may disagree on the best next step. You will need to find a mutually agreeable solution whilst still acknowledging each person has a valid opinion.

## Example Letter 1

Dear Resident

This letter is from the Cambridge City Council's Environmental Protection Department who are responsible for fulfilling the Council's obligations under Part 2A of the Environmental Protection Act 1990. This involves the investigation into areas of land that may have undesirable levels of chemicals present causing soil contamination.

### **What does this mean?**

The Council has reviewed its records and identified that in/between 19\_\_ and 19\_\_ the area around/on your property was formerly a \_\_\_\_\_. This may mean the soil around this area may have undesirable levels of \_\_\_\_\_. *Try to put chemical in context i.e., give examples of where routinely encountered to reduce resident's stress. For example benzo(a)pyrene is a common compound found in ashes.*

### **What do the Council want to do?**

The Council would like a Scientific Officer to carry out an initial visual inspection of the land surrounding your property. This means they would need access to your garden. It may also mean a small sample of soil is taken for testing.

### **What will happen next?**

The Scientific Officer will send any soil samples taken to an independent laboratory for chemical testing. This process is expected to take \_\_\_\_ weeks.

Residents will be kept informed of progress and will be contacted again to discuss the outcome of the testing. All soil analysis results will be made available to property owners/occupiers.

### **What further action may be required?**

The results of the chemical analysis may indicate further soil analysis is needed to confirm where and how much of the chemical is present. The Council will write to the owners/occupiers of the properties affected in advance to seek permission for further sampling.

### **What should I do now?**

If you are happy to allow the Scientific Officer to visit your property please write to the Environmental Protection Department using the enclosed SAE. Alternatively you can log on to the Cambridge City web site at [www.cambridge.gov.uk](http://www.cambridge.gov.uk) and following the links to the \_\_\_\_\_page. Here you will be able to automatically accept the Scientific Officers visit.

If you would like further information you can either send a query via the website (at the above address) or call Mr Jo Dicks 01223 457892 between 9am and 5pm Monday to Friday.

Yours faithfully,

Environmental Protection

## Example Letter 2

Dear Resident

### Results of soils samples taken from \_\_\_\_\_ Road.

This letter is from Cambridge City Councils Environmental Protection Department regarding the soil analysis carried out on samples taken from properties on \_\_\_\_\_ Road.

#### What was done?

A small sample of surface soil was taken from some properties on \_\_\_\_\_ Road and sent to an independent Laboratory for analysis.

#### What was found?

The results indicate that there is evidence of soil contamination on some properties at \_\_\_\_\_ Road. Chemicals found in the soil are likely to have come from the \_\_\_\_\_ industry known to have been located in the area.

Your property was among a selection shown to have recorded levels of \_\_\_\_\_ above the recommended assessment level.

#### What does this mean?

A more detailed investigation of the area affected is required to confirm where and how much contamination is present. This will involve taking shallow samples of soil from a number of gardens and open spaces in the \_\_\_\_\_ Road area. The Council will try to ensure these investigations cause a minimum amount of disruption, and will write to those properties affected in advance to seek permission for the sampling.

*Who is responsible? Who will pay? How should this be communicated?*

#### Health Information

The Cambridge City Council Environmental Protection Department is working closely with other health agencies to ensure that appropriate advice and measures are put in place to protect resident's health.

The chemicals identified so far are not considered to present any **immediate** risk to health. The Council is concerned that continued exposure through repeated contact with the soil, **could** have an effect on resident's health in the **long term**.

Therefore as a precaution, until further investigation has been undertaken the Council and Cambridgeshire Primary Care Trust advises that people should follow a number of normal good hygiene practices when enjoying their garden. These are detailed in the attached Do's and Don'ts' list.

*Is access to health screening necessary?*

The results of the proposed detailed investigations will be carefully considered to decide whether any further actions should be carried out to safeguard against these **possible** long-term effects.

Should you have any particular concerns regarding your health then these should be discussed with your GP in the usual way.



**What will happen next?**

A Scientific Officer from the Council will phone you shortly to discuss the next steps in the investigation process. This will also give you a chance to raise any questions or concerns you might have.

In addition the Council will be inviting residents to attend small meetings/ drop in sessions to be held at \_\_\_\_\_ next week.

- List times *or offer*
- All day information event from 8am –6pm

The Council is committed to ensuring residents are fully informed throughout the detailed investigation process. Residents can view up-to-date progress information at [www.cambridge.gov.uk](http://www.cambridge.gov.uk). Should you wish to discuss things further you can contact the Principal Scientific Officer, Mr Jo Dicks on 01223 457892 between 9am and 5pm Monday to Friday or alternatively post a query at anytime via the web address above.

**Options: Do's and Don'ts List could be included at this stage**

## Example Letter 3

Dear Resident

### **Request for permission to collect further soil samples.**

As you are aware the Environmental Protection Department at Cambridge City Council are investigating the levels of specific chemicals in the soil at \_\_\_\_\_ Road.

### **Progress so far**

The initial samples taken from your property on \_\_\_\_\_ have been analysed by an independent laboratory and the results show elevated levels of \_\_\_\_\_. Because only a small number of samples were analysed further sampling is needed. This aims to more clearly establish where and how much of the chemical contamination is present.

### **What will happen next?**

The Council would like a Scientific Officer to return to your property to collect further samples of soil. In order to gain a more detail of the contamination distribution, samples will need to be taken from a variety of depths. This will mean using manual equipment such as a spade or hand held auger to dig trial pits.

### **Where will the digging take place?**

The soil samples need to be taken from specific locations your garden. These have been carefully chosen using historic maps to identify locations most likely to be contaminated from the \_\_\_\_\_ industry, known to have been located on/near your property.

A map of the proposed soil sampling locations has been included with this letter for your information.

### **When will the digging take place?**

The Scientific Officer would like to access your property at \_\_\_\_\_ on \_\_\_\_\_. The proposed soil sampling collection process is likely to take \_\_\_\_\_ hours. The Council will try to ensure these investigations cause a minimum amount of disruption.

If you are happy with the date and time proposed for the visit, please confirm this is writing with the Environmental Protection Department at the above address using the enclosed SAE. Alternatively you can send an online confirmation via the Council website at [www.cambridge.gov.uk](http://www.cambridge.gov.uk) / \_\_\_\_\_. If you would like arrange an alternative time or date please send a message via the website or phone Mr Jo Dicks on 01223 457892.

### **Health Information**

The Cambridge City Council Environmental Protection Department is working closely with Cambridgeshire Primary Health Care Trust (PCT) in consultation with the Health Protection Agency.

The chemicals identified so far are not considered to present any immediate risk to health. The Council is concerned that continued exposure through repeated contact with the soil, **could** have an effect on resident's health in the **long term**.

As a precaution, until this further assessment has been undertaken the Council and Cambridgeshire PCT advises that people should follow a number of good hygiene practices, as detailed in the attached Do's and Don'ts' sheet.

However, for those who may be concerned about the impact of \_\_\_\_\_ on their health, Cambridge City Council has made arrangements with Cambridgeshire PCT for free health screening at the \_\_\_\_\_ clinic. Any residents who wish to take advantage of this facility can phone the clinic on 01223 \_\_\_\_\_ to make an appointment quoting reference\_\_\_\_\_.

**Where can I find out more?**

If you would like to discuss any aspect of the proposed soil sampling strategy please contact the Principal Scientific Officer, Mr Jo Dicks on 01223 457892 between 9am and 5pm Monday to Friday.

Alternatively you can e-mail [jo.dicks@cambridge.gov.uk](mailto:jo.dicks@cambridge.gov.uk).

Yours faithfully

Environmental Protection

*Once again other information may be include : Do's and Don't list/ FAQ/what to do to prepare for samples being taken...clear away toys/ make sure washing is not on line etc.*

## Example Only

### Do's and don't for residents

Cambridge City Council and Cambridgeshire Primary Health Care Trust are committed to dealing with the identified contaminated land issues affecting parts of \_\_\_\_\_ Road.

Until investigations are complete, we would ask that residents bear in mind the following advice:

#### DO

- Enjoy your garden
- Sit out in your garden but try to avoid letting children and pets play on exposed soil
- Try and cut down on the amount of soil and dust brought into the house from the garden
- Remove dirty footwear after gardening and leave outside or rinse clean with water before bringing inside
- Wash hands thoroughly after working or playing in the garden and before handling food
- Wear protective gloves when gardening such as turning soil to remove weeds, trimming the lawn and tidying the garden where necessary
- Rinse any tools used with water before placing in a shed or bringing into the house
- Talk to Cambridge City Council before having any building work done

#### DON'T

- Eat any home grown foodstuffs such as vegetables and fruit without having first washed it or peeled it as necessary. An exception would be foodstuffs grown in containers using clean compost
- Plant deep rooted shrubs or trees in your garden
- Let children play with the soil or put it in their mouths
- Dig holes for building works

*List prepared with reference to an example found from Gloucester City Council that was sent to residents during a part 2A investigation.*

#### Resources used to complete document

- Communicating understanding of Contaminated Land Risks. SNIFFER, 2001. Updated document expected 2009.
- Communication on contaminated land. NICOLE, 1999.
- Marcus Bell, Scientific Officer, 2009, East Cambridgeshire District Council.

## 9 Appendix C: Preliminary Investigation

(Adapted from British Standards Institute Code of practice on Site Investigation.)

### Desk study

The desk study should collect the following information where appropriate:

- a) The history of the site and adjoining areas, including details of its past and present uses, particularly the nature of any industrial processes or other activities that may have been potentially contaminative;
- b) Consideration of any previous desk study or site investigation where available;
- c) The geological, hydrogeological, hydrological and ecological setting of the site;
- d) Present and future potential receptors of ground contamination (e.g. current and intended users, trespassers, surface waters, ground waters, nearby water abstractions, groundwater vulnerability);
- e) The presence of waste disposal sites and other potential sources of contamination on land adjacent to the site and in the local area;
- f) Constraints to subsequent intrusive investigation of the site where practicable (access and height limitations, underground services and obstructions, noise, working hours, etc.).

The desk study should comprise a combination of documentary research and consultations. The level of historical research undertaken should be compatible with the objectives of the investigation, but should usually include all of the principal sources of information.

### Documentary research: site history

Site location and historical setting

The site history and location should be determined using the following sources or any other appropriate sources of information that are applicable:

- Ordnance Survey maps;
- other published maps, e.g. insurance, tithe, enclosure or parish maps;
- aerial photographs;
- documentary records held by the current (and former) owners of the land, trade directories, the local authority and local libraries.

Depending on the type of former use additional information may be held by DEFRA, the MOD, Health and Safety Executive, utility companies and others.

The types of information held by different parties is described in detail in the Department of the Environment's *Contaminated Land Research Report No. 3 CLR 3*.

Knowledge of the past and current usage of the site, and of its immediate environs, together with information on any incidents (such as spills or detected leakages) should be collated and used in the development of a conceptual ground model of the potential ground contamination.

The following sources contain details of existing research into contamination issues associated with different industrial uses of land and may be consulted, where appropriate:

- Department of the Environment Industry Profiles;
- *Guidance Notes* published by the Interdepartmental Committee on the Redevelopment of Contaminated Land; and
- *Appendix A* of the Highways Agency Advice Note HA 73/95;
- *Handbook of Model Procedures CLR 11* developed by DETR and Environment Agency.

Land may have become contaminated from a wide range of activities on the site, or on adjacent areas. The documentary research should ascertain if possible, whether any of the following activities (common sources of contamination) or any other potentially contaminative activity have taken place:

- spills or leaks of noxious liquids at the surface, or underground, from tanks, pipes and drains either accidentally or in the course of site activities;
- deposition or burial of industrial or domestic waste, and temporary stockpiling of leachable materials (e.g. road salt);
- demolition of industrial structures and dispersal or burial of contaminated rubble and other materials;
- importation onto the land of contaminated fill material.

Industrial sites where significant contamination of the ground is most likely, include, but is not limited to:

- landfill sites, other waste treatment, recycling and disposal operations and land surrounding these sites;
- former sites of heavy industry (e.g. steelworks, ship building etc.);
- former power stations or electricity substations and coal carbonization sites including gas works;

Former or current chemical and manufacturing plants, particularly those involving hazardous processes including using or storing bulk liquid chemicals or discharging significant quantities of effluent;

- sewage farms and sewage treatment plants;
- breaker's yards, railway sidings;
- all works employing metal finishing processes (e.g. plating, paint spraying etc.);
- fuel storage facilities, garages and petrol forecourts;
- former mining sites (particularly mines for metal ores);
- engineering works;
- works utilizing animal products, e.g. tanneries;
- Ministry of Defence sites (munitions manufacture, storage or disposal);
- timber treatment works.

Existing information on potential contamination of the ground should be obtained through consultation with the current (and/or former) occupiers, and by contact with the following regulatory authorities:

Environment Agency (EA)	Information held on groundwater and surface water quality;
Scottish Environmental Protection Agency (SEPA)	any known contamination problems; IPC and IPPC authorizations and discharge consent breaches,
Northern Ireland (NI) office:	current groundwater abstraction licences; operational and closed landfill and waste treatment sites; Special Sites.
Local Authorities:	Information held on contaminated land/remediation registers
Historical experience of environmental nuisances;	Conditions of any planning consents and whether they were met;
HSE and Fire Authorities:	Records of accidents and incidents
DEFRA:	Locations of animal burials, tanneries, knackers' yards
Petroleum Officer	Location and status of fuel storage tanks

Documentary research sources: geology and, hydrology and hydrogeology

All readily available sources of information on the geological, hydrological and hydrogeological conditions of the site should be collected and examined.

The following sources may be consulted, if appropriate:

- British Geological Survey (BGS) for geological and hydrogeological maps;
- Environment Agency for groundwater vulnerability maps ; and
- the results of any previous ground investigations carried out on the site.

BS 5930 gives a full list of geological information sources.

DETR report published by BGS on Environmental Geology Information for Planning Purposes (also published as a supplement to Quarterly Journal of Engineering Geology: Applied Geological Maps for Planning and Development. A Review of Examples from England and Wales, 1983 to 1996. QJEG SI-S44

### **Documentary research sources: ecology and archaeology**

If a site or its immediate environs have been designated as areas of ecological or archaeological significance, it is likely that there will be constraints on the methods of ground investigation.

The following sources should be checked:

- Natural England for Sites of Special Scientific Interest
- DEFRA for Environmentally Sensitive Areas
- The Local Authority's Local Plan. (These plans identify sites of national and international importance as designated by English Heritage, Countryside Council for Wales and Scottish National Heritage, in Wales and Scotland respectively, as well as sites of county and local importance.)

### **Consultations**

Consultation should be carried out with interested parties, normally in parallel with documentary research, in order to:

- a) gather additional information on potentially contaminative activities or events on or adjacent to the site; and

- b) discuss acceptable methods of investigation with regulatory authorities, where applicable.

If the documentary research has highlighted any particular concerns, consultation should take place with the appropriate regulatory authorities to determine any particular actions necessary.

Consultations with the Environment Agency, SEPA or NI Office should include discussion of acceptable methods of ground investigation to minimize potential risks to groundwater caused by the creation of contaminant migration pathways during boring or trial pitting. Similarly, if investigations are to be undertaken on (or accessed via) ecologically designated sites or agricultural land, then Natural England, Countryside Council for Wales, Scottish Natural Heritage or DEFRA should be consulted on acceptable methods of work.

More information can be obtained from:

Interviews with persons with knowledge of activities on or adjacent to the site may be combined with the site reconnaissance visit, as this provides the best opportunity to indicate suspect locations or features, underground services, etc.

### **Site reconnaissance visit**

Following data collection and analysis, a reconnaissance visit to inspect the site and view the neighbouring land should be made during the course of the study. Ideally this should occur after the available background information has been collected. Permission for site access should be obtained.

The visit should:

- a) validate information on the site collected during the desk study;
- b) collect additional information about the site and potential sources and receptors (targets);
- c) assist in the planning of any subsequent phases of site investigation taking into account any constraints to access.

A strategy for the visit should be decided in advance and suitable plans, checklists and reference documentation prepared. The team undertaking the visit should be thoroughly briefed on any potential hazards that may be encountered. If operational buildings still exist, an audit of the past and present usage of the property may be necessary. If possible the team should be accompanied by someone familiar with the site (such as a plant manager or safety officer in the case of an industrial site). During the site visit, photographs should be taken.

A limited amount of sampling, where appropriate, may be undertaken during the reconnaissance visit. If undertaken, this should usually be limited to sampling of surface deposits of suspect materials and sampling of water from existing boreholes, water courses or drains. Testing for ground gases by driving a "spike" into the ground to enable the ground gas atmosphere to be tested (spiking test) may also be carried out in some cases (see 7.6.4).

NOTE Additional, detailed guidance on carrying out preliminary site inspections of potentially contaminated land is given in the Department of the Environment's CLR 2. Useful guidance is also contained in CIRIA's Special Publication 103.



## Stage 2 of preliminary investigation

### Formulation of conceptual site model

The conceptual site model of the site and its environs allows a preliminary assessment of hazards, pathways and receptors, and of the potential significance of the contamination hazards that potentially occur on the site to be made. It should also highlight the extent of uncertainty in different components of the model and the basis on which information was obtained.

The information from the documentary research, site reconnaissance visit and consultations should be collated and evaluated to produce an initial conceptual ground model of the site. The model should identify as far as possible:

- the likely vertical and horizontal stratification of natural and anthropogenic layers beneath the site;
- layer variability in occurrence and thickness in different areas of the site, and their relative permeability;
- the characteristics of groundwater bodies beneath the site, and the general piezometric levels and flow directions;
- the presence of surface water bodies on or adjacent to the site;.
- potential types of contamination present in different zones of the site.
- potential depths of contamination;
- the presence of services trenches, drainage runs, underground storage tanks, former foundations and other obstructions in the ground, and any other physical features which may influence the occurrence or migration of contamination or provide a constraint to its investigation. (This should include identification of any overhead features such as power lines.)
- Likely biological, chemical and physical processes that are or may be operating at the site that could affect contaminant fate and transport, including natural attenuation.

NOTE The conceptual site model of the site may include hypotheses of the presence of made ground, underground obstructions, buried river channels, the expected directions of groundwater flow, number of aquifers, groundwater recharge, permeability of the ground, the physical and chemical properties of the expected contaminants, their possible degradation products, the location and form of the contaminant source, duration, etc.

### Preliminary risk assessment

Carrying out a risk assessment is outside the scope of this Code of Practice. Reference should be made to *Model Procedures* or other appropriate guidelines. However, the risk assessment is likely to include the following aspects:

- a) identification of contaminant sources, pathways and receptors;
- b) assessment of the plausible pollutant linkages and the degree of risk;
- c) estimation of the likelihood of, the nature of, and extent of, exposure to a hazard; and the risk of adverse effects;
- d) evaluation of the need for controlling the estimated risk.

Where a considerable quantity of existing site investigation information has been revealed by the preliminary investigation, a quantitative, or semi-quantitative, risk assessment may be undertaken. However where little or no previous ground investigation has been undertaken only a qualitative assessment can be made. The effects of uncertainties in the information available on the outcome of a risk assessment should be identified.

### **Scope of further investigations**

The findings of the preliminary investigation should form the basis upon which a decision is made on the scope, requirements and phasing of subsequent investigations. This decision should be principally dependent upon the objectives of the investigation, the quantity and quality of previous ground investigation information, and the level of confidence required of the actual characterization of ground conditions on the site.

A subsequent ground investigation should be designed to test the conceptual ground model developed during the preliminary investigation. The methods of field investigation and the health and safety precautions needed during its implementation should take account of the actual or potential hazards identified, and the pathways that may exist, or be created by conducting the investigation.

### **Reporting**

The preliminary investigation should be completed by the issue of a report. This report should present the factual results of desk study, site reconnaissance and consultations, together with conclusions drawn including the conceptual ground model, and recommendations on the requirements and scope of further research and/or ground investigation. The report should also describe the results of the preliminary risk assessment that has been undertaken.

## 10 Appendix D: Site Investigation Protocol

The purpose of this document is to help officers undertaking site investigations to identify the main issues involved and develop a consistent approach. Both of these objectives are put in the context of site constraints, essentials, equipment used, the sampling process, cross-contamination and health and safety.

### Site Constraints

Cambridge city has a wide range of sites when considering ownership, operations and accessibility and sometimes these characteristics can place constraints on the way the investigation is carried out.

### Site Ownership

*Orphan sites:* Permission for entering the premises is not a constraint, since neither the owner nor the polluter have been found, therefore the enforcing authority has powers of entry.

*Council owned land:* Although no actual permission is required for entering the site, since the enforcing authority is the owner, liaison with the relevant Council department is important and the occupier must be informed prior to the investigation. It is preferable that a suitable time is agreed by all interested parties for the work to be undertaken.

*Special Sites:* Permission by the owner and occupier of the site has to be acquired before undertaking the investigation. Because of the sensitive operations undertaken on some of them (e.g. MOD ownership) allow for sufficient time between the initial approach and the actual date of the investigation to deal with work permits, access permits and security checks.

*Privately owned sites:* Prior permission of the owner/occupier of the site has to be acquired beforehand. Because of the subsequent financial implications of the investigation if contamination is found, allow for a sufficient amount of time for negotiation/discussions prior to the sampling procedure.

### Type of Use

*Residential:* The activities undertaken on site do not put any constraint on the actual investigation. However, depending upon the nature of the investigation, the residents will need to be informed. This may be sensitive issue.

*Industrial:* Communication with the sites operator is essential. Constraints on the working hours and the site access are some of the main issues.

*Commercial:* The same comments made about industrial sites apply here but working hours to avoid times of high activity are probably the main issue.

*Mixed Use:* Depending on the type of use a combination of the comments made before apply in this case.

### Accessibility

Depending on the type of site actual access to it may be an issue.

*Fenced:* In this case and if the entrance is blocked special equipment might be needed to gain access.

*Key Access:* Necessary arrangements need to be made for obtaining site gate key or site security should be informed.

### Equipment

The following equipment should be inspected and ready for on-site use:

*Gas Analyser 2000* should be fully charged overnight and calibrated. All filters and tubes should be checked and cleaned from impurities and water residues.

*PID Analyser* should be fully charged overnight and calibrated. However if the instrument requires calibration, the gas cylinder stored in the box should be used to perform a manual calibration before going on site.

*Soil Sample Bags and Water Collection Vessels* should be numbered and labelled with the date and site name prior to the visit with a waterproof marker.

*Compass or GPS* may be required in order to navigate during the investigation but also to ensure the accuracy of the sampling location.

*pH Colour Strips* for quickly testing water acidity if any smells are detected.

The *handheld auger* for opening the boreholes.

A small *spade* or *trowel* for collecting surface soil samples.

A *digital camera* may be required for documenting any stains on soil or any evidence of contamination found on soil excavated. The batteries should be charged overnight.

## Essentials

Table 3.1: Site Essentials Checklist

Issues	Comments
Cambridge Map and Site location plan	Entrance and boundaries of property should be clearly marked.
Historic Maps	Identify areas of concern (e.g. landfills)
Detailed Site Plan	Show all structures, service supplies (e.g. gas and electricity pipes) and fuel tanks (above and below ground)
Notepad, waterproof pen and log datasheet	Record the time and the location that the samples were taken and the tests were carried out.

## Sampling Process

This section summarises the procedure followed for the construction of boreholes, collection of soil samples (surface or below ground level), and VOC and landfill gases detection.

### Collecting soil surface samples

- Remove excess vegetation from the sampling point
- Record the type of vegetation and soil found in place
- Collect sample by using spade
- Place into sample bag and seal
- Clean spade by using a tissue and still water

### Collecting soil sample bgl (below ground level)

- Remove excess vegetation from sampling point
- Record on the datasheet the type of vegetation and soil found in place
- Use auger to open hole
- Remove auger, collect the soil to a sample bag and seal
- Record the depth of the sample
- Clean auger by using a tissue and still water

### Collecting water samples

- Ensure the container is clean
- Collect and stabilise the sample if required (e.g. adding acid to the sample)
- Use pH strip to record water acidity
- Seal container and record any comments about smells or colour

### VOC Detection with the use of PID

- Collect sample bgl as described (before sealing bag cover with foil) and record time
- Leave sample for a minimum of 30 minutes
- Use relative zero before measurement (deletes background VOC levels)
- Record the time the sample is tested
- Open bag, pierce foil using PID probe and take measurement (wait for reading to stabilise)
- Clean the probe from any soil residues

### Landfill Gases Detection with the use of Gas Analyser 2000

Before sample testing is carried out:

- Record depth of borehole, outside pressure, temperature and humidity
- Look for any signs of gas migration on soil and vegetation (e.g. burn stains on leaves or soil)
- Turn on unit and store the relative pressure (use zero transducers option)
- Run pump for approximately 30 sec to allow for previous gases to escape before carrying the sampling test

Test carried out on exiting gas monitoring installation:

- Place pump on the gas tap
- Allow for pump to run for 1-2 minutes before recording the measurements
- After recording all the information ensure gas tap is closed properly

Test carried out on borehole created with hand auger:

- Carefully place the tube into the borehole
- Wait 1-2 minutes for the reading to stabilise
- Record all the necessary information on the datasheet
- Clean the tube from any soil residues

### Cross-Contamination and Data Quality

Cross-contamination during site investigation is a factor that cannot be completely eliminated. However there are some basic good practise guidelines that could help minimise it.

Table 5.1: Cross-Contamination on Site

Potential Cause of Cross-Contamination	Minimisation Techniques
Use of dirty sample bags or water containers	<ul style="list-style-type: none"> <li>• Check that all vessels are clean before site visit</li> <li>• Wipe clean the vessels after each site investigation</li> </ul>
Contaminants transferred between sampling locations and sites from dirty equipment	<ul style="list-style-type: none"> <li>• Clean the auger and spade using tissues and still water between sampling and between sites</li> <li>• Allow the air pump on the gas analyser to run for 30 sec before the next sampling</li> </ul>
Contaminants transferred between samples and equipment	<ul style="list-style-type: none"> <li>• Wear two pairs of disposable gloves and always change the outer pair between samples</li> <li>• Clean sampling equipment</li> </ul>
Oil and petrol leaks on ground from vehicles	<ul style="list-style-type: none"> <li>• Inspect vehicles before going on site</li> <li>• Minimise losses when occurring</li> </ul>
Contamination transferred off-site from the vehicles	<ul style="list-style-type: none"> <li>• Clean the wheels of the car thoroughly from soil</li> <li>• Clean the equipment before putting it in the vehicles</li> </ul>
Contaminated soil/dust released during excavation	<ul style="list-style-type: none"> <li>• Try to minimise the creation of dust during drilling</li> <li>• Reinstate the borehole with the soil excavated.</li> </ul>
Invasive Plants listed in Wildlife and Countryside Act	<ul style="list-style-type: none"> <li>• Do not sample location where they are present</li> <li>• Ensure that excavated material does not have any plant parts or roots</li> <li>• If sampling at the location is necessary make sure soil is not spread around the site, as far as possible, when excavated.</li> </ul>

Source: Environment Agency, 2000

## Health and Safety Checklist

The following table summarises the main health and safety issues related to the investigation of contaminated land. Because every site is unique there will be issues, identified during the visit, that are not covered below. In this case common logic and an assessment of the situation is required.

Table 6.1: Health and Safety Main Issues during Site Investigations

Area	Hazard	Potential Harm	Control Measures
Construction Site	Vehicle Movements	<ul style="list-style-type: none"> <li>• Accident</li> </ul>	<ul style="list-style-type: none"> <li>• High Visibility jacket</li> </ul>
Construction Site	Trip, slip, falling objects, sharp edges	<ul style="list-style-type: none"> <li>• Accident</li> </ul>	<ul style="list-style-type: none"> <li>• Hard hats and safety shoes are mandatory</li> </ul>
Site Investigation	Lone working	<ul style="list-style-type: none"> <li>• Violence</li> <li>• Accident</li> <li>• Illness</li> </ul>	<ul style="list-style-type: none"> <li>• Carry Personal Alarms</li> <li>• Record staff whereabouts, inform about duration of visit</li> <li>• Frequent check in with office</li> <li>• Mobile Phones provision</li> <li>• Refer to Violence Register</li> <li>• Always work in pairs</li> <li>• Hard hats, shoes and gloves should be mandatory</li> </ul>
Site Investigation	Exposure to contaminants through inhalation, ingestion and dermal contacts	<ul style="list-style-type: none"> <li>• Illness</li> <li>• Death</li> </ul>	<ul style="list-style-type: none"> <li>• Hard hats and shoes are mandatory, consider use of a breathing mask and/or disposable gloves</li> <li>• No drinking and eating allowed on site</li> </ul>
Site Investigation	Exposure to landfill gases	<ul style="list-style-type: none"> <li>• Asphyxia</li> <li>• Death</li> <li>• Explosion</li> </ul>	<ul style="list-style-type: none"> <li>• Be aware of any hissing sounds coming from ground</li> <li>• Use of gas analyser to assess levels</li> <li>• No smoking allowed on site</li> </ul>
Drilling Boreholes	Manual Handling	<ul style="list-style-type: none"> <li>• Physical Harm (back strains, hand injuries)</li> </ul>	<ul style="list-style-type: none"> <li>• Provide manual handling training</li> <li>• Protective equipment is mandatory</li> </ul>
Drilling Boreholes	Exposure to contaminants through inhalation, ingestion and dermal contact	<ul style="list-style-type: none"> <li>• Illness</li> <li>• Death</li> </ul>	<ul style="list-style-type: none"> <li>• Protective equipment is mandatory</li> <li>• No eating and drinking allowed on site</li> </ul>
Drilling Boreholes	Escape of landfill gases	<ul style="list-style-type: none"> <li>• Explosion</li> <li>• Fire</li> <li>• Physical Harm</li> <li>• Death</li> </ul>	<ul style="list-style-type: none"> <li>• No smoking allowed on site</li> <li>• Use a gas analyser to assess levels before drilling</li> <li>• Protective equipment is mandatory</li> <li>• Provision of fire extinguisher</li> </ul>
Boreholes	Tripping, falling into boreholes	<ul style="list-style-type: none"> <li>• Physical Harm</li> <li>• Death</li> </ul>	<ul style="list-style-type: none"> <li>• Reinstate boreholes after tests are carried out</li> <li>• If they need to remain open keep them covered and mark the surrounding area with a small sign</li> </ul>

Source: Environment Agency, 2000

**Documents referred to in preparation of this report**

BSI (2001) Investigation of Potentially Contaminated Sites. Code of Practise. 10175. BSI, London

EA (2000) Technical Aspects of Site Investigation, R&D Technical Report, P5-065/TR

Nathanail P. et al (2002) Contaminated Land Management, Land Quality Press

## 11 Appendix E: Site Investigation Check List

Name/Site Reference	
Address	
Post Code	
Easting	
Northing	

### Background

B1: Is the present use of the site industrial, non-industrial or commercial (if it is not industrial ignore the Occupational Section)?	I/NI/CM
B2: Does the site have a past industrial use?	Y/N
B3: What are the most likely pollutants attributed to these use(s)?	
B4: Do the adjacent sites have a past or current industrial use(s)?	Y/N
B5: What are the most likely pollutants attributed to these use(s)?	

### Hydrogeology

HG1: Is the site above a major or minor aquifer?	Y/N
HG2: What is the solid geology underneath the site?	
HG3: What is the drift geology of the site?	

### General Knowledge

GN1: Is there a history of pollution incidents?	Y/N
GN2: Have there been prior site investigation?	Y/N
GN3: Have there been any remediation?	Y/N

### Weather Conditions and Details of Visit

Date	
Time	
Dry or Humid	
Temperature	
Atmospheric Pressure	



### Accessibility and Proximity of Site

P1: Is the site fenced or not?	Y/N
P2: Is it in good condition?	Y/N
P3: Are there barriers between the site and the adjacent properties?	Y/N
P4: Does the site slope towards any other site-sources of contamination?	Y/N
P5: Are there any residential properties on or adjacent to the site (If not ignore the corresponding Section)?	Y/N
P6: Are there sensitive ecosystems on or adjacent to the site (If not ignore the corresponding Section)?	Y/N
P7: Are there SW bodies on or adjacent to the site (if not ignore the corresponding Section)?	Y/N
P8: Are there trees and vegetation on site (If not ignore the corresponding Section)?	Y/N

### Appearance of Site

A1: Are there signs warning people about possible contamination?	Y/N
A2: What is the percentage of hard landscape on site?	Y/N
A 2(a): Are there any cracks on the concrete?	Y/N
A3: Is there evidence of back filling and waste fly tipping?	Y/N
A4: Is there discontinuity within or adjacent to the site?	Y/N
A5: Are there any wells or PWA facilities?	Y/N
A6: Are there any signs of smoke or odour emanating from the ground?	Y/N
A7: Broken Pipes?	Y/N
A8: Barrels and Drums?	Y/N
A 8(a): Are there any evidence of leaching?	Y/N
A9: Are there decaying buildings on site?	Y/N
A 7(a): Do the floors have cracks?	Y/N
A10: Are there any tanks present?	Y/N
A 10(a): Are they above ground or underground?	A/B
A 10(b): Have they been infilled or made safe?	Y/N
A 10(c): Are there any evidence of leaching?	Y/N

### Soil

S1: What is the soil texture?	
S2: Is there discontinuity on the soil texture along the site?	Y/N
S3: Is there discontinuity on the soil texture between the site and adjacent properties?	Y/N
S4: Are there stains or evidence of oils or petrol spills on the site?	Y/N
S5: Could the colour of the soil be considered natural or not?	Y/N
S6: Are there patches of bare soil with respect to vegetation?	Y/N
S7: What is the acidity of the soil?	Y/N

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### Surface Water (SW)

SW1: Is there water discoloration?	Y/N
SW2: Is there odour emanating from the surface body?	Y/N
SW3: Are there any oil or petrol spills on the surface of the water?	Y/N
SW4: Is there foam or bubbling occurring?	Y/N
SW5: What is the acidity of the water?	
SW6: Does the water appear clear or not?	Y/N
SW7: Does the water characteristics remain the same before and after entering the site?	Y/N

### Vegetation and Trees

V1: What is the percentage of vegetation cover?	
V2: Does the vegetation appear healthy?	Y/N
V3: Is there discontinuity of vegetation along the site?	Y/N
V4: Is there discontinuity of vegetation between the site and the adjacent properties?	Y/N
V5: Are there trees on the site?	Y/N
V 5(a): Do they appear healthy?	Y/N
V 5(b): Do the leaves show any evidence of discoloration?	Y/N

### Occupational

OC1: Are the workers aware of the risks?	Y/N
OC2: Are there buildings on site?	Y/N
OC 2(a): Are there cracks on the floor of the buildings?	Y/N
OC3: Are there any hazardous materials stored on site?	Y/N
OC 3(a): Are they properly contained and not easily accessible?	Y/N
OC 3(b): Are there any evidence of leaching from them?	Y/N
OC4: Are there signs informing workers of the potential risks?	Y/N
OC5: Are there tanks on site?	Y/N
OC 5(a): Are they above or below ground?	
OC 5(b): What are they used for?	
OC 5(c): Are there evidence of leaching around the tanks?	Y/N

### Recreational

RC1: Is the public allowed to use the site?	Y/N
RC2: Are their signs informing about possible contamination on site and precautions that need to be undertaken?	Y/N

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**Residential**

RD1: Are there barriers between site and residents?	Y/N
RD2: Are there gardens or veg patches on the properties?	Y/N
RD3: Are there private water abstraction facilities?	Y/N
RD4: Have the residents been given guidelines on how to conduct everyday activities?	Y/N
RD5: Are there pets?	Y/N
RD6: Are there allotments?	Y/N
RD7: Is there any livestock?	Y/N

**Sensitive Ecosystems**

EC1: Are there barriers between the site and the sensitive ecosystems?	Y/N
EC2: Are there any SSSI's?	Y/N
EC3: Are there any Wildlife Areas?	Y/N
EC4: Are there any Local Nature Reserves?	Y/N
EC5: Are they any TPO_ areas?	Y/N
EC6: Are there any TPO _ points	Y/N
EC7: Are there any conservation areas?	Y/N

## 12 Appendix F: Glossary

DETR Circular 02/2000 contains a detailed glossary of terms that provides legal definitions of terms that may be used in this Strategy. This Glossary provides an interpretation of terms used in the Strategy to aid reading by the layperson.

**AONB** Area of Outstanding Natural Beauty

**Brownfield site** A site that has been generally abandoned or underused where redevelopment is complicated by actual or perceived environmental contamination. Only a small proportion of brownfield sites will meet the definition of contaminated land.

**CCC** Cambridge City Council

**CIRIA** Construction Industry Research and Information Association

**CLEA** Contaminated Land Exposure Assessment, a methodology for carrying out a risk assessment

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

a) significant harm is being caused or there is a significant possibility of such harm being caused; or  
b) pollution of controlled waters is being, or is likely to be caused or with respect to radioactive contamination defined in section 78A (2) (as modified) as :

a) harm is being caused, or

b) there is significant possibility of such harm being caused.

Controlled waters, these include

a) **inland waters** (river, streams, underground streams, canals, lakes and reservoirs)

b) **groundwaters** (any water contained in underground strata (except if it is above the saturation zone), wells or boreholes)

c) **territorial waters** (the sea within three miles of a baseline)

d) **coastal waters** (the sea within the baseline up to the line of highest tide, and tidal waters up to the fresh water limit)

**DEFRA** Department for Environment Food and Rural Affairs

**Drinking water abstraction** - The taking of water from a source (in this case, primarily an underground source) for drinking water

**EA** The Environment Agency

**Eco-system** A biological system of interacting organisms and their physical environment

**Effective (radiation) dose** an energy measure which applies a weighting factor to the equivalent dose to account for the different effectiveness of the dose in causing damage to different human tissues. It is measured in Sieverts.

**Equivalent (radiation) dose** an energy measure which applies a weighting factor to the absorbed dose to account for the different effectiveness of various types of radiation in damaging human tissue. It is measured in Sieverts.

**GAC** Generic Assessment Criteria

**GIS** Geographical Information System.

**Groundwater** Any water contained in underground strata (except if it is above the saturation zone), wells or boreholes

**LAPC** Local Authority Pollution Control

**NNR** National Nature Reserve

**Part 2A** Part 2A of the Environmental Protection Act 1990.

**Pathway** One or more routes by which a receptor can be exposed to a contaminant

**Pollutant linkage** The relationship between a contaminant, a pathway and a receptor

**RCLEA** Radioactivity Contaminated Land Exposure Assessment model

**Ramsar site** A site protected under an international convention on protection of wetlands of international importance, especially as habitats for waterfowl, named after the city in Iran where the convention was signed

**Receptor** Sometimes referred to as “a target “– the health of a person, waters, ecosystem or property type that could be affected by contamination

**Remediation** Generally accepted as being the carrying out of works to prevent or minimise effects of contamination. In the case of this legislation the term also encompasses assessment of the condition of land, and subsequent monitoring of the land

Risk assessment, the study of:

- a) the probability, or frequency, of a hazard occurring; and
- b) the magnitude of the consequences

**SAC** Special area of conservation

**SGV** Soil Guideline Values produced by Environment Agency

**Source** A substance in, on or under the ground with the ability to cause harm

**Source protection zone** Protection zones around certain sources of groundwater used for public water supply. Within these zones, certain activities and processes are prohibited or restricted.

**SPA** Special Protection Area for birds

**Special site** Any contaminated land designated due to the presence of:

- Waste acid tar lagoons
- Oil refining
- Explosives
- Environmental Permitting Controlled Sites
- Nuclear Sites
- Ministry of Defence Sites
- Pollution of controlled waters

**SSAC** Site Specific Assessment Criteria

**SSSI** Site of Special Scientific Interest

**SSV** Soil Screening Values

## **13 Appendix G: Details Of Statutory Contacts**

Environment Agency – Richard Bowen  
Team Leader Groundwater and Contaminated Land  
Anglia region Central Area Office  
Bromholme Lane  
Brampton  
Huntingdon PE29 6FH

Natural England – Janet Nuttall  
Eastbrook  
Shaftesbury Road  
Cambridge CB2 8DR

English Heritage – Jade Spencer  
Case Officer Cambridge  
East of England Region Office  
Brooklands  
24 Brooklands Avenue  
Cambridge CB2 8BU

Health Protection Agency – Dr Kate King  
Kingfisher House  
Kingfisher Way  
Hinchingsbrooke Business Park  
Huntingdon  
Cambridgeshire PE29 6FH

DEFRA – Andrew Holden  
Contaminated Land Policy Advisor  
Nobel House  
17 Smith Square  
London SW1A 3JR

Cambridgeshire County Council – David Nuttycombe  
Head of Strategy  
Room 301  
Shire Hall  
Castle Hill  
Cambridge CB3 0AP

Food Standards Agency – Alan Dowding  
Aviation House  
125 Kingsway  
London WC2B 6NH

## **14 Appendix H: Responses from Statutory Consultees**

Waiting for responses.

