Appendices

Appendix A Glossary

AONB Area of Outstanding Natural Beauty

Brownfield Site a site that has been generally abandoned or underused, often by heavy industry. For a short time gardens were viewed as Brownfield Land. Redevelopment is complicated by actual or perceived pollution. Only a small proportion of brownfield land will meet the definition of contaminated land

'Class A' person a person who is an appropriate person for a significant pollutant linkage in that he/she has caused or knowingly permitted a pollutant to be in, on or under the land

'Class B' person a person who is an appropriate person for a significant pollutant linkage in that he/she is the owner or occupier of the land in circumstances where no Class A person can be found with respect to a remediation action

CLEA Contaminated Land Exposure Assessment model, is the UK's method for assessing exposure to pollutants in soil. It has several standardised land-uses. The current model is version is CLEA 1.07, released August 2015

Contaminant linkage refers to where a contaminant, a pathway and a receptor exist so that exposure is occurring.

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: significant harm is being caused or there is a significant possibility of such harm being caused; or pollution of controlled waters is being, or is likely to be caused

Controlled Waters these include inland waters (river, streams, underground streams, canals, lakes and reservoirs) groundwater (any water contained in underground strata, wells or boreholes) territorial waters (the sea within three miles of a baseline) 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 of 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

DQRA detailed quantitative risk assessment

Generic Assessment Criteria (GAC) a screening tool used to determine if measured concentrations of contaminants can be excluded from the need for further inspection and assessment

GIS Geographical Information System

Groundwater any water contained in underground strata, wells or boreholes. It does not include water held in pores of surface soil.

Health has been defined by WHO as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

Hardship where an 'appropriate person' (see Class A and Class B persons, above) can demonstrate that carrying out a remediation action would cause him/her 'hardship', the council will assess whether it is appropriate to require that person to carry out the remediation

ICRCL Interdepartmental Committee on the Remediation of Contaminated Land

Hydrocarbons When testing hydrocarbons, the data should be fractionated into equivalent carbon chain lengths as described in British Standard BS11504

NNR National Nature Reserve

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

RAMSAR site a site protected under an international convention on protection of wetlands of international importance, especially as habitats for waterfowl.

Receptor the health of a person, waters, ecosystem or property type that could be affected by contamination

Remediation generally accepted as 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

Remediation Action any individual thing which is being, or is to be done by way of remediation

Risk the combined effect of the probability and consequence of a defined hazard, or the probability of exposure to harm

Risk Assessment the study of the probability, or frequency, of a hazard occurring; and the magnitude of the consequences

Risk Summary produced prior to determining land as contaminated land, the risk summary will explain the risks in a context that is easily understandable to the lay person.

SAC Special Area of Conservation

Significant Harm any harm that is determined to be significant in-line with the statutory guidance

Significant contaminant linkage a proven or likely pollutant linkage which forms the basis for a determination that a piece of land is contaminated land

Significant pollutant linkage a pollutant linkage which forms the basis for a requiring a detailed quantitative risk assessment (DQRA)

Significant contaminant a pollutant which forms a part of a significant contaminant linkage

Significant pollutant a pollutant which forms a part of a significant pollutant linkage

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 bird life

Special Site any contaminated land designated due to the presence of: waste acid tar lagoons; oil refining; explosives; integrated pollution control sites; nuclear, biological and chemical weapon sites; MOD land; land containing weapons; radioactive sites; and pollution of controlled waters used for human consumption. The Environment Agency may choose to accept the regulatory burden of such sites on behalf of the Local Authority.

SPOSH Significant Possibility of Significant Harm. The level, above which, the local authority considers (on basis of probability based on professional judgement) to cause significant harm to a specified receptor.

Suitable Person a person suitably qualified and experienced to carry out a specific task, as assessed by the relevant authority

SSSI Site of Special Scientific Interest (designated due to geological or wildlife interest)

TPH Total Petroleum Hydrocarbons is the total concentration of all types and forms of hydrocarbons. It is a crude measure and is no longer used because individual fractions have health based screening criteria. See hydrocarbons

VOCs volatile organic compounds

Written Statement a statement produced by the authority about land it considers not to be contaminated land after undertaking a risk assessment

Appendix B Land Quality in Portsmouth

Description of Portsmouth

Portsmouth is the second largest city in Hampshire located on the south coast of England, 64 miles south west of London. Portsmouth is the United Kingdom's only island city located on Portsea Island and 6 local areas on the main land. These distinct areas together make up the 15 square miles (4040 ha) of the city of Portsmouth. The city is tightly constrained by its coastal boundaries on three sides and by Portsdown Hill to the north. There are no opportunities for urban expansion and pressure to redevelop land within the city is great (p.1.20 Portsmouth Plan).

Portsmouth was officially founded in 1180 and a city in 1926. Much of the city's expansion has occurred in the last two hundred years and across much of the island the land have been repeatedly developed upon. The town was heavily bombed during the World War 2 destroying many buildings in the dockyard and the naval and military establishments as well as housing across the city and this allowed further redevelopment. This was rebuilt, and later prefabricated houses, many of which have now themselves been cleared.

Portsmouth City Council was formed in 1972. It has land borders with Fareham Borough Council, Winchester District Council, and Havant Borough Council, and its maritime neighbour on the west of the harbour is Gosport Borough Council. Due to the Royal Navy dockland the whole of Portsmouth Harbour (up to and including mean high water) is part of Portsmouth and this includes Burrows Island at the opening to Gosport.

The most recent census for Portsmouth was conducted in 2011 by the office of national statistics. The results recorded a population for the city of 205,100. It is the most heavily populated urban area in the United Kingdom with an average density of 50.4 people per ha compared to the south east average of 4.5 persons per ha.

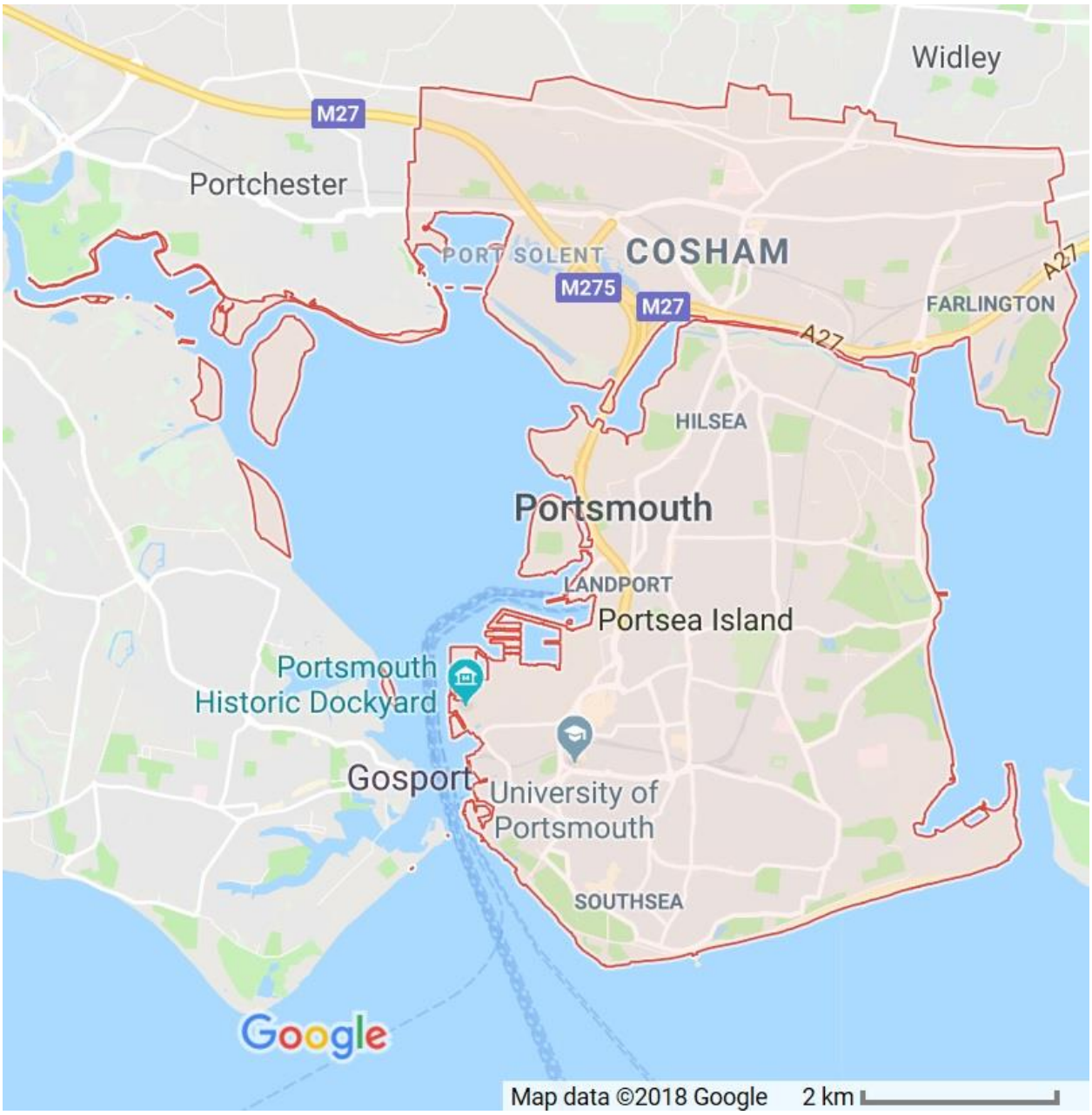


Figure 1: Outline of Portsmouth

The City has had a long history of industrial use including 4 commercial gasworks sites (Rudmore gasworks, Flathouse Quay gasworks, Hilsea gasworks on Voyager Park, Green Lane and Cosham gasworks on Salisbury Road), in addition to the often poorly recorded private gasworks (e.g. Eagle brewery), chemical works, timber importers/treatment yards, tar distillation plants and the normal range of smaller industries common in urban areas such as hat manufacturers, metal workers, and dry cleaners existed. Portsmouth continues to have military uses and these are addressed as part of our strategy. The two primary sources of information on historical land-uses in Portsmouth, are the Ordnance Survey historic maps dating back to 1860 and the Trade Directories (the 'Kellys directories) for Portsmouth dating back to 1823. There are also petrol

licence files, environmental permits, and MOD observations of locations where ordnance was dropped in World War 2.

As much as 20% of the current land area has been reclaimed from the sea by drainage or land raising activities. Approximately 10% of the current land area has been reclaimed by tipping of waste. Most of this land creation took place before 1974 when pollution control legislation began. The military owned large tracts of land across the city. With sea level rise being expected the city's coastal defences are being updated to protect its current outline.

The first Royal Naval Dockyard was established in 1495, with other uses ranging from firing ranges to luminising workshops (navigational instruments are coated with luminescent materials for night time use).

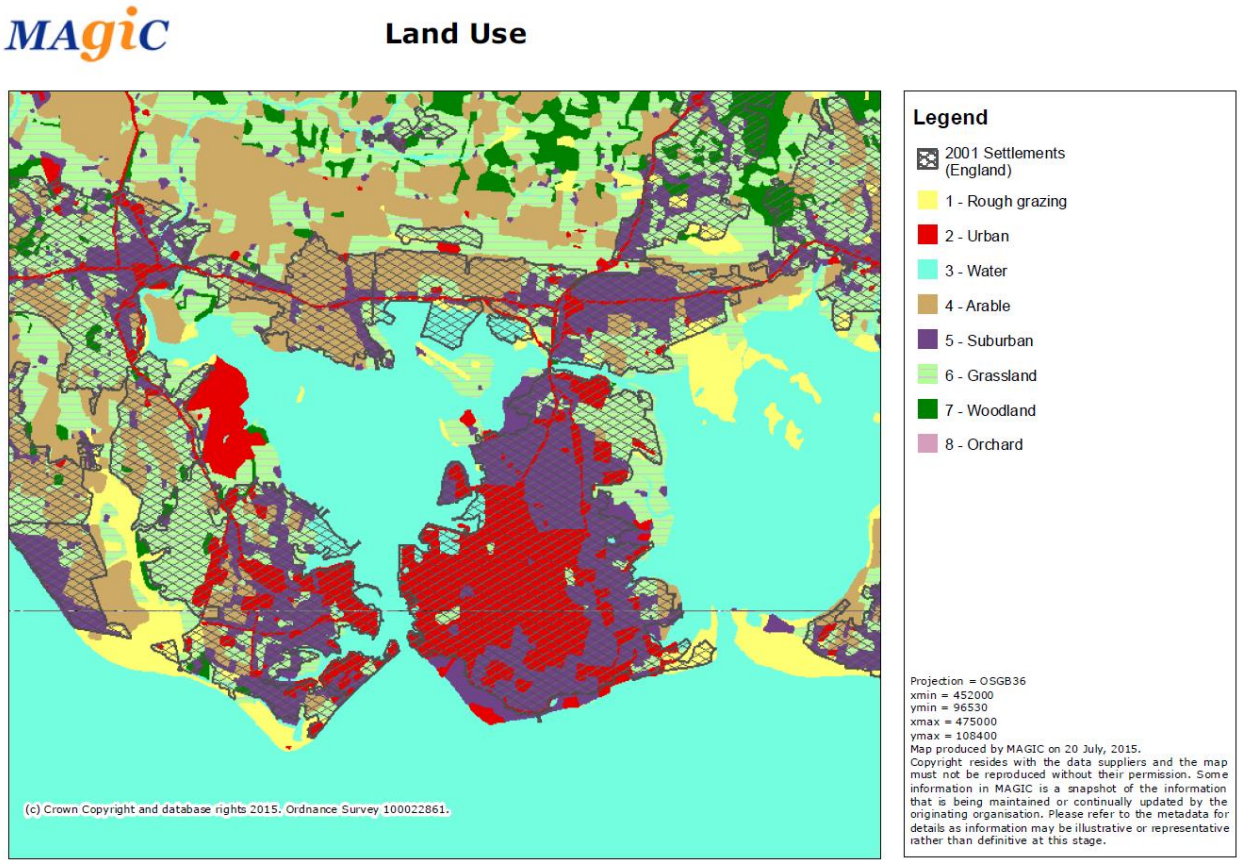


Figure 2: Land use

The city is urban/suburban land with areas of landfill transforming Milton Harbor to its current Milton Common. However, the entire 480 acres of Southsea Common whilst former MOD land, has been Crown land from the 16th century to allow clear lines of fire adjacent to Southsea Castle. I

Historic landfill sites are a potentially significant source of risk, most notably from the production of leachate, leading to the contamination of groundwater, and the migration of methane and carbon dioxide gases. The city has some 30 disused formal landfill sites that were operational prior to the licensing requirements of the Control of Pollution Act 1974. It also has areas of infilling. Unusual and interesting local examples include:

- The Great Morass and Little Morass are historic tidal inlets from the sea which are associated with a significant thickness of peat and localised gas generation.
- Milton Harbour was filled with dockland wastes and by uncontrolled tipping. This created Milton Common which has become a pleasant green space with proposed Local Nature Reserve (LNR) status.
- The Portsmouth to Arundel Canal is a linear fill feature crossing the city from the relict lock at Eastney Lake in Langstone Harbour to the East to the wide opening intended for small ships on the west of the island. The canal is now infilled but generally follows the railway and roads such as Goldsmith Avenue and Locksway Road (originally Asylum Road)

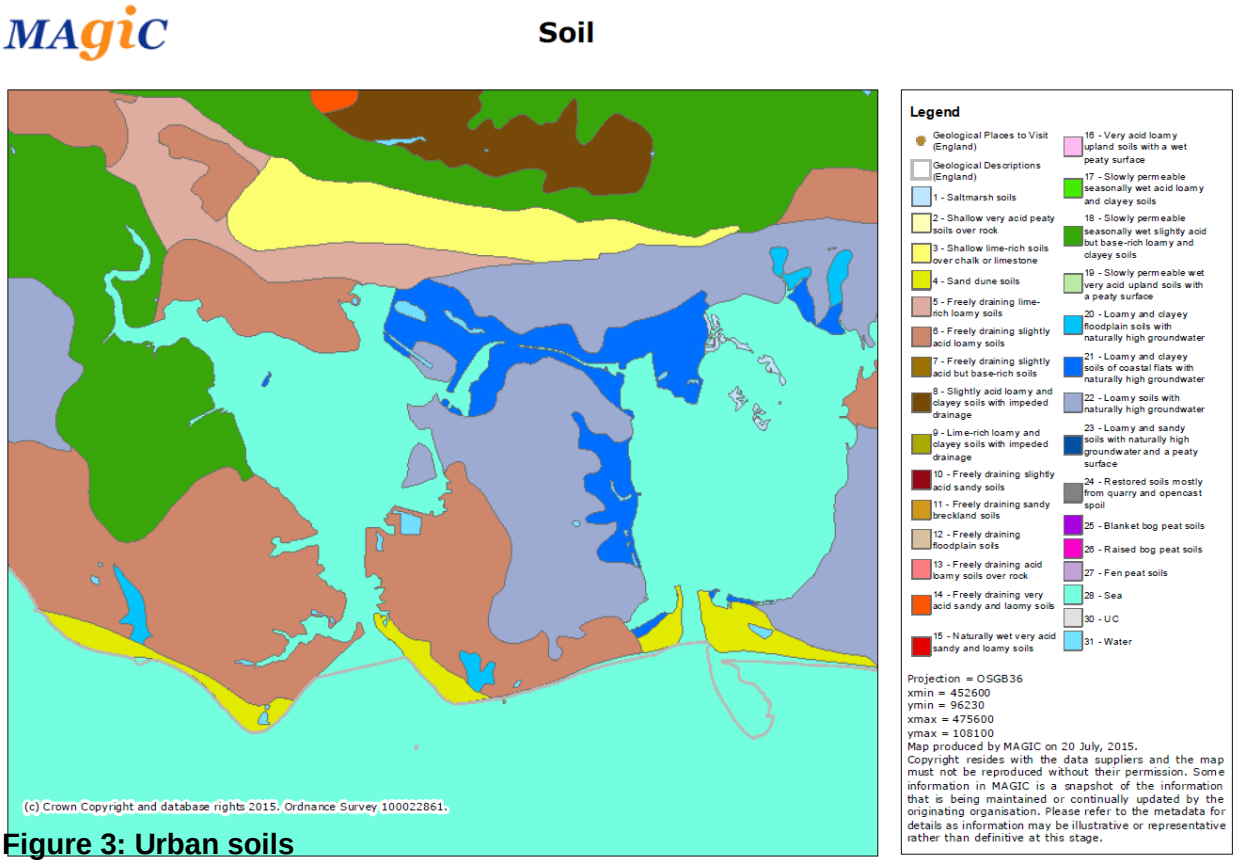


Figure 3: Urban soils

Urban soils are chemically distinct from their equivalent rural soils due to the accumulated impacts of human use. In Portsmouth the soils vary from the gley soils of the northern edge to loamy soils (blue and indigo in Figure 3, above) to the freely draining acid loams in the south, but with naturally occurring thin alkaline soils in the south west and south east. Mostly soils are covered with development.

Appendix C Definition of Significant Harm

Significant harm and significant possibility of harm to non-human receptors)

Table B1
Ecological System Effects

Relevant type of receptor	Significant harm	Significant possibility of significant harm
Any ecological system, or living organism forming part of such a system, within a location which is: • A SSI • A national nature reserve • A marine nature reserve • An area of special protection for birds • A "European site" within the meaning of reg. 8 of the conservation of habitats and species regs. 2010 • Any habitat or site afforded policy protection under para. 6 of pps9 on nature conservation (i.e. Sac, spa, RAMSAR sites) • Any nature reserve established under Section 21 of the national parks and access to the Countryside Act 1949	The following types of harm are considered to be significant harm: • Harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or • Harm which significantly affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location. In the case of European sites, harm should also be considered to be significant harm if it endangers the favourable conservation status of natural habitats at such locations or species typically found there. In deciding what constitutes such harm, the local authority should have regard to the advice of Natural England and to the requirements of the conservation of habitats and species Regulations 2010.	Conditions would exist for considering that a significant possibility of significant harm exists to a relevant ecological receptor where the local authority considers that: • Significant harm of that description is more likely than not to result from the contaminant linkage in question; or • There is reasonable possibility of significant harm of that description being caused, and if that harm were to occur, it would result in such a degree of damage to features of special interest at the location in question that they would be beyond any practicable possibility of restoration. Any assessment made for these purposes should take into account relevant information for that type of contaminant linkage particularly in relation to the ecotoxicological effects of the contaminant.

"relevant information" refers to information which scientifically-based, authoritative, relevant to the assessment of risks arising from the presence of contaminants in the soil, and appropriate

Table B2
Property Effects

Relevant type of receptor	Significant harm	Significant possibility of significant harm
Property in the form of: • Crops, including timber; • Produce grown domestically, or on allotments, for consumption; • Livestock; • Other owned or domesticated animals; • Wild animals which are the subject of shooting or fishing rights.	For crops, a substantial diminution in yield or other substantial loss in their value resulting from death, disease or other physical damage. Foe domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage. The local authority should regard a substantial loss in value as occurring only when a substantial proportion of the animals or crops are dead or otherwise no longer fit for their intended purpose. Food is regarded as no longer fit for purpose when it fails to comply with the provisions of the Food Safety Act 1990. Where a diminution or loss in value is caused by a contaminant linkage, a 20% diminution or loss it is regarded as a benchmark for what constitutes a substantial diminution or loss. In this chapter, this description of significant harm is referred to as an "animal or crop effect".	Conditions would exist for considering that a significant possibility of significant harm exists to the relevant types of receptor where the local authority considers that significant harm is more likely than not to result from the contaminant linkage in question, taking into account relevant information for that type of contaminant linkage, particularly in relation to the ecotoxicological effects of the contaminant.
Property in the form of buildings. For this purpose, "building" means any structure or erection, and any part of a building including any part below ground level, but does not include plant or machinery comprised in a building, or buried services such as sewers, water pipes or electricity cables.	Structural failure, substantial damage or substantial interference with any right of occupation. The local authority should regard substantial damage or substantial interference as occurring when any part of the building ceases to be capable of being used for the purpose for which it is or was intended. In the case of a scheduled ancient monument, substantial damage should also be regarded as occurring when the damage significantly impairs the historic, architectural, traditional, artistic or archaeological interest by reason	Conditions would exist for considering that a significant possibility of significant harm exists to the relevant types of receptor where the local authority considers that significant harm is more likely than not to result from the contaminant linkage in question during the expected economic life of the building (or in the case of a scheduled ancient monument the

	of which the monument was scheduled. In this chapter, this description of significant harm is referred to as a "building effect".	foreseeable future), taking into account relevant information for that type of contaminant linkage.

"relevant information" refers to information which scientifically-based, authoritative, relevant to the assessment of risks arising from the presence of contaminants in the soil, and appropriate

Appendix D Special Sites

1. Once a local authority has identified land as contaminated land by definition, it must also consider whether it falls into the category of a Special Site.

2. What exactly constitutes a Special Site is specified in the contaminated land (England) Regulations 2006. For a legal definition the regulations must always be consulted. In simple terms, however, they include land:

- Polluting controlled waters;
- On sites subject to integrated pollution control;
- With waste sulphuric acid tar lagoons (sites used for refining benzole ('motor spirit')
- Used as an oil refinery;
- Used to manufacture or process explosives;
- Used to manufacture or dispose of atomic, chemical or biological weapons (non-biological contamination only);
- Used for other nuclear purposes;
- Owned or occupied by a defence organisation (excluding off base housing);

3. contaminated land beyond the boundary of these premises (but contaminated by them) also forms part of Special Sites.

4. If the local authority has reason to believe that a site falls under the definition of a Special Site it will arrange with the Environment Agency to carry out the remediation. The council will authorise a person from the Environment Agency to use powers of entry conferred under Section 108 Environment Act 1995.

Land cannot be designated as a Special Site until it has been determined as contaminated land. The local authority must make this determination, but in such cases will take account of any advice/ information provided by the Environment Agency. Note that the Environment Agency then decides whether it is a 'Special Site'

If the Environment Agency agrees that the site is a Special Site, then the Environment Agency will become the enforcing authority for that site. If the Environment Agency does not agree with the decision that a site is a Special Site it must notify the local authority in writing within 21 days detailing reasons for the disagreement. Any disputes over the issue will be referred to the Secretary of State.

When a site is designated a Special Site the council will notify in writing: Environment Agency; the owner; any occupier of all/part of the land; the person(s) responsible for remediation. Other parties may also be notified such as local water companies and the health protection agency in the case of affected drinking water.

*non biological and non-radioactive contamination only

Appendix E Contact Points

Portsmouth City Council

Contaminated Land Team

Contaminated Land Team
Regeneration
Portsmouth City Council
Civic Offices
Guildhall Square
Portsmouth
PO1 2AU

Tel: 023 9284 1399
Email: contam@Portsmouthcc.gov.uk
Website:www.Portsmouth.gov.uk

Development Management
Regeneration
Portsmouth City Council
Civic Offices
Guildhall Square
Portsmouth
PO1 2AU

Tel: 023 9268 8633.
Email: planningpolicy@portsmouthcc.gov.uk or planningapps@portsmouthcc.gov.uk
Website:www.Portsmouth.gov.uk

Building Control

Building Control Partnership
Depot Offices
Broadcut
Fareham
PO16 8SP

Tel: 01329 824823
Email: bcpartnership@fareham.gov.uk
Website: www.buildingcontrolpartnershiphants.gov.uk/

Hampshire County Council
Hampshire County Council
The Castle
Winchester
Hampshire.
SO23 8ZB
Info@hants.gov.uk
Tel: 01962 841841
Fax: 01865 810106

Hampshire Highways
Tel: 0845 603 5633

Household Waste Recycling Centres/Household Waste Management
Tel: 0845 603 5634

Heritage England
Heritage England South East Region
Eastgate Court
195-205 High Street
Guildford. GE1 3EH
Tel: 01483 252002
Fax: 01483 252001

Natural England
Natural England
Dorset, Hampshire and Isle of Wight Area Team
Pheonix House
33 North Street
Lewes
East Sussex
BN7 2PH
Tel: 0300 060 0873
enquiries.southeast@naturalengland.org.uk

Environment Agency
Solent and South Downs Office
Guildbourne House
Chatsworth Road
Worthing
West Sussex
BN11 1LD
Tel: 03708 506506

Customer and Engagement team
SSDEnquiries@environment-agency.gov.uk

Health Protection Agency
7th Floor
Holborn Gate
330 High Holborn

London
WC1V 7PP
Tel: 020 7759 2700 / 2701

Chemical Hazards and Poisons Division Headquarters
Centre for Radiation, Chemical and Environmental Hazards
Chemical Hazards and Poisons Division
Chilton
Didcot
Oxon OX11 0RQ
Telephone: 01235 824852
Telephone: 01235 822895 (General Enquiries)
chemicals@hpa.org.uk

Food Standards Agency
Alan Dowding
Incidents and Prevention Division
Room 707
Aviation House
125 Kingsway
London. WC2B 6NH
Tel: 020 7276 8727
Fax: 0207 276 8289
Alan.Dowding@foodstandards.gsi.gov.uk

Health & Safety Executive
Health and Safety Executive
Belgrave House
Greyfriars
Northampton
Tel: 01604 738300
Fax: 01604 738333

Her Majesty's Customs and Excise Office
Landfill tax is the responsibility of the Birmingham business centre:
2 Broadway
Broad Street
Five Ways
Birmingham. B15 1BG
Tel: 0121 697 4000
Fax: 0121 643 3454

DEFRA
Customer Contact Unit
Eastbury House
30 - 34 Albert Embankment
London
SE1 7TL
Tel: 08459 33 55 77
Fax: 020 7238 2188
helpline@defra.gsi.gov.uk

The Government Office for the South East (Environment and Rural)

Housing & Planning Directorate
Bridge House
1 Walnut Tree Close
Guildford
GU1 4GA
Tel: 01483 882 255
rural.gose@go-regions.gsi.gov.uk

Appendix F Powers and 'Suitable Persons'

1. Section 108 of the Environment Act 1995 gives the local authority power to authorise, in writing, "suitable persons", to investigate potentially contaminated land. These powers are not available to the Environment Agency. The powers which a person may be authorised to exercise include:

- To enter at any reasonable time (or in urgent cases, at any time, if need be by force) any premises / land to make such examination and investigations necessary;
- To take samples, photographs, carry out tests, install monitoring equipment

2. At least seven days notice must be given to residential occupiers and to occupiers of land where heavy plant is to be used. Consent must be obtained to enter from the occupier, or failing that, a warrant obtained under schedule 18 of the 1990 Environmental Protection Act;

3. . There are no circumstances, in which the council will use these powers to obtain information about the condition of land, where:

- It can obtain the information from third parties without the need for entering the site; or
- A person offers to provide the information within a reasonable and specified time, and does so.

Urgent action

4. Urgent action must be authorised where the council is satisfied that there is imminent danger of serious harm or serious pollution of controlled waters being caused as a result of contaminated land. In such circumstances the procedures identified in the statutory guidance will be followed which may involve the forced entry into the premises;

5. The terms 'imminent' and 'serious' are unfortunately not defined, local authorities are advised to use the normal meaning of the words. There is, however, guidance on what may constitute "seriousness" when assessing the reasonableness of remediation;

6. The council will undertake the remediation in urgent cases where it is the enforcing authority if it is of the opinion that the risk would not be mitigated by enforcement action.

In the case of a Special Site the council will determine the land contaminated land in accordance with the statutory procedure after a site investigation has been undertaken in cooperation with the Environment Agency. The Environment Agency will then be responsible for the remediation;

7. In appropriate cases the council will recover costs of remediation works it has completed;

8. All intrusive investigations will be carried out in accordance with appropriate technical procedures to ensure:

A) They are effective
B) They do not cause any unnecessary damage or harm
C) They do not cause pollution of controlled waters.

Compensation

9. Schedule 18 of the Environment Act 1995 makes clear the circumstances when local authority must pay compensation for loss or damage as a result of the use of these powers. The council will ensure that only appropriate technical procedures are deployed, the utmost care is taken at all times, and the conditions carefully recorded before, during and after completion of the necessary works;

'Suitable Persons'

10. The science and associated technical procedures relating to the investigation and assessment of contaminated land are extremely complex. Knowledge of several specialised disciplines is required together with an ability to interpret significant volumes of data and make a reasoned judgement, often in difficult circumstances;

11. The consequences of, 'getting it wrong', could, in many cases, have a major impact on people's lives. On the one hand, an entire area could be unnecessarily blighted, whilst on the other, a generation of children could be left at risk from an unidentified impact;

13. Ultimately, the responsibility for determining what land may and may not be determined contaminated, by definition, lies with the head of environmental services. He/she will, however, often need to rely on the advice of appointed, 'suitable persons'. Under these circumstances criteria have been developed to assist in their selection.

Procedure for the appointment of 'suitable persons' for the Purposes of Part IIa

14. There are two prerequisites to commencing the process of appointing suitable Persons, firstly:

- Adequate funding to support the process; and secondly

- An appropriately qualified person, 'in house', to act in the client role.

15. Such a person, as well as having sufficient knowledge and experience to specify the contract, must have sufficient time to monitor it also

16. Additional training may be required to provide an adequate foundation of knowledge upon which to carry out the role. The council has achieved the 'investors in people status and recognises the need for professional development. Training needs will be identified in this way, as and when required;

17. The council will produce a comprehensive, unambiguous but succinct draft specification for each contract which clearly identifies the work to be carried out, its purpose, timetable and client / contractor responsibilities. If it is considered necessary to employ outside consultants / contractors, the following criteria will be observed. The council will produce a list of appropriate companies, taking care to seek out those most prominent and successful in the field, rather than only those who promote themselves to the council. Each of these will then be contacted in turn for an informal discussion as to their capability, expertise and experience. Prior to commencing this process the council will produce a selection of questions relevant to the contract to ask each company. This should then hopefully result in a short list of six or so companies who will be asked to quote / tender for the work based on a final specification;

18. A check list of information requirements is included at the end of this section;

19. Once appointed responsibilities include monitoring the contract to ensure:

The contractors are kept fully aware of their responsibilities at all times;

- Quality control requirements are met;
- Amendments are quickly agreed and documented;
- The time table is strictly adhered to;
- The aim of the contract is achieved.

Appendix G Information Requirements from Consultant

Client's information Requirements	Requirements of The consultant
1. **General**	
1.1 background on company Capability	How long has company been operating What kind of work were they originally set up to do - is this an add on Who traditionally are their clients
1.2 numbers and qualifications of staff 1.3 curriculum vitae and availability of Key Staff	If a large company, what are the interests / sympathies of those in control? Do they consider local authorities as a serious market How many staff are available for this type of work, will they need to subcontract Who will actually be doing the job, what are their qualifications and experience Practical experience is key. Do they really understand Part IIa Knowledge of environmental law and local government systems an important requirement.
1.4 details of quality assurance systems Including: Allocation of responsibilities Project management Technical procedures Technical review Training Assessment of external Suppliers	Where appropriate, need details of quality management systems indicating whether accredited by a third party. What technical procedures to be used. Which staff responsible, which will undertake technical review. How will quality of subcontractors be ensured.
1.5 management of health & Safety	Identify H&S management procedures where appropriate. Do they understand the fundamental requirements of H&S legislation
1.6 track record on similar Projects	Ever done similar work or is this a new departure
1.7 client references	Need several telephone numbers to enable rapid verification of statements made at interview.
1.8 financial status	May not always be necessary but on large contracts where considerable financial outlay required need to demonstrate solvency. Bond may be required on large remediation contracts.
1.9 details of insurance cover	Need to demonstrate insurance available 3rd party liability and professional indemnity. Identify limitations / exclusions

1.10 membership of Professional and trade Associations	May be necessary to make checks, corporate membership of professional organisations
1.11 compliance with codes of Practice	Can they demonstrate knowledge of the appropriate guidance, codes of practice relevant to the job

Client's information Requirements	Requirements of The consultant
2. **Project specific**	
2.1 technical proposal	The proposal must make it absolutely clear that work will be carried out to comply with the requirements of the specification, what the results will be, and when they will be achieved.
2.2 project management plan / Working plan	A clear timetable must be available which states what stage will be reached by when and who will be responsible to deliver.
2.3 details of sub-contractors	Subcontractors will be necessary on large technical projects. Must state who they are, contact points and lines of responsibility.
2.4 details of technical Procedures	Again, the working plan must clarify all procedures and lines of responsibility.
2.5 reporting	Reporting procedures must be made absolutely clear. It is essential not to have masses of reports landing on the desk of the council which puts the responsibility back on him / her. The responsibility for doing what has been agreed to the agreed standard must lie with the contractor.
2.6 programme & 2.7 financial proposal	It may be that the contractor will want to provide a guide price or include large contingency sums. The programme of work and the quotation must not be ambiguous. A lot depends on the quality of the original specification. Stage payments and timetables must be firm and with perhaps penalty clauses if fail to deliver on time.
2.8 conditions of engagement	Contracts need not be long and wordy, should define responsibilities of both parties, liabilities succinctly.

Appendix H Potentially Contaminative Land-Uses

This list is taken from the Department of Environment Industry Profiles that were produced c. 1995 to help Local Authorities by illustrating the type of sites that have historically used materials that could pollute the soil. Inclusion on this list does not necessarily infer the existence of a pollutant linkage but it should be considered a possibility.

- Airports
- Animal and animal products processing works
- Asbestos manufacturing works
- Ceramics cement and asphalt manufacturing works
- Chemical Works - coatings paints and printing inks manufacturing works
- Chemical Works - cosmetics and toiletries manufacturing works
- Chemical Works - disinfectants manufacturing works
- Chemical Works - explosives propellants and pyrotechnics manufacturing works
- Chemical Works - fertiliser manufacturing works
- Chemical Works - fine chemicals manufacturing works
- DOE Industry Profiles: chemical works - inorganic chemicals manufacturing works
- Chemical Works - linoleum vinyl and bitumen-based floor covering manufacturing works
- Chemical Works - mastics sealants adhesives and roofing felt manufacturing works
- Chemical Works - organic chemicals manufacturing works
- Chemical Works - pesticide manufacturing works
- Chemical Works - pharmaceutical manufacturing works
- Chemical Works - rubber processing works (including works manufacturing tyres or other rubber products)
- Chemical Works - soap and detergent manufacturing works
- Dockyards and dockland
- Engineering Works - aircraft manufacturing works
- Engineering Works - electrical and electronic equipment manufacturing works (including works manufacturing equipment containing PCBs)
- Engineering Works - mechanical engineering and ordnance works
- Engineering Works - railway engineering works
- Engineering Works - ship building repair and ship breaking including naval shipyards
- Engineering Works - vehicle manufacturing works
- Gas works coke works and other coal carbonisation plants
- Metal manufacturing refining and finishing works - electroplating and other metal finishing works
- Metal manufacturing refining and finishing works - iron and steel works
- Metal manufacturing refining and finishing works - lead works
- Metal manufacturing refining and finishing works - non-ferrous metal works (excluding lead works)
- Metal manufacturing refining and finishing works - precious metal recovery works
- Oil refineries and bulk storage of crude oil and petroleum products
- Power stations excluding nuclear power stations
- Profile of miscellaneous industries incorporating: Charcoal works Dry-cleaners Fibreglass resins manufacturing works Glass manufacturing works photographic processing industry printing and bookbinding works
- Pulp and paper manufacturing works
- Railway land

- Road vehicle fuelling service and repair - garages and filling stations
- Road vehicle fuelling service and repair - transport and haulage centres
- Sewage works and sewage farms
- Textile works and dye works
- Tier products manufacturing works
- Tier treatment works
- Waste recycling treatment and disposal sites - drum and tank cleaning and recycling plants
- Waste recycling treatment and disposal sites - hazardous waste treatment plants
- Waste recycling treatment and disposal sites - landfills and other waste treatment or Waste disposal sites
- Waste recycling treatment and disposal sites - metal recycling sites
- Waste recycling treatment and disposal sites - solvent recovery works

Appendix I Other Regulatory Regimes

Other Regulatory Regimes

Environmental Permitting

The primary objective of the Environmental Permitting (England and Wales) Regulations 2007 regime is to move industrial operators towards greater environmental sustainability by minimising contamination at source. Operators of prescribed installations hold a permit and are subject to inspections to ensure impacts are minimised.

The Environmental Permitting Regulations 2010 (as amended):
The Environmental Permitting regime incorporates the previous Pollution Prevention and Control (PPC) regime, and includes permits held by

- 'Part A' installations overseen by the Environment Agency to ensure there are no consequential emissions to the environment (IPPC)
- 'Part A' installations overseen by the council (LA-PPC).
- 'Part B' processes that are regulated by the council to ensure there are no emissions to air (PPC). These processes range from cement, coatings, foundry and timber processes, to petroleum, incineration and combustion.

The council regulates 1 Part A installation and 36 Part B permitted installations.

The primary objective of the PPC regime is to move industrial operators towards greater environmental sustainability by minimising contamination at source.

Many installations occupy land with a relatively long industrial history, and site reports (the requirement for which will be incorporated into A1 or A2 permit applications) will identify contamination. In these circumstances, the Statutory Guidance gives a clear indication for the potential for the Part 2A contaminated land regime to be applied providing that the site can be deemed to comply with the restricted statutory definition of 'contaminated land' contained in the Part 2A legislation. However, it is important to note that an enforcing authority cannot require remediation under Part 2A where enforcement under the PPC permit is possible.

(a) Integrated Pollution Control (IPC) – Part I of the Environmental Protection Act 1990 ('the 1990 Act') placed a requirement on operators of prescribed industrial installations to operate within the terms of permits to control harmful environmental discharges;

(b) Pollution Prevention and Control (PPC) – This regime replaces IPC and includes the specific requirement that permits for industrial plants and installations must include conditions to prevent the pollution of soil; and there are also requirements in relation to the land filling of waste. This is regulated under the Environmental Permitting (England and Wales) Regulations 2010.

The Landfill Directive supplements the IPPC directive by setting a variety of technical standards of operation for landfill PPC (above) and covers waste via the Landfill Regulations 2002. These regulations are an enactment of the Landfill Directive 1999/31/EC. All landfill sites currently accepting waste are permitted under Pollution Prevention and Control legislation.

Part 2a does not normally apply where either the Environment Agency or the Council has powers to take action over contamination of land arising from the breach of a Process Authorisation under the above legislation.

Hazardous Substances regulations

Planning (Hazardous Substances) Regulations 1992 (Amended 2005)
This legislation requires consent to allow the presence on land of Hazardous Substances above a specified quantity. These regulations were recently amended by the Planning (Control of Major-Accident Hazards) Regulations 1999 (SI 981) to implement the requirements of the EU directive (96/82/EC) that land-use policies must take major hazard sites into account when siting new residential areas or locating new hazardous installations.

Control of Major-Accident Hazards (COMAH) sites
The Control of Major Accident Hazards Regulations 1999 (SI 743) are enforced by the Environment Agency and Health & Safety Executive (joint competent authority) to control both on and off site risks from industries with a high potential for disaster from dangerous substances (flammable, toxic or explosive).

Notification of Installations Handling Hazardous Substances Regulations (NIHHS) sites
All sites notified to the Health and Safety Executive under the notification of installations handling Hazardous Substances Regulations 1982, as well as COMAH sites, will be held on the Hazardous Substances register.

Explosives
These are not directly covered by the Hazardous Substances Regulations 1982, but the manufacture of all explosives and the storage of explosives (two tonnes and above), are controlled by the Health & Safety Executive under licences issued under the Manufacture and Storage of Explosives Regulations 2005. Below two tonnes the same regulations stipulate the council is the regulatory body, but in this case the higher tier local authority is the regulator.

Landfill and Waste Processing

Current landfill and waste processing sites
Licensed by the Environment Agency under the provisions of Part II of the Environmental Protection Act 1990, the council will maintain regular communication with the agency should any potential contamination issue arise. Locations of all such sites are kept on record by the council and this information is periodically updated from the Environment Agency.

Portsmouth has no active landfill sites. Paulsgrove was the last to close and has 2 licenses, one for its status as a closed and actively managed landfill site, the other for the Energy Recovery Facility. Paulsgrove Landfill was a co-disposal landfill, with the Pyramids area of the landfill having accepted household, commercial and industrial waste. But this landfill itself sits upon older landfilled areas.

Many installations occupy land with a relatively long industrial history. The requirement for site reports to establish a baseline for the site has been incorporated into new A1 or A2 permit applications but older sites will not have this evidence base for the operator. In these circumstances, the Statutory Guidance gives a clear indication for the potential for the Part 2A contaminated land regime to be applied. The current occupier/operator may be deemed as the 'appropriate person' and so could be liable for any remedial actions which are required. However, it is important to note that an enforcing authority cannot require remediation under Part 2A where enforcement under the PPC permit is possible.

Part 2a powers are only used as last resort, and where a permit is in force, the Environment Agency or the council has powers to take action over contamination (see Environmental Damage regulations).

The Landfill Directive supplements the IPPC directive by setting a variety of technical standards of operation for landfill and covers waste via the Landfill Regulations 2002. These regulations are an enactment of the Landfill Directive 1999/31/EC. All landfill sites currently accepting waste are permitted under Pollution Prevention and Control legislation.

Environmental Damage

The Environmental Damage (Prevention and Remediation) Regulations 2009 (SI 2009 no. 153 and amended in 2010 (SI 2010 587) impose obligations on operators of economic activities requiring them to prevent, limit or remediate major environmental damage. They implement Directive 2004/35/EC on environmental liability making operators of activities that cause damage financially liable for that damage (the 'polluter pays' principle).

The Regulations apply to serious environmental damage to land, water and to species and habitats. The council is the lead regulator in respect of the Environmental Damage Regulations. The damage must result in a significant risk of adverse effects on human health.

Operators should inform the relevant enforcing authorities if possible environmental damage occurs, enforcing authorities can require information from operators and serve prevention and/ or remediation notices on operators to require certain action to be taken to prevent damage or remediate damage that has occurred.

The Water Resources Act 1991 gives powers to the Environment Agency to prevent or remedy pollution of controlled waters by the issuing of works notices. The appropriate application of either regulatory regime to any given site will need to be determined after consultation between the Council and the Environment Agency. The normal enforcement mechanism under these powers is service of a 'works notice', which specifies actions to be taken and in what time period. This is served on any person who has 'caused or knowingly permitted' the potential contaminant to be in the place from which it is likely to enter controlled waters, or to have caused or knowingly permitted a contaminant to enter controlled waters.

There is a clear potential for overlap between these powers and the Part 2A regime in circumstances where substances in, on or under land are likely to enter controlled waters. The two powers use differing enforcement mechanisms.

The Environment Agency has published a policy statement, 'Environment Agency Policy Guidance on the Use of Anti-Contamination Works Notices'. This sets out how the Environment Agency will use Works Notice powers, particularly in cases where there is an overlap with the Part 2A regime. In summary, the effect of the policy (which was agreed with the Department of the Environment, Transport and the Regions), taken together with the legislation, is that in the Portsmouth area:

a) the council, acting under Part 2A, should consult the Environment Agency before determining that land is contaminated land in respect of contamination of controlled waters;

b) in any case where the council has identified contaminated land which is affecting controlled waters, the Statutory Guidance requires the council to take into account any comments the Environment Agency makes in respect to remediation requirements;

c) where the Environment Agency identifies any case where actual or potential water contamination is arising from land affected by contamination, the Environment Agency will

notify the council, thus enabling the council formally assess whether the land is 'contaminated land' for the purposes of the Part 2A regime; and

d) in any case where land has been identified as 'contaminated land' under the Part 2A regime, the Part 2A enforcement mechanism should normally be used rather than the works notice system with regard to contamination of controlled waters. This is because Part 2A imposes a duty to serve a remediation notice (see section 2.7.2 of the strategy), whereas the Environment Agency is given only a power to serve a works notice.

The Water Resources Act powers may be especially useful in cases where there is an historic contamination of groundwater, but where the Part 2A regime does not apply. This may occur, for example, where the contaminants are entirely contained within the relevant body of groundwater or where the 'source' cannot be identified.

No remediation notice served under Part 2A can require action to be carried out which impedes or prevents a discharge into controlled waters for which a 'discharge consent' has been issued under the Water Resources Act 1991.

Water Framework Directive

The Water Framework Directive (2000/60/EC) is the most significant piece of European water legislation to be produced for over twenty years. The directive takes a holistic view to water management and will cover surface and groundwater bodies updating and in some cases replacing, existing EC water legislation. The Drinking Water Directive (98/83/EC) sets quality standards for drinking water quality (at the tap) and concentrations are being adjusted to European values, with lead (Pb) being reduced in 2013.

For groundwater, both quantitative and chemical objectives are set and all water bodies must be classed as ‘good status’ by 2015. The directive will be relevant to the redevelopment of contaminated land as remedial objectives may be linked to ‘good status’. The Environment Agency is the authority responsible for the implementation of the directive.

Discharge Consents (Water)

Covered under the Water Resources Act 1991 Part III, no remediation notice can require action to be taken which would affect a discharge authorised by consent.

Change of Land-Use

Where land becomes a risk to potential new receptors as a result of a change of use, the Town & Country Planning development control regime will continue to apply as before.

Risk of harm to employees

Where there is a risk of harm to persons at work from land contamination, this should be dealt with under the Health and Safety at Work Act 1974 the enforcing authority will be either the health & safety executive or this council depending on the work activity.

Control of Major Accident Hazard Regulations

Risk of harm following an incident at a COMAH site. Where there has been a release, explosion or other major incident, which has caused land contamination, the restoration should be carried out as part of the COMAH on site / off site emergency restoration plan.

Contaminated Food

Part I of the Food and Environment Protection Act 1985 gave the Secretary of State, via the Food Standards Agency emergency powers that include preventing the growing of food on contaminated land.

Where the council suspect crops may be affected from contaminated land so is unfit to eat, it will consult the Food Standards Agency and DEFRA to establish whether an emergency order may be necessary. Remediation of the site, if necessary, would be carried out through the council's implementation of Part 2a regime.

Organisms

Part 2a was intended for chemical pollution of land. It does not apply to contamination caused by organisms such as bacteria, viruses, protozoa as they do not fall within the definition of substances.

This excludes anthrax (a historical disease connected with farm animals and leather processing), e-coli, and prions from being considered under the regime. If any such sites are found, in lieu of a pertinent regime, the council will liaise with Public Health England and the Environment Agency in relation to MOD land and DEFRA on all other sites.

Land contaminated due to biological weapons would be designated as a Special Site although the Part 2a regime is only to be applied to the non-biological contamination of that land.

Ordnance

As the Part 2a regime relates to chemicals and not devices, it cannot be applied to risks from unexploded ordnance. However, substances released by the old ordnance and landfills containing ordnance are included within Part 2a regime.

Radioactive Wastes

Radioactive wastes have separate Statutory Guidance.

Industrial uses of heavy substances include radiation shielding and radiography, sailboat keels and aircraft. Armour-piercing projectiles (depleted uranium/DU/Q-metal/depleted alloy/D-38) are a recent innovation and would not be found discarded.

Statutory Nuisance (Part III of the 1990 Environmental Protection Act)

Land Contamination has been removed from the Statutory Nuisance regime by an amendment to the definition of a statutory nuisance in section 79 of the 1990 Act, consisting of the insertion of sections 78(1A) and (1B); this amendment was made by paragraph 89 of Schedule 22 of the Environment Act 1995.

Once determined as statutory contaminated land, it is regulated solely under the Part 2a regime and by definition it is not considered a statutory nuisance. This is to ensure there is no duplication or conflict between the two regimes.

It should also be noted that the exclusion of the statutory nuisance regime applies only to harm (as defined in section 78A(4)) and the contamination of controlled waters, and so it continues to apply to the effects of substances that give rise to odour resulting in loss of amenity, or when land

is being remediated if the remediation activity generates noise, odour or dust.

Land that is not being resolved through Part 2a as statutory contaminated land may contain 'accumulations that are prejudicial to health or a nuisance'. The definition of harm under Part 2a (see SPOSH) and the evidence of proof required (95% proof of exposure e.g. concentration of contaminant exceeds screening concentrations, with that soil screening concentration being based on a lines of evidence as casing harm; with that harm being on balance of probability 50% as judged by professional opinion) is stringent compared to the pragmatic decisions made by Environmental Health Practitioners for Part III.

The statutory nuisance regime will continue to apply for land contamination issues in any case where an abatement notice under section 80(1), or an order of the court under section 82(2)(a), has already been issued and is still in force. This will ensure that any enforcement action taken under the statutory nuisance regime can continue and will not be interrupted by the implementation of the Part 2A regime.

Statutory Guidance

The Statutory Guidance - April 2012.

Http://www.DEFRA.gov.uk/publications/files/pb13735cont-land-guidance.pdf

Included as the main changes to the guidance are the following:

- A four category test to help decide when land is and is not contaminated;
- Clarification of both the status and how to use technical screening levels;
- Clarification that 'normal' background levels of contamination would not be contaminated land, unless exists a reason to consider otherwise;
- Clarification of what constitutes 'reasonableness of remediation';
- Change in the definition of contaminated land to include 'significant' and 'significant possibility' when defining controlled waters;
- Introduction of 'risk summaries' before determining land as contaminated;
- Local authorities, once taking the decision that land is contaminated, may reverse that decision;
- Radioactively contaminated land is removed from the guidance;

As the main statute has not changed there are no rule changes in relation to the identification of appropriate persons, the exclusion test and apportionment of liability.

The Statutory Guidance for radioactively contaminated land resides in the Department of Energy and Climate Change publication Environmental Protection Act 1990: Part 2a Contaminated Land Radioactive Contaminated Land Statutory Guidance, April 2012.

Non-statutory technical guidance

Technical guidance is released by numerous organisations; the Statutory Guidance requires that when determining land as contaminated, local authorities must 'carry out any intrusive investigation in accordance with appropriate good practice technical procedures' (DEFRA, 2012a).

Guidance documents are available on the Environment Agency website.

Http://www.environment-agency.gov.uk/research/planning/33706.aspx

Appendix I Environmental Permitting Regulations

This appendix lists the installations permitted under Environmental Permitting Regulations and also formal landfill sites. Installations are correct as of May 2015.

Table 1

Part A - Prescribed Installations

Name of Installation	Address	A2	Date Permit Issued/Reviewed	Permit Reference
Chesapeake	Limberline Road, PO3 5JF	Printing	29/01/2013	A2/1.1A

Source: Environmental Health, Portsmouth City Council;

Table 2

Part B- Prescribed Installations

Name of Installation	Address	Part B Process Type	Date Permit Issued/Reviewed	Permit Reference
LBL 2 (Tomburn)	Gunstore Road PO3 5HL	Powder Coating	20/07/2007	B21.1
KRM	Kendalls Wharf Eastern Road PO3 5LY	Cement Batching	11/01/2013	B7.3
Hope Construction	Tipner Wharf PO2 8QA	Cement Batching	30/11/2012	B6.2
Cemex	Walton Road PO6 1UJ	Bulk Cement	01/03/2011	B2.3
BAE Systems Surface Ships Support	Portsmouth Naval Base PO1 3AQ	Coating of Metal	04/03/2009	B33
BAE / SELEX	Neville Shute Road PO3 5RT	Melting	08/02/2011	B17
Queensbury Shelters	Fitzherbert Road	Solvent Degreasing	04/03/2011	B24.1
FPT 1. (GKN)	The Airport PO3 5PE	Carbon Black	14/07/2005	B19.1
FPT 2. (GKN)	The Airport PO3 5PE	(Adhesive/ Textile)	14/07/2005	B19.1
Demolition & Salvage	Ackworth Road	Mobile Concrete Crushing	30/09/2010	B/MCS/1
Adams Morey	Burrfields Road PO3 5NN	Vehicle Respraying	06/02/2008	B16.1
Nationwide	Plot 3000 PO3 5SE	Vehicle Respraying	16/01/2012	B12.2
J Lawrence	Unit A The Kinard Centre Northarbour Road PO6 3TF	Vehicle Respraying	16/01/2012	B23.2
ERB	Claybank Road PO3 5NH	Vehicle Respraying	16/01/2012	B15.2
Apollo Motor Group	Unit 6 Fitzherbert Road PO6 1RU	Vehicle Respraying	16/01/2012	B18.2
Welfare Garage	Portsmouth Naval Base PO1 3HH	Waste Oil Burner	11/07/2003	B5

Fairway Garage	4-6 Bourne Road Paulsgrove PO6 4JS	Waste Oil Burner	02/01/2013	SWOB2
Richmond Cars	Fitzherbert Road Portsmouth PO6 1RU	Waste Oil Burner	09/12/2013	SWOB

Continued next page/….

…./ Table continued from previous page

Name of Installation	Address	Part B Process Type	Date Permit Issued/Reviewed	Permit Reference
Solent	44B High Street PO6 3AG	Dry Cleaners	18/11/2010	B31
Solent	253 Albert Road PO4 0JR	Dry Cleaners	18/11/2010	B32
Solent	Unit 5 Mountbatten Buisness Park Jackson Close PO6 1UR	Dry Cleaners	26/03/2014	B42
Look Smart	149 Copnor ɔad PO3 5BS	Dry Cleaners	18/11/2010	B36
Guest care	145 Albert Road PO4 0JW	Dry Cleaners	16/11/2010	B34
Impress (Palmerston d)	72 Palmerston Road PO5 3PT	Dry Cleaners	07/02/2012	B40
Impress (Albert Road)	169 / 171 Albert Road PO5 3PT	Dry Cleaners	30/09/2010	B39
Impress North ıd (London Road)	98A London ɔad North End PO2 0LZ	Dry Cleaners	08/07/2014	B43
Washeteria	279 London ɔad PO2 9HF	Dry Cleaners	18/11/2010	B41
Smarty pants	36 London Road PO2 0LN	Dry Cleaners	18/11/2010	B30
Kingston eaners Ltd.	35 Kingston ɔad PO2 7DP	Dry Cleaners	16/11/2010	B38
Tesco	Clement Atlee Way PO6 4SR	Vapour Recovery - Stage II	10/11/2009	PS36
Shell Victory	Kettering ɜrrace PO2 7SB	Vapour Recovery - Stage II	14/04/2010	PS4
Sainsburys	Fitzherbert Road PO6 1RR	Vapour Recovery - Stage II	14/05/2010	PSII.02
Tesco	241 -243 Copnor Road PO3 5EE	Vapour Recovery - Stage II	10/11/2009	BPS9
Shell ırlington	Eastern Road PO1 1OW	Vapour Recovery - Stage II	20/10/2009	BPS5.1
Shell Bastion	London Road PO2 9RR	Vapour Recovery -	14/05/2010	PSII.01

		Stage II		
Asda	Holbrook Road PO1 1JP	Vapour Recovery - Stage II	18/07/2012	BPS42
Shell Fratton	Goldsmith Avenue. PO4 8BH	Vapour Recovery - Stage II	10/11/2009	BPS3.1

Continued next page/….

…./ Table continued from previous page

Name of Installation	Address	Part B Process Type	Date Permit Issued/Reviewed	Permit Reference
Installation BP	CommercialRoad, PO14BU	Process Type Vapour Recovery-StageI	30/06/2010	PS011
Portsbridge	PortsmouthRoad, PO62ST	Vapour Recovery-StageI	30/06/2010	PS28
Green Road Service Station	GreenRoad, PO54DY	Vapour Recovery-StageI	30/06/2010	PS15
Eastern Road Service Station	EasternRoad, PO36QB	Vapour Recovery-StageI	30/06/2010	PS38
Rontec	144-160Milton Road, PO48PN	Vapour Recovery-StageI	29/11/2012	PS43
Malthurst - Northend Service Station	Kingston Road, PO2 7DZ	Vapour Recovery - Stage I	15/05/2013	PS38
White Heather	Richmond Road, PO5 2LN	Vapour Recovery - Stage I	30/06/2010	PS46
Malthurst - Cosham Service Station	Northern Road, PO6 3DN	Vapour Recovery - Stage I	10/06/2008	PS2.1

Table 3

Licensed Landfill Sites

Name	Operator	**Licence type**	Licence	Permit No.
Paulsgrove Landfill Site	Veolia E S Hampshire Ltd	A1 : Co-Disposal Landfill Site	19957	NP3792HM/A001
Pyramids At Paulsgrove Landfill Site	Veolia E S Hampshire Ltd	A4 : Household, Commercial & Industrial Waste Landfill	10207	AP3795HY/A001

Source: Environment Agency WIYBY. Retrieved from http://maps.environment-agency.gov.uk/wiyby/

Table 4

Disused Landfill Registered by Environment Agency

Site name and location address
Kendals Quay
Sports Field East of Eastern Road
Hilsea Gasworks Refuse Disposal Area
Longmeadow Allotments
Moneyfield and Longmeadow Allotments
Moneyfield Allotments
Land South of Burrfield Road
Land East of Baffin's Pond
Milton Common Lake
Twyford Wharf
Continental Ferry Port
North Harbour Allotments
Reclaimed Land In Paulsgrove Area
Paulsgrove Landfill Site
Paulsgrove Tip
Pyramids (Paulsgrove Landfill Site)*
Paulsgrove Landfill Site*
King George V Playing Fields
Salisbury Road Allotments
Horsea Allotments
Alexandra Park
MOD Site
Tipner Stamshaw Area
Stamshaw 'Site A'
Milton Common
Eastney Lake
Henderson Road Caravan Park
The 'Glory Hole'
Site B South of Ferry Road
Land East of Baffin's Pond

Source: http://maps.environment-agency.gov.uk/wiyby/

* holds a closure current licence

Appendix J Liaison and Communication

This chapter describes both, the formal consultation partners as well as the internal liaison and consideration of land condition.

External agencies

To fulfil the council's statutory duty with respect to contaminated land formal liaison procedures will be established with the following external agencies:

- **Environment Agency** - The agency provides liaison for inspection of potential Special Sites (controlled waters are main receptor) and becomes the regulator when Special Sites are determined as Contaminated Land. Particular information collected from the Environment Agency will include the location of: landfills; sewage treatment works; water abstractions; consents to discharge; waste management licensed sites; Permitted Installations; radioactive substance licensed sites, as well as information on water quality monitoring from groundwater and surface water, river quality objectives exceedances, source protection zones and groundwater vulnerability;

- **Public Health England**– provides support and expert advice on toxicological issues relating to contaminants of concern which pose a threat to public health;

- **Food Standards Agency** – for providing advice on food safety, including the safety of consumers from any food that may be affected by contamination from land. This includes food produced in domestic gardens and allotments as well as food collected from the wild;

- **Natural England** - with respect to all matters relating to statutory designated sites, e.g. Sites of Special Scientific Interest, Special Areas of Conservation, Special Protected Areas (SPAs) and RAMSAR sites;

- **Historic England**– with respect to the protection of historic/protected buildings, archaeological sites and ancient monuments;

- **British Geological Survey** – for information relating to geological conditions and the provision of geological data;

- **Hampshire County Council** - and neighbouring local authorities.

Internal Agencies

To fulfil the council's statutory duty with respect to contaminated land formal liaison procedures will be established with the following internal agencies**:**

Land in use and controlled by the council may be polluted and require remediation. There may be interplay with remediation schemes and tree growth or upon ecological receptors.

Planning ('Development Management')
The Town and Country Planning Act 1990 is clear that the potential for contamination is a material planning consideration, and is to be taken into account during the normal course of development. The government considers that the redevelopment phase is the most appropriate and cost effective time to deal with contamination issues, stressing that local authorities should

make full use of the powers available to them in accordance with the National Planning Policy Framework (NPPF, 2019). A key part of the National Planning Policy Framework is the reference to Part 2A as a minimal standard for risk management. Online Planning Practice Guidance (PPG, 2019) provides guidance on the management of land condition and the onus being upon the developer for safe development.

The planning system is the primary tool for encouraging the remediation of polluted and contaminated land. The majority of all polluted land is cleaned up through the planning regime. The assessment and risk management (including remediation) of polluted land allows that land to be brought back into use for residential and commercial uses.

The planning process and Part 2a are complimentary regimes as Part 2A is primarily focused on addressing the historical legacy of land contamination, whereas planning applies to land being brought into use. Part 2a powers cannot be used on land that could be cleaned up through planning regime within a reasonable timescale. In general terms, the planning regime addresses proposed land use, whereas Part 2A considers current land use.

To prevent unacceptable risks from pollution, planning policies (as set out in the Local Plan) and decisions should ensure that new development is appropriate for its location. The effects of pollution (including cumulative effects) on health, the natural environment or general amenity and the potential sensitivity of the area or proposed development to adverse effects from pollution should be taken into account. Where a land is affected by pollution or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

Planning policies and decisions ensure that:

- The land is suitable for its new use, taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land risk management (remediation) or impacts on the natural environment arising from remediation;

- After remediation to Category 3 standard, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990;

- Adequate site investigation information, prepared by a competent person, is presented.

Planning policies and decisions should also ensure that:

- The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;

- After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and adequate site investigation information, prepared by a competent person, is presented.

In some cases, the carrying out of remediation activities under the Part 2A regime may itself constitute 'development' within the meaning given in the Town and Country Planning Act 1990 and therefore require planning permission.

In any case where new development is taking place, it is the responsibility of the developer to carry out the necessary investigation and remediation. The enforcement of investigation and remediation requirements is through planning conditions and Building Control, rather than by a remediation notice issued under Part 2A. In terms of development control, remediation may also be covered within a Section 106 Agreement made under the Town and Country Planning Act.

The application procedure requires developers to provide a brief history of the land indicating all previous known land-uses and operations.
Where the answer(s) to the new question 13 indicates a potential for contamination, or where the redevelopment will involve the creation of new residential properties, or commercial redevelopment with an area greater than 250m² a full desk study should be provided by the developer (unless the Planning Officer in consultation with the Contaminated Land Team considers sufficient information has been provided by the applicant). The desk study will provide a comprehensive site history with historic maps. A guidance leaflet from the Contaminated Land is available to assist applicants.

Where the application is on a identified historical use or the end-use is sensitive, the Planning Officer consults the Contaminated Land Team and if the information indicates the potential for contamination may impact upon the development, planning permission shall only be granted subject to conditions requiring appropriate site investigation prior to the commencement of the development, and site remediation prior to occupation of the development, where such is found to be necessary.

Where conditions are imposed on planning approvals the Development Management Service must ensure the conditions are complied with before development commences.

The Local Planning Authority is required by the Town and Country Planning Act (GDP -1995) to consult with the Environment Agency in respect of certain types of application. Open discussion of all information related to potential contamination at the development stage and the application of conditions is the only sensible way forward to ensure the safe development of brownfield land and previously used land.

This process ensures market confidence in the redevelopment of brownfield land and promotes the reuse of brownfield land in accordance with government policy. This is essential in a city with no greenfield land available where all land available for development will have a history of usage.

Public Health

Portsmouth City Council has regard to the Department for Environment, Food and Rural Affairs guidance for identifying land that poses an unacceptable health risk , alongside other considerations including the Water Environment Regulations 2017 and other matters that could affect the amenity of a site and its future occupants. Health impacts of contaminated land, depending on the contaminant could include substances that cause nausea, headaches, odour/nuisance to people .

Stringent standards of remediation also apply to the management of the risks posed by man-made radioactive substances for redevelopment for a new use. the Department for Business, Energy and Industrial Strategy has published statutory guidance on land affected by radioactive contamination .

Public Health England has published guidance on areas affected by radon and the control measures available for new development. Naturally occurring radon is not covered. However,

Portsmouth has low levels of background radon, based on its geology, so radon does not pose a significant risk to health in this area.
Chemical release:
In the event of a deliberate chemical release, expert advice on the public health impact will be needed from the outset. Public Health England has published technical guidance on recovery from chemical incidents. The response to the acute phase of an incident is likely to be complex. The recovery process in the aftermath of a chemical emergency will be equally as complex.

In the event of an accidental chemical release, for example for a road traffic accident involving a heavy goods vehicle containing hazardous substances, the same protocols can be followed.
Contaminated water run off:

A fire or other incident on land may cause contaminated water run off to enter the Solent, or other water sources. In this event, dams may need to be erected to prevent this.

Plans and guidance from elsewhere in the country are available on the Resilience Direct website, accessible by the Emergency Planning team and Public Health team.

Currently, and until an alternative processing alternative can be found, untreated sewage from across Portsmouth is filtered into the water in Langstone Harbour, at times of high pressure, including storm and heavy rainfall. In the event that this was likely to contaminate local land, the same procedures could be followed.

Public Health encourages the growing food wherever possible for the associated health benefits. Community gardens, allotments and other types of community growing are beneficial to people's health, local environment and community development, and community growing is becoming increasingly popular. In cases where land was previously contaminated (for example through industrial activities) action may need to be taken before starting to grow food crops.

Measures to remove pathways reduce risk. Once such measures includes raised bed gardens or container gardens on high concern sites, and unless remediation of the soil is undertaken, food should not be grown directly in the soil on the site. Further measures will include thoroughly washing food to be eaten and hand washing with soap. Detailed information on contaminants and advice for growers can be found in a guidance leaflet available form the CLT.

Building Control

The Building Control process is fundamental to the safe redevelopment of 'Brownfield' land, both in the checking of sites durng development and because some risk management are built into the building fabric (e.g. gas and radon membranes).

Building Control and Approved Inspectors have the duty to enforce protection measures in new build projects that they are consulted on. The Building Controls regulatory powers can be used to ensure that pollution is properly assessed even if planning conditions have not been applied or a retrospective planning application is received.

Approved Document C provides guidance on Part C of the Building Regulations 2000 incudes the impacts of contamination of the land surrounding the building structure in addition to a buildings footprint. Similarly the councils Part 2a responsibilities include the building structure itself, but the assessment criteria for contaminants are to British Standards rather than screening purposes.

It is not sufficient to rely on remediation controlled by Building Control only. Developers may use privately contracted Approved Inspectors rather than Building Control Officers. It is unlikely that

private sector practitioners have the same local knowledge about historic land uses as they may come from other regions.

Building Control inspect developments that wouldn't require planning permission, and as result have encountered unexpected contamination and so have identified sites that have gone onto be assessed and ultimately determined as statutory Contaminated Land.

Highways Authorities

Engineers and Highways responsibilities include land under highways, pavements, verges and common areas which may be contaminated and present a risk to potential receptors. Highways Authorities must maintain registers under Part III of the New Roads and Street Works Act 1991 regarding, amongst other things, streets with, ‘special engineering difficulties’.

Council Owned Land

Land owned by the council includes uses such as allotments, schools, recreational space and public open spaces all of which would be sensitive to any contamination being present. The council also owns depots, sports centres, community buildings, car parks and properties held as investments such as shops or industrial units.

Various council departments work to avoid land being statutory Contaminated Land.

Works & Maintenance Contracts

As a major land holder the council awards contracts for major new works projects and maintenance works each year. Where such works are taking place on potentially contaminated land the council has a duty of care to provide the fullest information possible to contractors. The contractor will then be in a position to comply with:

a) Relevant health and safety legislation/guidance, including the Construction Design & Management Regulations (Note: the CDM Regulations place duties on both the council and the contractor);

b) Duty of care with respect to carriage of waste and waste disposal;

Contracts are awarded by any front line services. Where site specific information is not available, the officer responsible for the contract must ensure that proper enquiries are made to:

a) Establish the site history using records held by the Contaminated Land Team;

b) Establish if previous site investigation data is available within the City Engineer's Department; or

c) Where enquiries made under 'a' indicate a potential for contamination but no site investigation data is available then provision must be made to obtain the necessary data before tendering the contract, or make allowance in the specification/bill of quantities for the contractor to undertake the necessary investigation;

d) Any new data collated under 'c' must be copied to the Contaminated Land Team which will act as the central store for information on site contamination.

Property Transactions

The council is a major land owner and a significant percentage of the land within the city has had a potentially contaminative history such as waste disposal/ land reclamation, engineering, workshops, incineration, unspecified MOD uses. The City Council leases and sells (leasehold) properties to private organisations that by their legitimate use of the land may have caused or be causing new pollution.
The council checks to ensure that:

a) Potentially polluting land uses of our land holdings is known;

b) The council does not unwittingly purchase any contaminated land without appreciating the long term implications of such a purchase, with the price of the land reflecting the site's condition;

c) Pollution of council land by persons/companies who lease our land is not accepted.

Existing Land Holdings

Portsmouth has investigated 33 sites and 10 sites have been remediated using funds from Department of the Environment, Transport and the Regions Supplementary Credit Approval Scheme. In 2010 land near Canoe Lake was inspected and assessed under the Part 2a regime.

Where sites are found to have potentially significant levels of contamination a quantified risk assessment is undertaken to decide if there is a need for remediation for the current land-use or any proposed land-use. Where the risk assessment indicates remedial works are necessary or would be prudent the land holding committee is advised and appropriate remedial measures agreed with the relevant Departments.
This ongoing programme of site prioritisation, investigation and where necessary remediation should continue in conjunction with the council's strategy on contaminated land. In future all City Council land will be prioritised in the same manner as all other sites in the City.

Land Purchases/Acquisitions

Prior to committing the council to any new land purchases or acquisitions the Property Service/Legal Services check with the Contaminated Land Team that the full site history is known. This must include:

- a search of all available historical maps;
- a review of the trades database held by the Contaminated Land Team;
- detailed enquiries from the seller as to the former activities at the site, location of storage tanks, details of materials, fuels, wastes stored and information on any spillages.

If there is any indication that the land is on or adjacent to land which has the potential to be contaminated consultants shall be appointed to undertake an appropriate site investigation.

Only when the full implications of any contamination is known, appropriate consideration has been given to the potential long term cost implications and this has been reflected in the sale price, shall the transactions continue. Advice should be sought from Contaminated Land Team and Legal Services as to the need to address future liabilities which will be dependent on the circumstances of the site.

Where land such as public open space is to pass to the council as part of a planning agreement ('Section 106') the Planning Officer must require the developer to provide:

a) Full site history information on the land to transfer; and

b) Site investigation (scope to be agreed with the Contaminated Land Team).

Leasing Property

Many of the commercial organisations to whom the council let property or land undertake potentially polluting activities. If the original polluter cannot be found (for example, because the company no longer exists) the landowner becomes the person liable for the contamination and any site remediation required. If the council as a landowner does not take steps to prevent the off-site migration of contaminants then the council may be found to be liable for the remediation of adjacent land and water.

In order to protect the value of its land holdings and to prevent the council becoming liable for our tenants contamination it is essential that we have a strategy/policy which will protect the council's interests in the long term.

The councils Property Services ensures that a land condition is considered as part of any letting, leasing, or sale of land. This is because statutory Contaminated Land can not only be created by contaminants being present but also by changing the land-use to one that is sensitive to those pollutants

Prior to Letting/Leasing Property

a) Ensure the council has information on the quality of the site. If it is a Greenfield site with no former potentially contaminative uses, ensure this is documented along with some background soil data to provide a baseline which can form the basis of any future claim. Where possible the onus should be placed on the new tenant to provide this background data.

b) If the site has previous uses establish where potentially contaminating uses have taken place. For example, the presence or previous use of the land for fuel tanks, chemical storage tanks, and the council must ensure this information is documented and provide appropriate background assessment. This is necessary not only to protect the council's interest but also to comply with our obligation in relation to disclosure to the new tenant whose workers or contractors might come into contact with ground contamination.
Note: where new information becomes available to the council regarding contamination during the term of the lease/tenancy agreement which may require action, then the council must pass the information onto the tenant/lessee in order that they can make appropriate decisions.

c) Ensure there are appropriate conditions in the lease/tenancy agreement requiring the new occupier(s) to comply with all appropriate environmental legislation to minimise the potential for future contamination and to require them to clean up any spills which may occur during their occupation.

d) Ensure that it is clear in the contract documents that prior to relinquishing the lease/tenancy the onus will be on them to return the land in a condition which is suitable for its existing use and prove that they have not caused any new pollution. Where the occupier's trade is such that there is a high risk of contamination occurring then a site

investigation will be necessary to prove the site has not been affected, or if it has to quantify the problem. The results of the investigation can be compared to the original background data obtained prior to the commencement of the lease before agreeing the remediation works necessary and/or the appropriate level of financial compensation to the council which is applicable. The new tenant/lessee will not be liable for contamination caused by a previous tenant/lessee.

e) During the course of the lease/tenancy agreement the tenant/Lessee must provide the council with:

- Details of the location/nature of fuel storage, and documentation to confirm there has been no gradual loss of free product due to leakage;
- Plans showing where chemicals or wastes are stored;
- Plans showing where services and fuel lines are;
- A copy of any Health and Safety files created in compliance with the Construction, Design and Management Regulations;
- Details of accidents/spillages;
- Where locations are moved the council must be advised.

Legal services

Contaminated land is a highly complex piece of legislation which could have significant implications for the council, land owners and occupiers. Advice from the council's solicitor may be required on many aspects relating to enforcement, liability, powers of entry, data protection, access to information *etc.*

Information Services

Significant volumes of data need to be held both on data base and geographical information systems. Support will be required on the use of these systems and data protection.

Appendix K Site Prioritisation Methodology

A SYSTEM FOR THE PRIORITISATION OF POINT SOURCES

A summary of the site prioritisation methodology used in the GeoEnviron Contaminated Land Module

GeoEnviron

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

TERMINOLOGY

The following gives short definitions of the meaning of certain terms as they are used in the report and in this document.

Contact Risk**:** refers to the possibility that humans will come into contact with polluted soil or gases. The possibility of humans coming into contact with polluted water is not considered in this definition.

Degradation: refers to breakdown of potentially hazardous contaminants to their harmless derivatives in the natural environment.

Hazard: a substance, property or situation that in particular circumstances could lead to harm. The hazardous nature of a contaminant is valued according to its mobility, toxicity, degradability and volatility.

Mobility: the mobility of a contaminant in soil is defined relative to groundwater velocity and is a function of dispersion, sorption, ion exchange, solubility etc.

Pathway: the mechanism by which the receptor and source can come into contact.

Receptor: the entity that is vulnerable to the adverse effects of the hazardous substance or material.

Risk: a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.

Risk characterisation: a preliminary evaluation of risks on a site. Risk characterisation differs from risk assessment in that the level of information required to carry out a characterisation can be a fraction of that required to carry out a risk assessment.

Risk Screening: identification of all major hazards and receptors

Source: the hazardous site, substance or material

Source strength: refers to the gas generation capability of a waste disposal site at any given moment.

Toxicity: refers to the relative ability of a particular chemical substance to cause harm to a living organism. The toxicity of the chemical is dependent on the environmental receptor being considered.

Volatility: This is defined as the propensity of a chemical to vapourise and is measured using Henry"s Constant.

1. INTRODUCTION

For most Local Authorities, the implementation of their contaminated land strategies will begin with a desk top study. The information acquired from this exercise will then be used to set priorities for further investigation and remediation. Setting priorities is important for decision-making as it helps to promote transparency by ensuring an explicit and justifiable basis for decisions (DETR, 2000).

The USEPA and the UK Environment Agency advocate the use of the "source-pathway- receptor" concept as the basis for risk assessment. A tiered approach where risk management questions are answered at each stage is recommended.

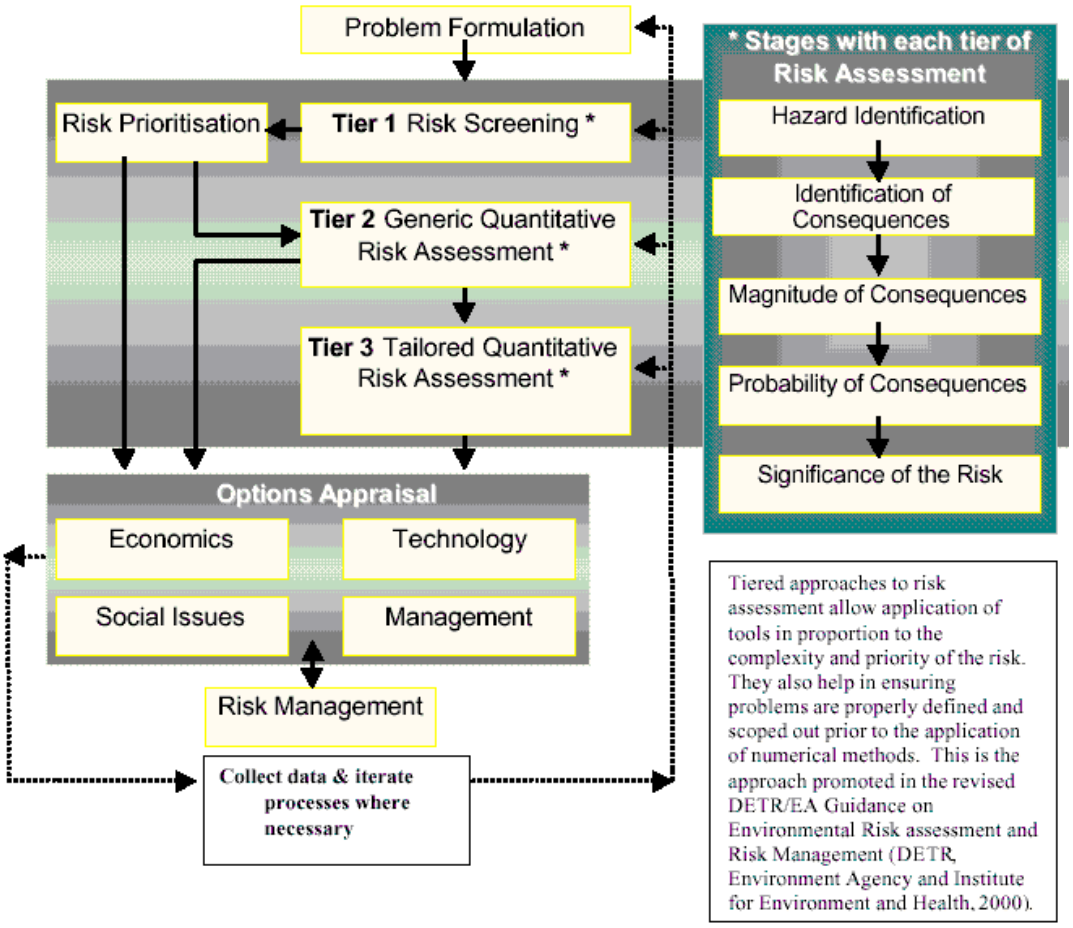


Figure 1 - A tiered approach to risk assessment
(Source: DETR, Environment Agency and Institute for Environment and Health).

As can be seen from the figure above, the first tier of the risk assessment process involves hazard identification, risk screening and prioritisation. This process is used to determine which hazards or risks should be investigated in more detail. The process helps to minimise unnecessary effort and reduces the chance of potentially important risks being overlooked. In addition, it provides an auditable trail to support or explain the omission of certain risks from further consideration. It also helps to identify risks where action, as

opposed to further investigation, may be preferable (DETR, 1999). Ultimately prioritisation provides a mechanism for targeting resources towards those sites that present the greatest risks.

There are various prioritisation methods available. One simple and effective method is to rank hazards based on screening scores, thereby providing a priority list for further action.

Geokon have produced a computer based environmental information management system known as GeoEnviron, which among other things, includes a module dedicated to managing information related to the identification, risk assessment and remediation of contaminated land. The module has built within it, a site prioritisation system for use in tier 1 of the risk management process.

The prioritisation system uses the Source-Pathway-Receptor concept to assess risks. It is split into two stages. The Stage I assessment involves hazard ranking sites based on their historical industrial uses and the receptor"s sensitivity. The Stage II procedure involves refining the assessment from Stage I by carrying out an exposure assessment.

The stage I assessment can be carried out very rapidly, providing that source and receptor information is available. The assessment produces a priority listing of sites for each type of receptor considered.

The Stage II assessment involves refining the priority listing obtained from stage I, by carrying out a pathway or exposure assessment to determine whether or not a potential pollutant linkage exists. The priority listing arrived at after Stage II can be used to inform decisions as to which sites should be investigated further under the Part IIA regime. In many instances the information yielded after a stage II assessment will be sufficient to enable a decision to be taken as to whether a site should be determined „contaminated".

The GeoEnviron Site Prioritisation methodology is similar to that proposed in Contaminated Land Research Report No. 6 (CLR6) in that it is not designed to produce a single site risk score that encompasses all the different receptors types. Instead it requires that policy decisions are taken with respect to the relative priority that is assigned to each o f the receptor groups. These decisions should be made after taking local circumstances into account.

The main part of this document details the Stage I and II of the GeoEnviron site prioritisation methodology. The Appendix, which contains screen shots of the GeoEnviron system"s risk assessment tab folders, describes how both the Stage I and II site prioritisation methods have been implemented practically within the GeoEnviron system.

2. BACKGROUND

The prioritisation system has been developed to fulfill the needs of local authorities to identify, register and deal with contaminated sites.

Overall Aim: To establish a prioritisation system for contaminated sites about which little is known.

Requirements:

- The system should prioritise sites based on their potential risk to humans and the environment;
- The system should be simple and transparent;
- Site characterisation should be based as much as possible, on existing data;
- Site prioritisation should be based on a uniform method;
- The system should be objective and verifiable (i.e. others performing the exercise should be able to arrive at the same score);
- The system should be capable of being used at both local and regional levels;
- The time used to prioritise sites should be minimal. The

prioritisation system caters for:

a) regional prioritisation of sites in terms of their requirement for detailed site investigations;
b) regional prioritisation of sites in terms of their requirement for remedial works;
c) national prioritisation of sites.

The system characterises sites according to their impact on three receptors:

a) Groundwater - considered mainly with regard to its value as a drinking water resource;
b) Land Use related receptors – the term land use related receptors encompasses the use of land by humans, wildlife, plants and buildings.
c) Surface water – considered mainly with regard to the desired quality objective of the water body.

The characterisation of each site results in a Risk Score for each receptor, which can then be used to prioritise the sites in terms of the need for detailed site investigation and/or remediation.

3. DATA REQUIREMENTS

In an ideal situation, data on geography, hydrogeology, contaminant properties, current and historical site uses as well as information on animal use and behavior patterns would be available for a risk assessment. In acknowledgement of the fact that this is rarely the case, this method has been designed such that it has very minimal data requirements.

Where the data required is not available, implementation of the method can be based on assumptions. In such cases, the user is advised to assume a worst case scenario for each situation. Further information should then be collected in order to verify assumptions made a n d further refine the priority listing.

Information on former and historical land uses can in most instances be obtained fairly readily these days. It can be accessed from archive libraries or purchased from the increasing number of commercial organisations offering historical land use information for sale. One of the methods most important data requirements is information on contaminants likely to be present on the site. Information on typical contaminants associated with industries can be obtained from a variety of sources including the DOE industry profiles, which are included as part of the GeoEnviron system. Site specific information necessary for the exposure assessment can be obtained from land coverage"s in a GIS, aerial photos, from documentation held by the local authorities or alternatively by carrying out site walkovers.

4. STAGE I SITE PRIORITISATION

Before arriving at the stage of site prioritisation you should have compiled a list of potentially contaminated sites. This can be done using sources and receptor information which will usually be available in a GIS. A simple spatial query can then be performed in the GIS, to find out for example, areas where sources and receptors overlap. A buffer zone can be incorporated within the spatial query, in cases where the source contamination is considered to have the potential to migrate. The areas identified via the spatial query are considered to be the potentially contaminated sites. The list of potential sites obtained from the GIS is then imported into the GeoEnviron Contaminated Land Module.

The different classes of receptors in the area along with a sensitivity score for each receptor is also entered in the base tables of the database. Receptors are divided into 3 broad categories - land use, groundwater and surface water. Land use receptors are further sub-divided into humans and protection zones (i.e. nature conservation reserves, SSI"s, RAMSAR sites, listed buildings, etc). Following this, a list of receptors that each site may potentially impact is captured from GIS and imported into the database.

The first stage of the site prioritisation is based solely on the types of industrial uses the site has been subjected to and the sensitivity of the potential receptors. The issue of pathways is considered in Stage II. The GeoEnviron system contains as standard detailed information on all the DOE industry profiles. An objective methodology (which is not detailed here) has been used to derive hazard scores for each of the profiles in relation to land use, ground and surface water receptors. The hazard scores have been derived by considering the contaminants likely to be present on the site. Information on potential contaminants of concern is available from CLR8 “Potential Contaminants for the Assessment of Land”. A spreadsheet is available with the GeoEnviron system to enable the same objective methodology to be used to rate industries that do not fall within the scope of the DOE industry profiles.

An example of risk categorisation and hazard ranking for a selection of the industry profiles is shown in the tables below.

Note: All the scores used in the GeoEnviron risk ranking are user configurable. The numbers presented below are only examples.

Table 1: Example OF Stage I Prioritisation Risk Categories

Risk Category	CODE	Score
Very High	VH	6
High	H	5
Medium High	MH	4
Medium	H	3
Medium Low	ML	2
Low	L	1

Table 2: Example of Industry Profile Hazard Ranking

INDUSTRY PROFILE	LAND USE	GROUNDWATE	SURFACE
Airports	M	MH	MH
Animal and animal products processing	M	L	L
Asbestos manufacturing works	VH	MH	MH
Ceramics, cement and asphalt manufacturing works	LM	L	L
Charcoal works	MH	MH	MH
Chemical works : Coatings (paints and printing inks)	MH	M	M
Chemical Works : Mastics, sealants, adhesives	M	M	M
Chemical works: Cosmetics and toiletries manufacturing works	L	M	M

As mentioned above, the different classes of receptors are rated in terms of their sensitivity. For human receptors, the sensitivity rating is carried out by assessing the current land use. For the groundwater receptor, the rating is carried out by considering the groundwater class. For surface water receptors, the rating is carried out by considering the water body"s quality objective. An example is given below.

Table 3: Example of Land Use Sensitivity Rating

Land Use	Sensitivity	Score
Residential Houses with gardens	H	5
Residential without gardens	M	3
Commercial with soft cover	M	3
Commercial (no soft cover)	L	1
School with play grounds	H	5
Nursery	VH	6
Allotments	VH	6
Park	H	5
Nature Conservation Area	H	6
SSI or RAMSAR site	H	6

Table 4 : Example of Groundwater Sensitivity Classes

Groundwater Class	Sensitivity	Score
Major Aquifer	H	5
Intermediate Aquifer	M	3
Minor Aquifer	L	1

Table 5: Surface Water Sensitivity Classes

Surface Water Quality Objective	Sensitivity	Score
Major Aquifer	H	5
Intermediate Aquifer	M	3
Minor Aquifer	L	1

4.1. Calculation of Stage I Site Risk Score

The stage I site risk scores for each individual potentially contaminative industrial site use for each receptor is then automatically calculated using the following simple algorithm:

SRS= IRS x RSS

Where:

SRS = Site Risk Score IRS =
Industrial Risk Score
RSS = Receptor Sensitivity Score

When using the default scores, the maximum site risk score for land use related receptors is 30. The maximum for ground and surface water receptors is 25.

Using these site risk scores, one can rapidly obtain a site by use by priority listing. However, as this listing does not include a pathway assessment, it is recommended that it is refined using the Stage II methodology outlined below.

5. STAGE II PRIORITISATION

Using the scores obtained from the Stage 1 prioritisation, sites can be placed in groups based on risk. For example those sites with SRC"s above 20 may be catergorised top priority for further investigation and may constitute the initial group of sites taken further to stage II.

5.1 PRIORITISATION of SITES BASED ON RISKS TO LAND USE RELATED RECEPTORS

Due to the differences in the nature of the potential hazards likely to be encountered, the methodology makes a distinction between two groups of sites with land use related receptors. These are:

a) current or former industrial sites – where risks are mainly direct contact or inhalation related
b) current or former waste disposal/landfill sites - where risks are associated mainly with explosive and/or toxic gases.

Sites should be characterised for both categories of risk, where both are thought to exist.

5.1.1 Current and former industrial sites

Please note that the process described below has been automated within the GeoEnviron system and can be carried out in a matter of a few minutes for each site provided the required receptor and pathway information is available.

5.1.1.1 Contaminant Properties

The prioritisation begins with a listing of the site"s potential contaminants along with an assessment of their potential impact on the receptor of interest. For each receptor, the contaminant (the „significant contaminant") with greatest potential impact is selected. In order to help establish a uniform basis for the prioritisation, the priority contaminants of concern are characterised prior to the assessment and allocated receptor specific hazard scores. The process used to derive these scores is described below. However, it is necessary to first briefly consider the issue of „exposure pathways".

The method distinguishes between two main types of exposure pathways in respect of land use associated hazards. These are referred to as the „direct contact" and „inhalation" pathways. The direct contact pathway considers exposure to soil contaminants via ingestion (both direct ingestion of soil and ingestion of foods grown in the contaminated soil) or dermal absorption. The inhalation pathway considers exposure to soil contaminants via inhalation of soil contaminant vapours and/or dust.

The toxicity of a contaminant, in relation to the direct contact pathway (skin contact and ingestion), can be evaluated based on regulatory or soil quality standard values where they exist. Where these are not available, the method recommends the use of reference factors such as Tolerable Daily Intakes (TDI) and Acceptable Daily Intakes (ADI). Each contaminant is placed into one of three toxicity indicator classes (high, medium and low) and assigned a direct contact related toxicity score (see table below).

Table 6. Derivation of contaminant toxicity score for direct contact pathway

Class	Soil Quality Criteria	ADI, TDI, PMTDI Carcinogenic µg/kg body	ADI, TDI, PMTDI Non-Carcinogenic µg/kg body weight	PTWI µg/kg body weight	Score
High	< 10	< 0.4	< 20	< 2.8	**8**
Medium	10 – 200	0.4 – 8	20 – 40	2.8 – 56	**4**
Low	> 200	> 8	> 400	>56	**2**

The toxicity of a contaminant via the inhalation pathway can be evaluated using air quality criteria or reference factors such as Reference Concentration for Chronic Inhalation Exposure (RfC) where they exist. Due to the lack of such standards in the UK, the methodology by default uses the Danish Environmental Protection Agency"s standards, known as B values. B-values have been assigned based on experimental Lowest Observed Adverse Effect Level (LOAEL) values. Contaminants are placed into toxicity

indicator classes (high, medium and low) and assigned inhalation related toxicity scores (see table below).

Table 7: Derivation of contaminant toxicity scores for inhalation pathway

Class	**Permitted Concentratio**	**Score**
High	< 1µg/m^3	**4**
Medium	1 – 200 µg/m^3	**2**
Low	> 200 µg/m^3	**0**

The assessment of a contaminant‟s volatility is based on its Henry‟s constant (H). The method distinguishes between three volatility classes each of which is assigned a volatility scores (see tables below):

i. very volatile;
ii. volatile;
iii. non-volatile.

Table 8: Classification of contaminant volatility

Class	Henry's Constant (H)	Score
Very Volatile	$H > 1* 10^{-4}$	4
Volatile	$1* 10^{-4} > H > 1* 10^{-6}$	2
Non-Volatile	$H < 1* 10^{-6}$	0

Following on from the above, volatile contaminants are assigned an inhalation related contaminant hazard score, which is calculated as being the sum of indicator scores assigned to the contaminant in relation to its toxicity and volatility (see table below).

Table 9: **Derivation of inhalation related Contaminant Hazard Score**

	Toxicity		
Volatility	**High**	**Medium**	**Low**
High	8	6	4
Medium	6	4	2
Low	4	2	0

The direct contact and inhalation related contaminant hazard scores are then summed to give a total hazard score for the contaminant.

As in the case of the Groundwater receptor, the contaminant with the highest total contaminant hazard score is used in the calculation of the final risk score for the site.

5.1.1.2 Exposure Assessment

The figure below depicts the variety of pathways via which humans can come into contact with contaminants during their normal daily life. As mentioned above, for the sake of simplicity, the method integrates the various pathways into two categories – the direct contact (ingestion and dermal absorption) and inhalation pathways.

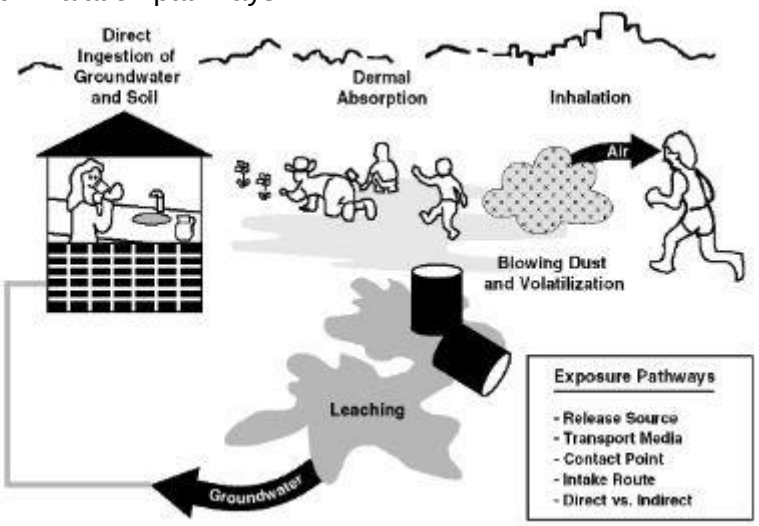


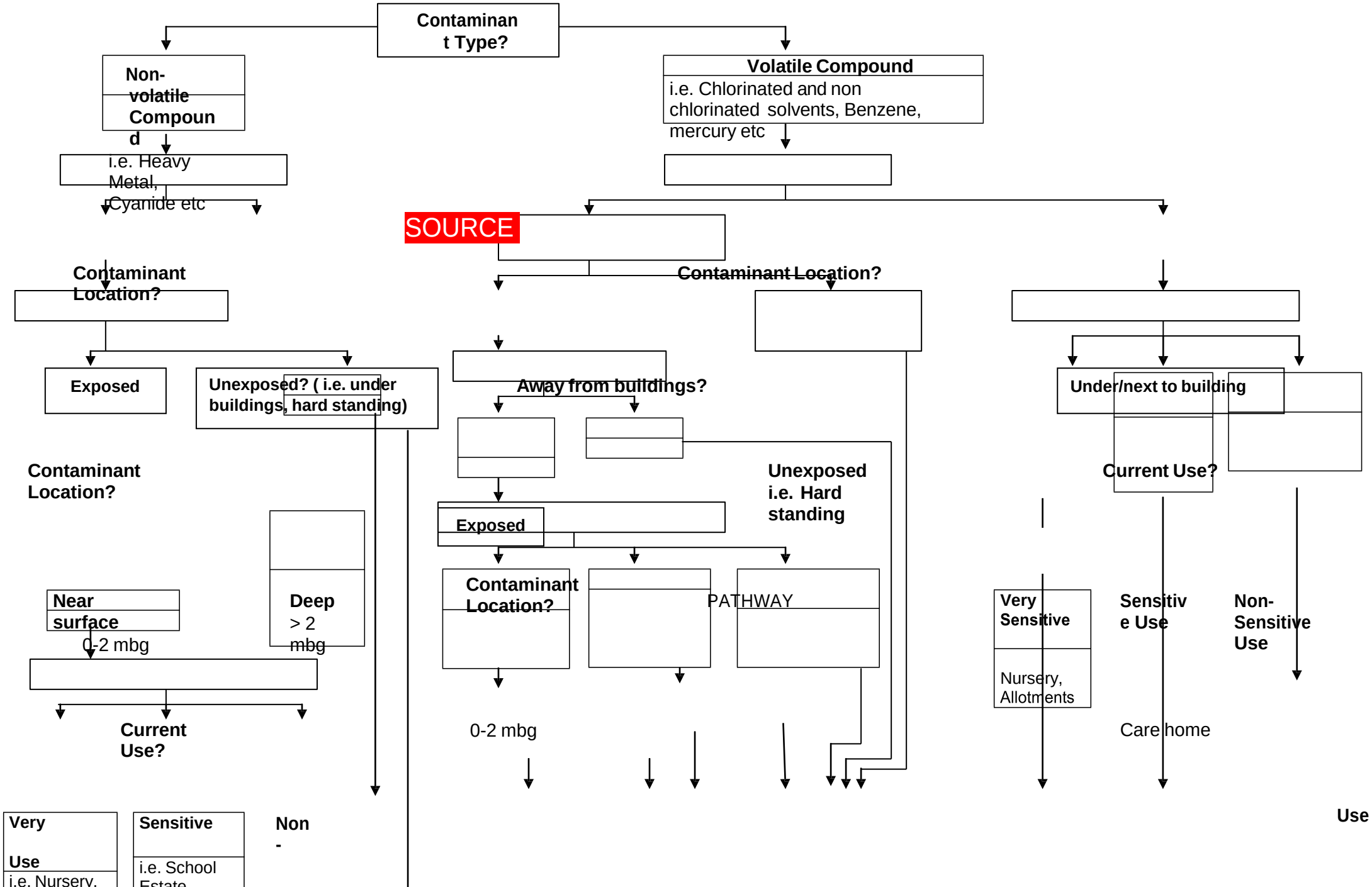
Figure 2 - Exposure Pathways (Source: USEPA)

Using the method, an exposure score is obtained for both the direct contact and inhalation pathways for each site. In summary, the main factors influencing the exposure score a site receives are:

- contaminant properties – mainly the volatility and toxicity of the contaminants;
- the risk of receptors coming into contact with the contaminants - depends primarily on the sensitivity of the land use;
- special conditions existing at the site that may make the contaminants more or less accessible.

The process for exposure assessment is summarised in the figure below.

Figure 3 - Exposure Assessment Flow Chart



RECEPTOR

Current Use?

i.e. Offices, Shops, Industry	**Very Sensitive Use** i.e. Nursery, Allotments	**Sensitive Use** i.e. School Estate, Care home	**Non-Sensitive Use** i.e. Offices, Shops, Industry

Contaminant location?

< 0,5 mbg	> 0,5 mbg

Contaminant location? (mbg)

< 0,5 mbg	> 0,5 mbg

High 8 p.

Contaminant location? (mbg)

< 0,5 mbg	> 0,5 mbg

Medium 5 p.

Low 2 p.

Contaminant location?

< 0,5 mbg	> 0,5 mbg

High 8 p.

Medium 5 p.

Low – 2 p.

High 8 p.

Medium 5 p.

Low 2 p.

5.1.1.3 Special Conditions

The term „special conditions" refers to site specific circumstances that may have an effect on the characterisation, but are not covered in the preceding sections. This could include for example, special measures that have been put in place to prevent exposure to the hazardous materials (i.e. the erection of a security fence or site remediation) occurring.
Circumstances could be considered to be aggravated on sites where both gaseous as well as non-gaseous contaminants are present or where synergistic effects are considered possible. The method again divides this criterion into 3 classes (aggravated, neutral and favorable circumstances).

The final land use risk score for the site is arrived at by adding the contaminant, pathway/exposure and special condition scores together. This is summarised in the figure below.

SOURCE

Contaminant Hazard Score	Exposure Score		
	8	**5**	**2**
16	24	21	18
15	23	20	17
14	22	19	16
13	21	18	15
12	20	17	14
11	19	16	13
10	18	15	12
9	17	14	11
8	16	13	10
7	15	12	9
6	14	11	8
5	13	10	7
4	12	9	6
3	11	8	5
2	10	7	4
1	9	6	3
0	8	5	2

PATHWAY

+

RECEPTOR

PATHWAY

	Special Conditions		
Class	**Aggravated**	**Neutral**	**Favorable**
Score	2	0	-2

	Final Score
Max. Score	26 0

Figure 4 - Procedure for deriving land use based risk scores

5.1.2 Waste Disposal and Landfill Sites

Sites that have been subject to landfilling are divided into two categories:

a) Sites without landfill gas generation potential (i.e. sites where no organic material has been deposited) - these sites are assessed using the same methodology as that described for industrial sites above.

b) Sites with landfill gas generation – these are typically waste disposal sites (WDS) where organic material (i.e. animal, vegetable, paper, textiles, and wood) has been deposited.

Assessment of landfill gas associated risks considers possible harmful health effects and explosion in a building. The assessment is based on the WDS gas generation capacity, the distance from the WDS to buildings and the type of use the buildings are being put to.

The most important factors governing a WDS gas generation capacity include its volume, age and the nature of the waste it has accepted. Generally a WDS cannot be considered to be dormant unless its age is over 30 years (i.e. since close down).

A range of other factors influence gas migration and entry into buildings (i.e. geology, pressure in the landfill, cover, underground pipes, distance to buildings and building construction etc). However, most of this information will not be available unless a field survey has been conducted.

Assessment of potential for gas migration is therefore based mainly on the distance from the WDS to the nearest building of interest and the size of the WDS. The method distinguishes between 3 different situations:

i. Buildings are located directly on the WDS
ii. Buildings are close to the WDS
iii. Buildings are located far from the WDS

The method also distinguishes between the sensitivity of the building use, which is divided into:

i. Sensitive (i.e. nursery, residential etc) and;
ii. Less sensitive uses (shop, industry, offices etc).

It assumes a situation where low pressure channels are available for transportation of the gas and does not take into account factors such as dilution, dispersion or circulation of gas.

The calculation of scores for buildings outside the WDS has been carried out under the following further assumptions:

- The methane concentration in the WDS is at least 50% v/v
- 20% of the methane in the WDS will move towards buildings during a pressure drop

- a pressure drop of 6 kPa occurs
- the pressure drop can last up to 2 days
- there is no resistance to gas entry into the building
- the soil is composed mainly of fine sand with a gas porosity of 0.2.

In general a pressure drop of 6 kPa can result in a gas front moving approximately 50m in two days provided the WDS has a minimum capacity of 130,000m^3 (20% of methane in the WDS contributes to the gas front).

When prioritising sites with reference to landfill gas related hazards, it should not be assumed that the building nearest to the WDS will automatically produce the highest risk score. For example, buildings far away from the site with a sensitive use can produce a higher score than a building with an insensitive use close to the site. Where there is a surface water course lying between the WDS and the building of interest, the building should be treated as though it were situated at a distance greater than 50m from the WDS.

The gas transport model used in this method gives an estimate of transport time from the WDS to a given point and should be viewed as a qualitative tool.

Table 10: **Exposure scores for sites with landfill gas associated hazards**

	V >= 130,000m^3	**V < 130,000m^3**	**Exposure Score**
Building on WDS			**12**
Building close to WDS	a<= 50m	a <= 50*V/130,000	**8**
Building far from WDS	a > 50m	a > 50*V/130,000	**0**

The figure below summarises the procedure for characterisation of WDS.

Fill Type

WDS/landfill *with* organic waste

SOURCE

WDS/landfill *without* organic waste

0 p.

	Site Capacity		Score
	V ≥ 130,000	**V < 130,000 m³**	
Buildings far from the site	a > 50m	a > 50*V/130,000	0 p.

PATHWAY

Or:

Buildings close to site	a < 50m	a < 50*V/130,000	8 p.
Buildings close to site	a = 0m	a = 0m	12 p.

V =Site's capacity
a = distance from site

RECEPTOR

Sensitive Use	**Less Sensitive Use**
Building with continuous occupation Nursery, School Industry where naked	Offices, Shops, industry Public buildings (i.e. library, sports hall etc)
6 p.	4 p.

Final Score = Exposure + Sensitivity of Use

Max. Score = 18 p.
Min. Score = 0 p.

Figure 5 - Procedure for derivation of final prioritisation score for waste disposal sites

5.2 PRIORITISATION OF SITES BASED ON POTENTIAL RISKS TO GROUNDWATER

Bearing in mind that generally groundwater is subject to decontamination treatment prior to distribution as drinking water, it is for the purposes of this methodology considered as a receptor, (i.e. it is a valuable resource that we would like to preserve) rather than as a pathway by which pollutants can reach humans or other living organisms.

The evaluation of a sites impact on groundwater resources is estimated taking into consideration:

- the groundwater class (i.e. is the site located within Groundwater Source Protection Zone);
- the level of aquifer protection provided by overlying geology;
- the chemical properties of the contaminants, mainly mobility (based on K_d or K_{ow}), toxicity and degradability.

5.2.1 Groundwater Class

The groundwater class is one of the most important of the above factors. This provides a measure of our desire to protect the resource. The method suggests that groundwater classes are divided up as follows:

i. Area with special drinking water interest (i.e. major aquifer/potable water supply)
ii. Areas with drinking water interest (aquifer with major aquifer potential)
iii. Areas with borderline drinking water interest (minor aquifer/ non potable water)

5.2.2 Aquifer Protection

The term „aquifer protection" refers to the degree of protection provided to the aquifer by the overlying geology. For example, an aquifer overlain by a thick clay layer will be much less vulnerable to contamination than one overlain by sand and gravel. The level of aquifer protection afforded is described in terms of three classes, namely;

i. None;
ii. Some;
iii. Good protection.

As geology can be highly variable even at site level, the method suggests that the degree aquifer protection conferred by the sites geology is assessed using site specific information, where possible.

5.2.3 Contaminant Properties

Assessment of an organic contaminant"s mobility is based on the log K_{ow} (Octanol-water partition coefficient) while for inorganic contaminants, it is based on the K_d (soil-water distribution coefficient). A low log K_{ow} or K_d indicates that the contaminant is highly mobile and vice versa. Examples of highly mobile organic compounds are Benzene and

Trichloroethylene (log K_{ow} < 3). Examples of organic compounds with medium mobility are Xylene and Naphthalene (log K_{ow} between 3 and 4), while low mobility organic compounds include PAH"s (log K_{ow} of approx. 5,09). Chromium (VI) and Mercury are examples of mobile inorganics while Lead is an example of an immobile inorganic compound (K_d approx. 50).

In terms of threats to groundwater, the toxicity of a compound is evaluated based mainly on regulatory drinking water quality standards. Contaminants are placed into one of three toxicity indicator classes (high medium and low) based on the contaminant"s target concentration (i.e. permitted concentration and values in drinking water).

The degradability of a contaminant also influences the contaminant"s hazard score. Compounds that are easily degraded (i.e. Benzene) will seldom migrate more than 500m away from the source whereas highly mobile contaminants such as Tetrachloroethylene may often be found many kilometres away from the contamination source. Again each contaminant is placed into one of three degradability indicator classes (high, medium and low) and assigned a degradation score (NB: compounds highly degradable are assigned low scores and vice versa).

Using the scores derived above, each contaminant likely to be present on the site is assigned a Contaminant Hazard Score. This calculated as the sum of the toxicity, mobility and degradation scores. The contaminant having the highest contaminant hazard score is then selected as the „significant contaminant'.

5.2.4 Groundwater Risk Score

A final risk score for the site is arrived at by summing the significant contaminant score with those awarded for the aquifer characteristics.

This procedure is summarised in the figure below.

A	GROUNDWATER CLASS?		
CLASS	Area with special groundwater interest	Area with groundwater interest	Area with borderline groundwater interest
Score	12	6	0

RECEPTOR

B	Degree of aquifer protection?		
Protection	None	Some	Good
Score	6	3	0

PATHWAY

C	Mobility?		
Class	High	Medium	Low
Score	6	3	0

D	Toxicity?		
Limit Valu	< 1 µg/l	1-10 µg/l	> 10µg/l
Score	4	2	0

SOURCE

E	Degradability?		
Class	High	Medium	Low
Score	1	2	4

F	FINAL SITE SCORE = (A+B+max(C+D+E))		
Max.	32	26	20
Min.	13	7	1

Figure 6 - Method for prioritisation of contaminated sites based on risks to groundwater

5.3 PRIORITISATION OF SITES BASED ON POTENTIAL RISKS TO SURFACE WATER

As mentioned above, surface waters are characterised mainly on the basis of their desired quality objectives and their distance from the pollution point source. However, quality objectives for water bodies in the UK are closely linked to drinking water quality objectives. Sites that are close to surface water bodies with high quality objectives receive high scores.

As for the other receptors, the method when considering surface water also takes into account the contaminants chemical properties (mobility, toxicity and degradation). The contaminant hazard scores used for surface water receptors are the same as those used for groundwater receptors, with the exception that the degradation processes occurring in surface water will be primarily aerobic.

The above factors become irrelevant if the water body has been subject to proven episodes of contamination arising from the site. In such cases, the final risk score is based entirely on the water body"s desired quality objective.

The procedure for characterising sites according to their impact on surface waters is summarised in the figure below.

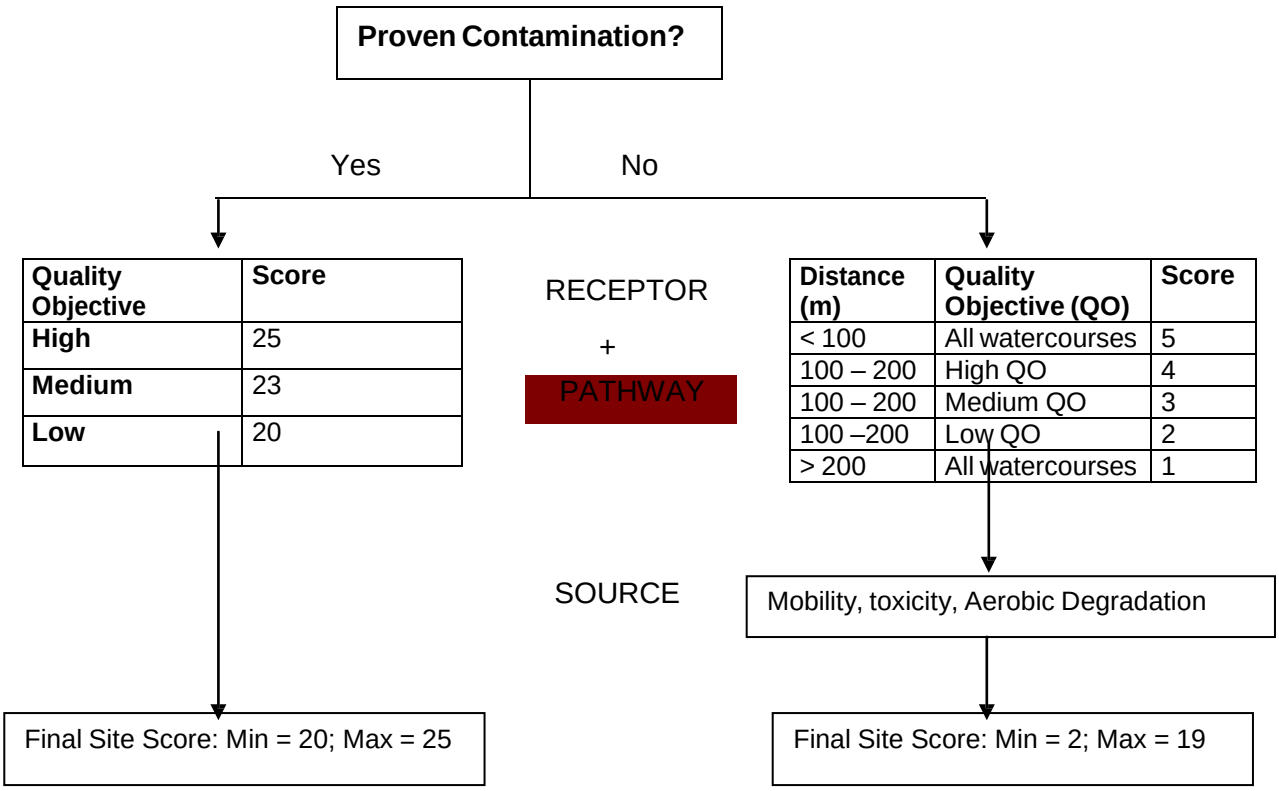


Figure 7 - Summary of procedure for deriving surface water risk scores

6. CONCLUSIONS

The Prioritisation System follows the principle of Source-Pathway–Receptor as advocated by the UK government and is therefore suitable for use under Part IIA. It incorporates a numerical scoring system that reflects the magnitude of the probability or consequences of adverse effects occurring at a location. The system therefore allows for a consistent and transparent approach to be established during the process of site prioritisation.

A major advantage of the system is that by considering the contaminants present or likely to be present on the site, it provides a particularly useful means of distinguishing between low probability, low consequence risks and high probability, high consequence risks.
Therefore sites with potentially carcinogenic contaminants will be flagged up consistently and can be subjected to a further level of analysis (i.e. a full quantitative risk assessment). However, at the same time, it is important to note that the low consequence risks should not be overlooked.

In summary, the system **can**:

- Allow for prioritisation of risks using risk scores;
- Distinguish between risks posed by different types of sites;
- Allow comparisons between situations with similar risk, but having different driving forces;
- Accommodate simple “what if“ questions;
- Allow for the rapid screening of numerous sites;
- Help prioritise and focus further risk assessment effort;
- Support the identification of high risk situations.

The system is not intended to and **cannot:**

provide absolute estimations of risk

This methodology is intended for use as a tier 1 level risk assessment (see fig. 1). Absolute or more accurate estimations of risk would require much more detailed site specific data, including contaminant concentrations and distribution as well as more detailed exposure assessment criteria.

7. REFERENCES

1. Department of Environment: Contaminated Land Research Report No. 6 (CLR6) – Prioritisation and Categorisation Procedure for Sites which may be contaminated, 1995.

2. Danish Environmental Protection Agency (Miljøstyrelsen): Report on the Prioritisation of Waste Disposal Sites and Chemical Waste Depots, 1990.

3. Department of Environment: Contaminated Land Research Report No. 8 (CLR8) – Potential Contaminants for the assessment of Land, 2002.

4. Department of the Environment, Transport and the Regions: Guidelines for Environmental Risk Assessment and Management Revised Departmental Guidance, 1999.

5. Department of the Environment, Transport and the Regions: A Practical Guide to Environmental Risk Assessment for Waste Management Facilities, Guidance Note 25, 2000.

6. Danish Ministry of the Environment – Statutory Order on the registration of Waste Disposal Sites under Waste Disposal Regulations, 1993.

7. Danish Environmental Protection Agency (Miljøstyrelsen): Classification of groundwater resources, 1995.

8. Danish Ministry of Agriculture: Aftercare of waste disposal sites with a view to promoting future utilisation, 1977.

9. Danish Environmental Protection Agency (Miljøstyrelsen): Environment Project nr. 123. Risk Assessment of Contaminated Land, 1990.

10. Nordisk Ministerråd : Environment Report Nr. 8. Systematic Data Collection and Handling for Priority Setting, Existing Chemicals, 1989.

11. Danish Environmental Protection Agency (Miljøstyrelsen): Limiting air pollution from industry. Guidelines from the Danish Environmental Protection Agency, Nr. 6/1990, 1990.

12. Department of the Environment: Waste Management Paper No. 27 (second edition) Landfill Gas. HMSO, 1991.

8. APPENDIX - THE GEOENVIRON PRIORITISATION SYSTEM IN PRACTICE

This appendix aims to show how the methodology outlined in the preceding chapters has been implemented within the GeoEnviron system.

Before arriving at stage I of the site prioritisation process, you should have characterised your industrial sources and receptors and have a list of sites that you consider to be potentially contaminated. If this information is available in a GIS or another database, then the GeoEnviron database can be populated with the list of potentially contaminated sites using the built in data import facilities.

STAGE I PRIORITISATION

The Stage 1 prioritisation begins with assigning sensitivity scores to the range of current uses, protection zones and ground and surface water receptors being considered.

Following this historical industrial site use (ISU) information is entered into the Site Use History tab folder. Again if any of this information is available in a GIS or another database, it can be imported directly in GeoEnviron removing the necessity to input the information manually.

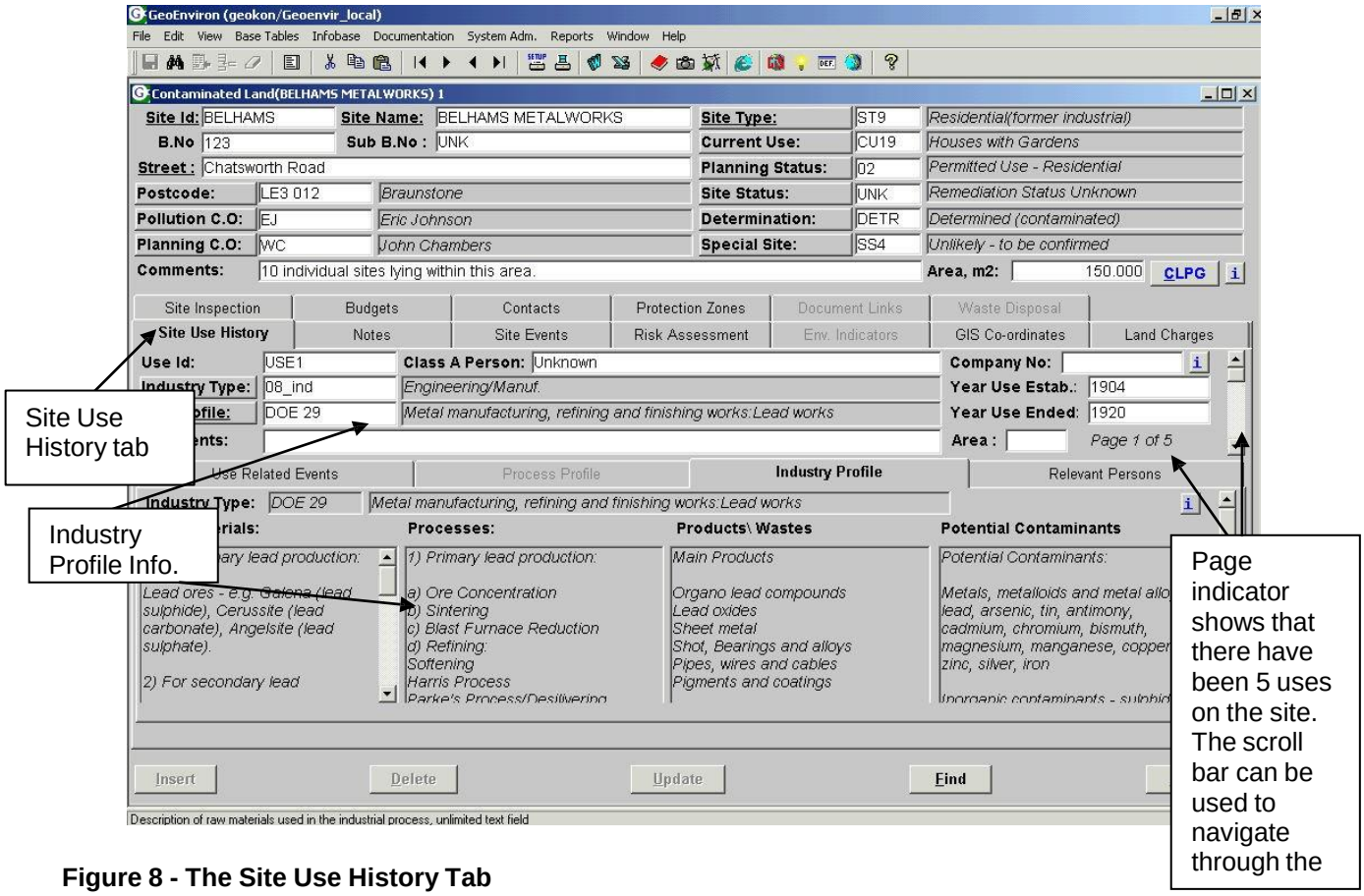


Figure 8 - The Site Use History Tab

Each ISU should be classified using the DOE Industry Profiles where possible. Where an ISU does not fall within the scope of an industry profile, then a new industry profile can be created and scores assigned to it by the user themselves.

Once the ISU information has been entered for the site, the site risk scores (SRS) are automatically calculated using the equation outlined in section 4.1 (i.e. SRS = IRS + RSS). The scores received for each industrial use can be viewed in the Industrial Risk data window (see fig 9.)

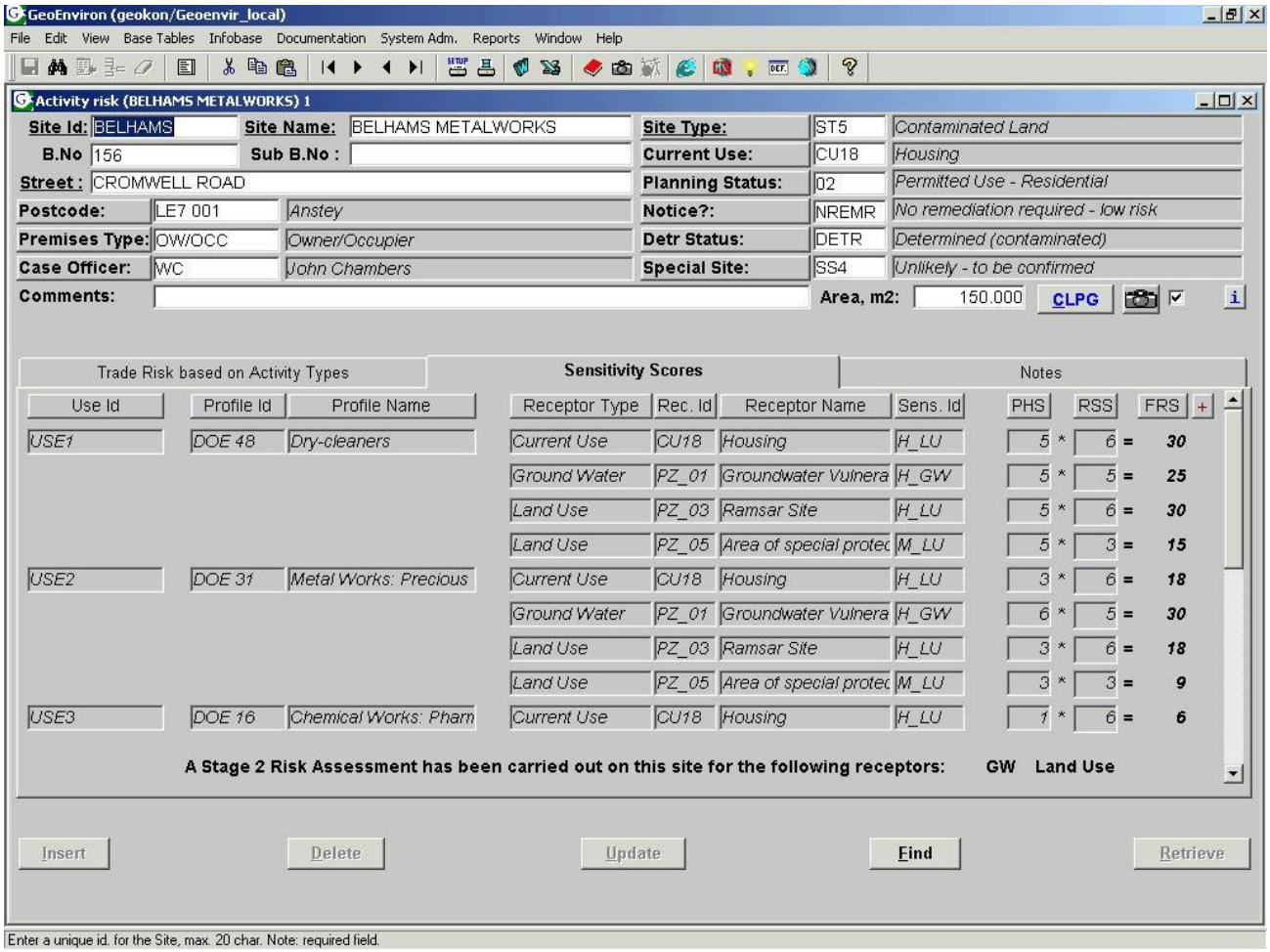
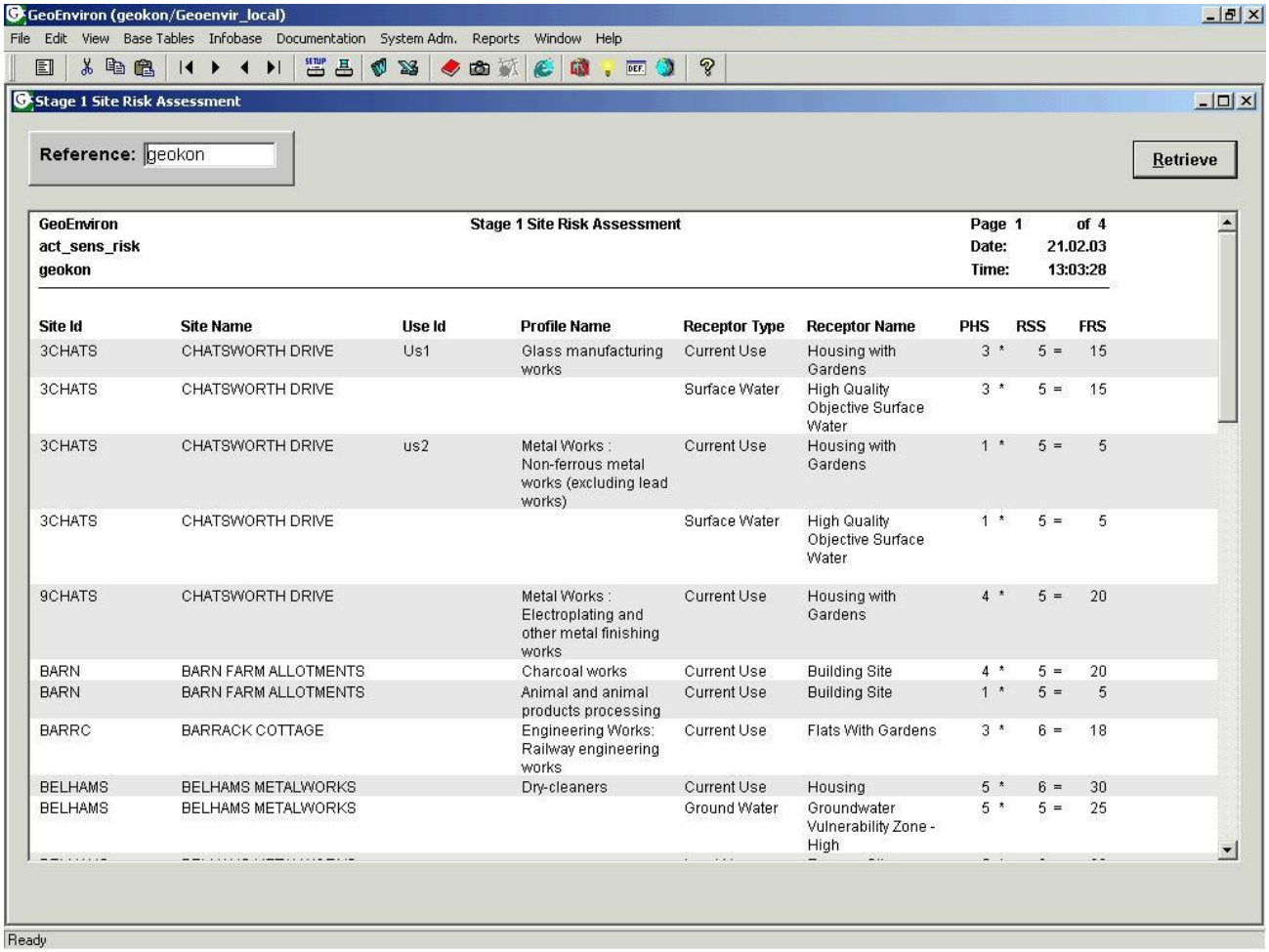


Figure 9 – Stage 1 Risk Assessment Data Window

Each industrial use is automatically assigned a risk score for each of the three receptor groups.

Once you have entered ISU information into the database for your sites, you can view a standard report that lists all the sites, their registered ISU"s and their respective hazard scores for each receptor. Each data column can be sorted for each receptor. This is a very quick way to obtain a first stage prioritisation list (see fig. 10 below).



Site Id	Site Name	Use Id	Profile Name	Receptor Type	Receptor Name	PHS		RSS		FRS
3CHATS	CHATSWORTH DRIVE	Us1	Glass manufacturing works	Current Use	Housing with Gardens	3	*	5	=	15
3CHATS	CHATSWORTH DRIVE			Surface Water	High Quality Objective Surface Water	3	*	5	=	15
3CHATS	CHATSWORTH DRIVE	us2	Metal Works : Non-ferrous metal works (excluding lead works)	Current Use	Housing with Gardens	1	*	5	=	5
3CHATS	CHATSWORTH DRIVE			Surface Water	High Quality Objective Surface Water	1	*	5	=	5
9CHATS	CHATSWORTH DRIVE		Metal Works : Electroplating and other metal finishing works	Current Use	Housing with Gardens	4	*	5	=	20
BARN	BARN FARM ALLOTMENTS		Charcoal works	Current Use	Building Site	4	*	5	=	20
BARN	BARN FARM ALLOTMENTS		Animal and animal products processing	Current Use	Building Site	1	*	5	=	5
BARRC	BARRACK COTTAGE		Engineering Works: Railway engineering works	Current Use	Flats With Gardens	3	*	6	=	18
BELHAMS	BELHAMS METALWORKS		Dry-cleaners	Current Use	Housing	5	*	6	=	30
BELHAMS	BELHAMS METALWORKS			Ground Water	Groundwater Vulnerability Zone - High	5	*	5	=	25

Figure 10 – Report showing Site Risk Scores by Industrial Profile and receptor type

STAGE II PRIORITISATION

The stage I priority listing gives you an idea of which sites are likely to present the greatest problems. It is recommended that the listing is further refined using the Stage II methodology before committing resources to undertaking expensive site investigations, making determinations or serving notices. More evidence needs to be gathered to ascertain whether or not a potential pollutant linkage actually exists.

1) Source Characterisation - Selecting the Contaminants of Concern

The Risk Assessment tab folder within GeoEnviron is used to carry out the site prioritisation. This is shown in the figure below. An example will be used to illustrate the way in which a stage II Prioritisation is carried out. The example consists of a site known as Belham"s Metal Works. which has been subject to a number of former industrial uses, but is currently used as housing.

The first step in the stage II prioritisation is to select the contaminants of concern (COC"s) for each particular site. This process is aided by the information contained within the DOE industry profiles.

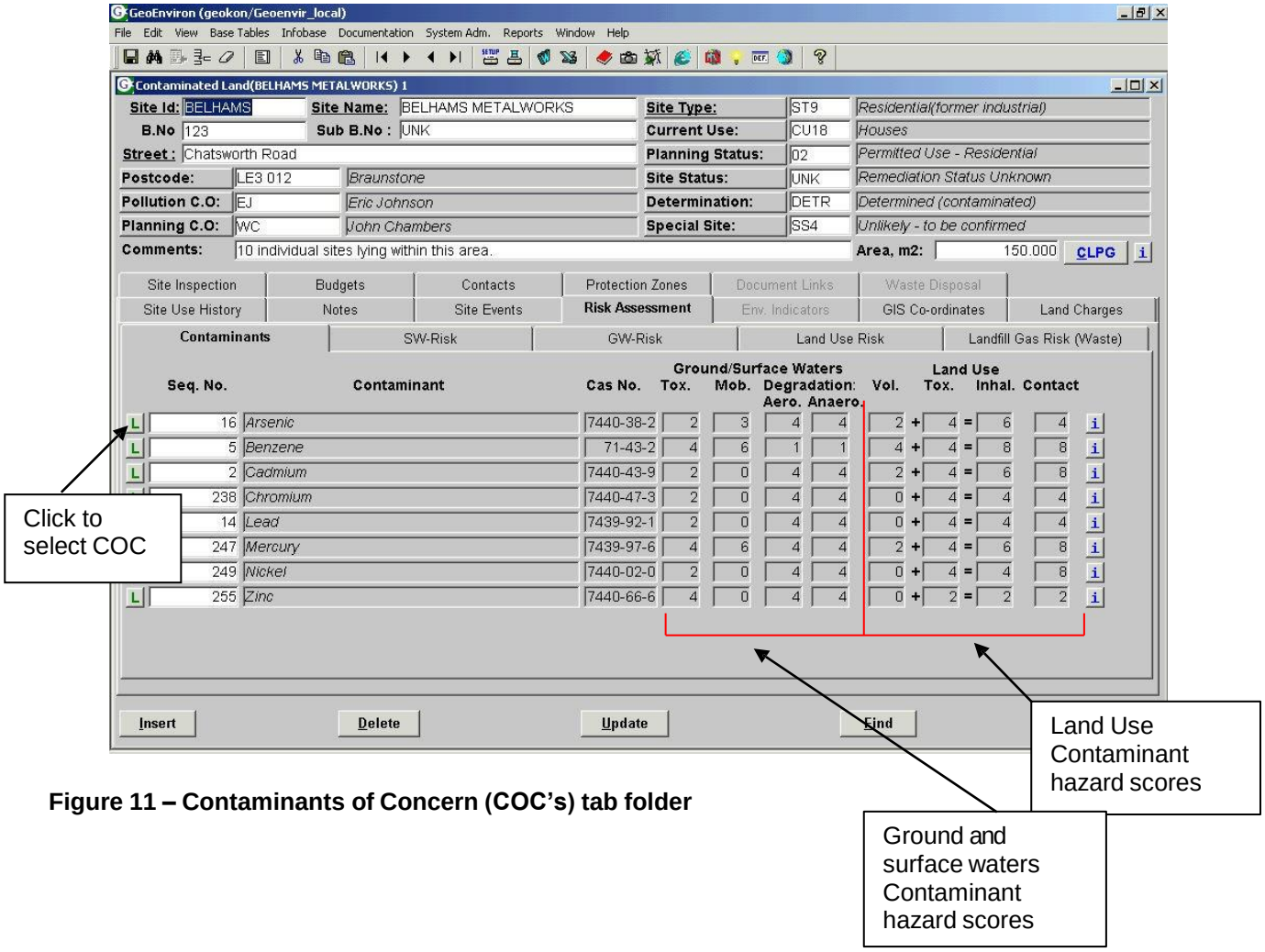


Figure 11 – Contaminants of Concern (COC's) tab folder

The COC"s are selected from a pop up list box (see figure below) which is displayed after clicking on the „L" button.

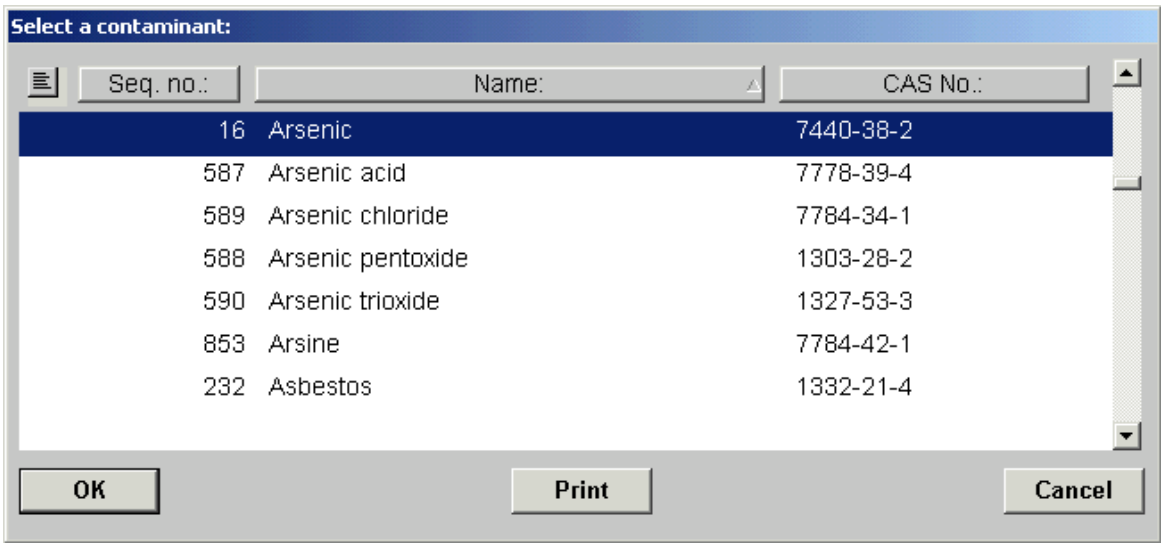


Figure 12 – Selecting contaminants of concern

Once a contaminant is selected it is automatically entered into the tab along with the contaminant hazard scores.

The contaminant scores section of the tab folder is split into two sections (see figure above) – one for Ground/Surface Water receptor scores and one for Land Use receptor scores.

The Ground and Surface Water CHS"s are calculated as follows:

Toxicity Score + Mobility Score+ Anaerobic Degradation Score = Groundwater Score

i.e. Tox. + Mob. + Anaero. = Groundwater CHS

Toxicity Score + Mobility Score + Aerobic Degradation Score = Surface Water CHS

i.e. Tox. + Mob. + Aero. = Groundwater CHS

The only difference between the groundwater and surface water scores is the degradation factor applied. Anaerobic degradation predominates in aquifer environments whereas aerobic degradation predominates in surface water environments.

The land use receptor scores are calculated as follows:

Inhalation Hazard Score (Inhal.) + Contact Hazard Score (Contact) = Land Use CHS

The Inhalation Hazard Score is calculated by summing the Contaminants „volatility score" and its „toxicity score".

i.e. Vol. + Tox. = Inhal.

The Contact Score is used to describe the degree of hazard posed by the COC"s via the ingestion or dermal contact pathways (see methodology).

Note: Due to space constraints, the final calculated Groundwater and Surface Water and Land Use CHS for each COC is not shown in this data window.

2) Performing a Land Use Risk Assessment

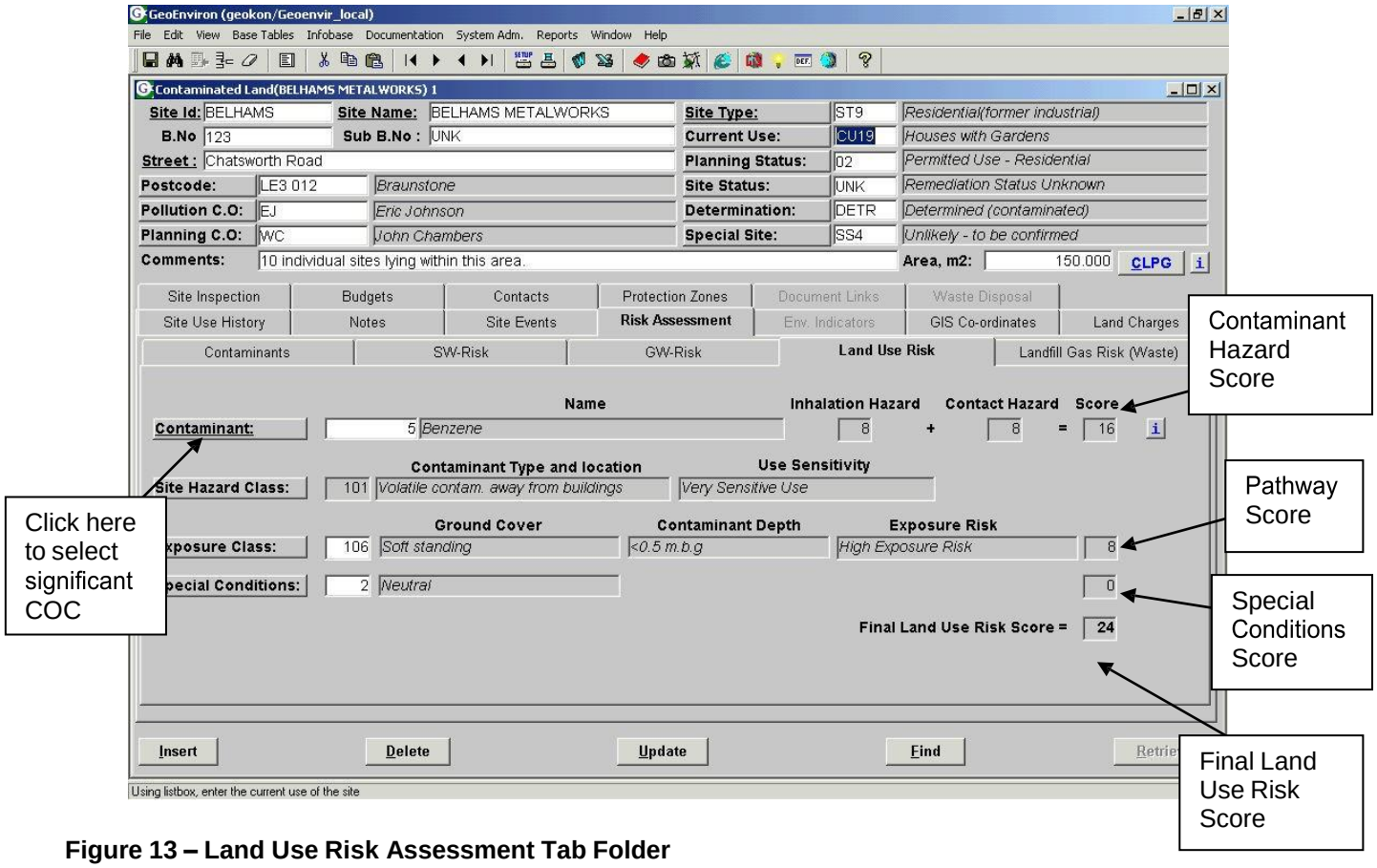


Figure 13 – Land Use Risk Assessment Tab Folder

As can be seen from the figure above the land use risk assessment tab consists of 4 lines o f information with text label buttons to the left of them. Clicking the buttons opens up dialog boxes from which you can select values for entering into the data window. After entering data, scores for each of the factors that form part of the risk assessment decision tree are automatically filled in.

To start with a significant contaminant (SC) is selected from the list of COC"s entered the previous step. This is done by clicking on the „contaminant" text label button. This causes a dialog box containing a list of the COC"s and their hazard scores (see figure below).

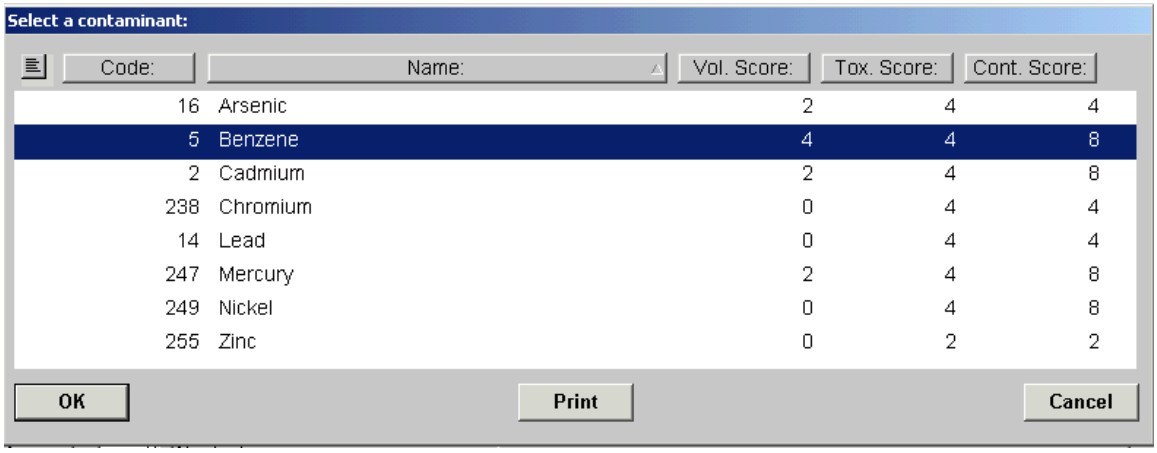


Figure 14 – Selecting the Significant Contaminant

As you will see from the figure above, only the land use related hazard scores are brought up into the list box. The SC is the contaminant with the highest land use CHS. In the above example, the SC is Benzene which has a CHS of 16 (i.e. 4 + 4 + 8).

Performing the pathway assessment

The next step is to carry out the exposure or pathway assessment (see the „pathway/exposure" assessment flowchart in the methodology section of this report). This step is commenced by clicking on the „Site Hazard Class" text label button. The following dialog box is displayed.

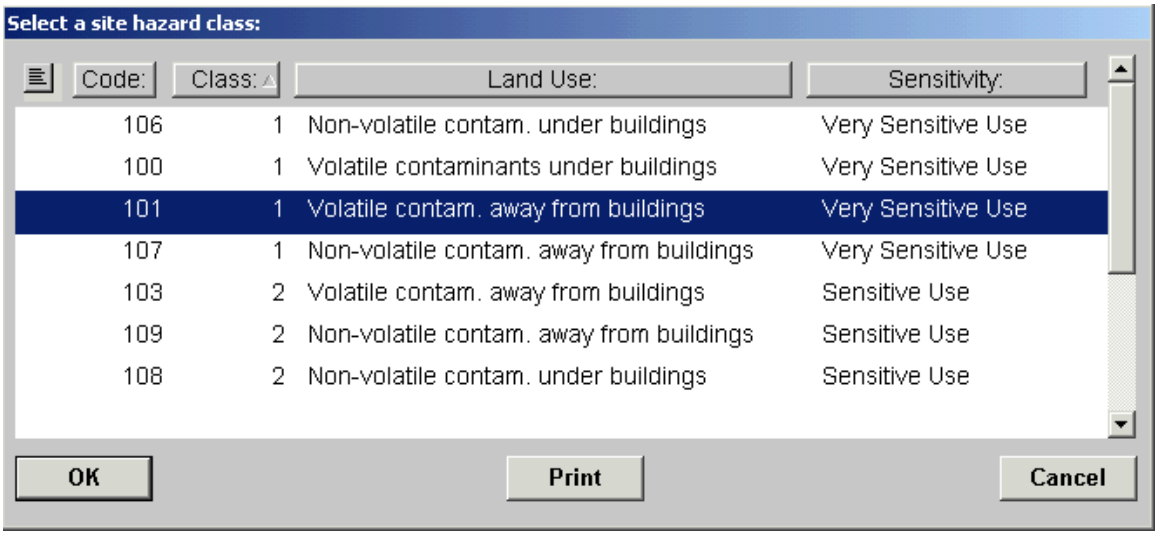


Figure 15 – Selection of a Site Hazard Class

Here you have to answer three questions with a single selection.

The first is “Is the SC selected from the previous step a volatile or non-volatile compound?”

In the case of our current example, the SC is Benzene, which is a volatile compound.

The second question is: “Is the current use of the site non -sensitive, sensitive or very sensitive?”

The current site use in our example is „Housing with gardens", which we shall deem to be a „very sensitive use".

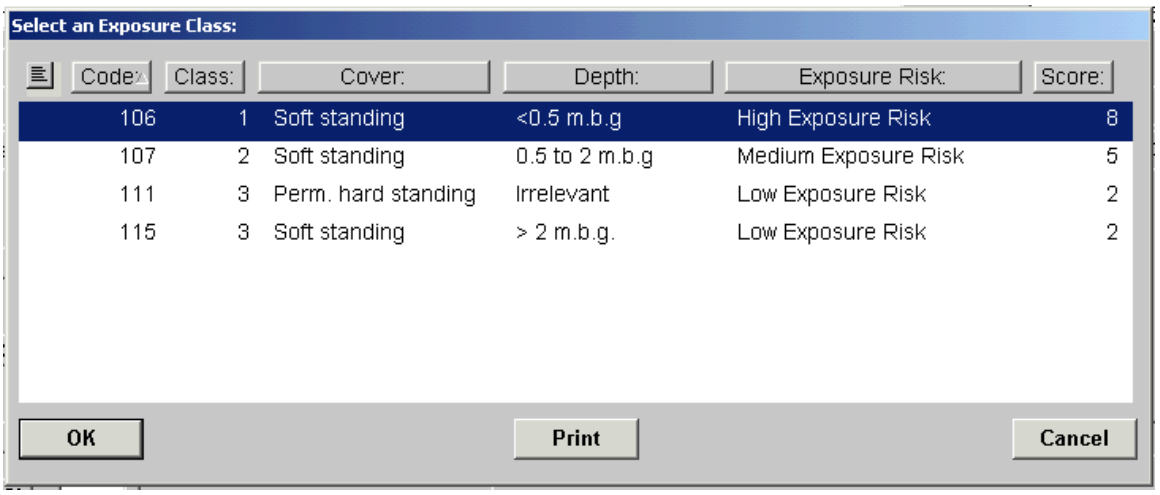
The third question is:

“Where are the contaminants likely to be located – away from buildings or only under buildings?”

We do not have any previous site investigation report, so we will assume that the contaminants are likely to be located all over the site. We therefore select „option 101" (see figure above) which is “volatile contaminants away from buildings, very sensitive use” as this is the worst case scenario.

The next step is to complete the pathway assessment by assigning an exposure class to the site. This is done by clicking the „Exposure Class" text label button in the Land Use Risk data window (see fig. 6).

A dialog box (see Fig. 16) showing exposure risk classes and their scores pops up. Here you have to answer two questions.



Code	Class:	Cover:	Depth:	Exposure Risk:	Score:
106	1	Soft standing	<0.5 m.b.g	High Exposure Risk	8
107	2	Soft standing	0.5 to 2 m.b.g	Medium Exposure Risk	5
111	3	Perm. hard standing	Irrelevant	Low Exposure Risk	2
115	3	Soft standing	> 2 m.b.g.	Low Exposure Risk	2

Figure 16 – Selecting an Exposure Class

The first question is “Does the ground cover on the site include soft standing (i.e. grass areas) or is it entirely permanent hard standing (i.e. asphalt, concrete)?” This question is designed to assess whether or not the SC is accessible.

In the case of our example we will assume that there are grassed areas in the gardens i.e. that there is soft standing.

The second question is “at what depth is the contaminant likely to be located?”

In our example, we do not have any sampling information and therefore assume the worst case scenario. We will assume that it is likely to be located close to the surface (<0.5 metres below ground or <0.5mbg).

Therefore we choose code selection 106 from the dialog box –“soft standing, <0.5 mbg, High Exposure Risk”.

The final step in the land use risk assessment process is to consider whether there are any special circumstances present on the site that may aggravate or ameliorate the situation. This is done by clicking on the special conditions text label button. The Special Conditions dialog box pops up (see fig. 17)

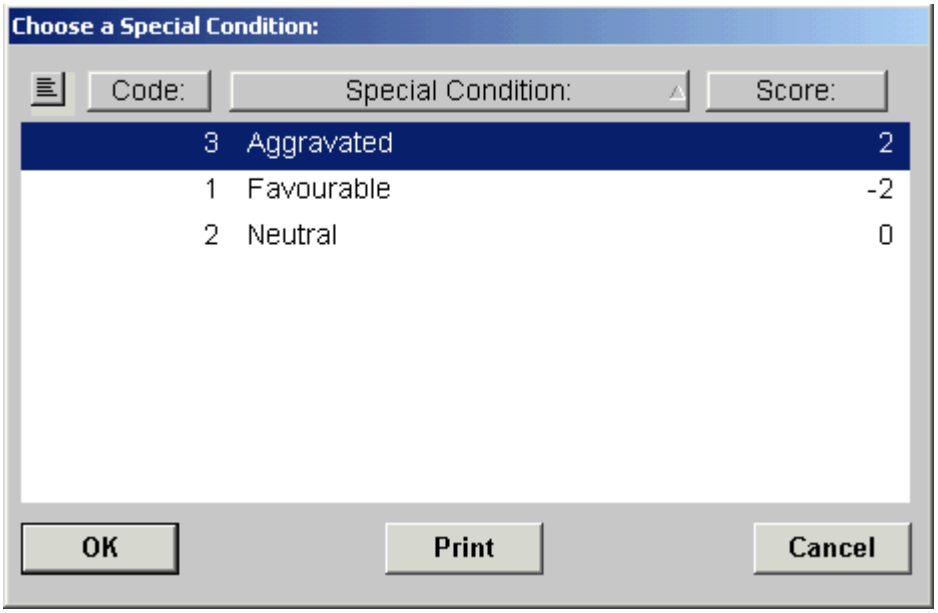


Figure 17 – Special Conditions Dialog Box

The term „Special Conditions" refers to any factor that may have an influence on the hazardous nature of the site. This could be for example the likely presence of other contaminants which are known to exert a synergistic effect when found in combination with the SC. In such a case the situation could be said to be aggravated. An example of a favorable situation could be one where a fence has been erected around a site in order to prevent children from entering the site.

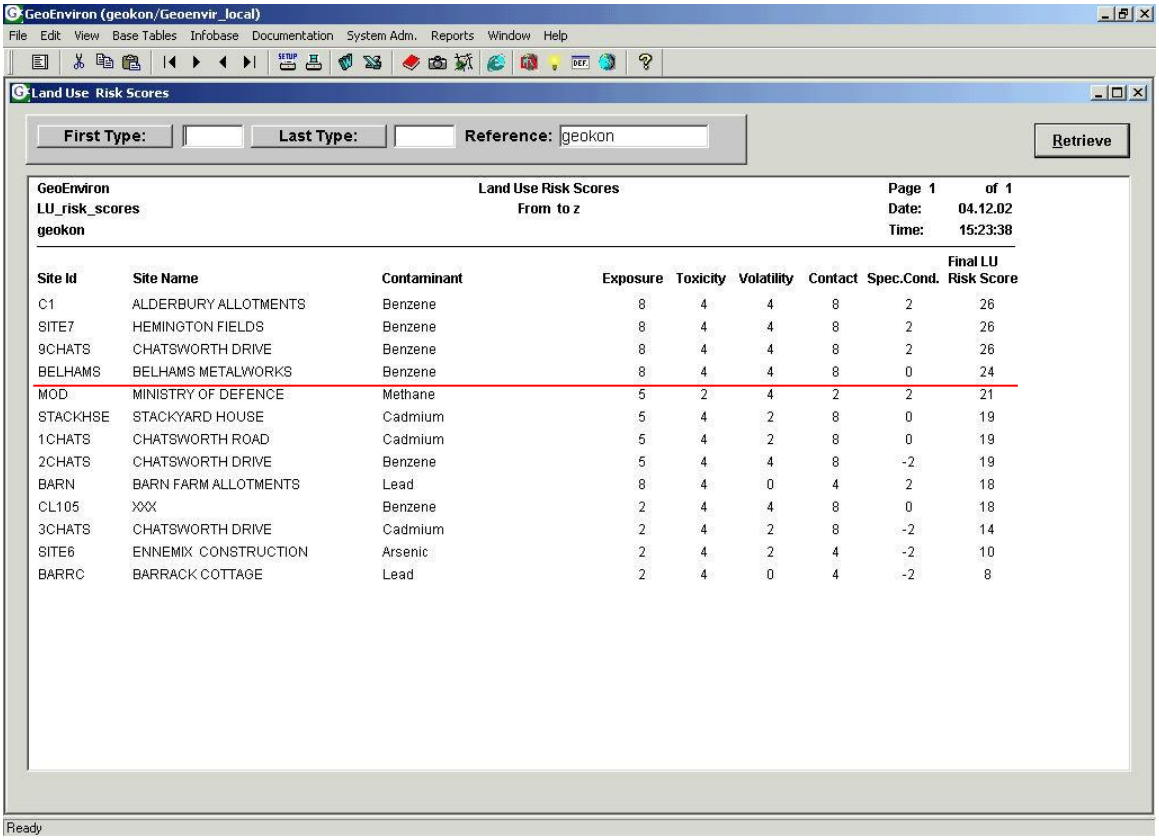
After the Special Condition score has been entered a final land use risk score for the site appears in the bottom of the data window (see fig. 13). This score is calculated as follows:

Contaminant hazard score + pathway/exposure score + special conditions score

It would not have been necessary to make any assumptions had we been in possession of a full site investigation report giving us information on the ground cover and exact location o f contaminants. Where worst case scenario assumptions have been made, steps should be taken to verify or correct them by gathering more information and reprioritising the site concerned.

For transparency reasons, it is important that a note detailing all assumptions made as well as explaining why the special conditions factor was used is kept in the database. The notes tab could be used for this purpose.

After the site has been assessed, you can use the system"s standard risk assessment reports to see what priority the site has in relation to other sites. In the case of our example the site ends up as a high priority site (see fig. 18).



Site Id	Site Name	Contaminant	Exposure	Toxicity	Volatility	Contact	Spec.Cond.	Final LU Risk Score
C1	ALDERBURY ALLOTMENTS	Benzene	8	4	4	8	2	26
SITE7	HEMINGTON FIELDS	Benzene	8	4	4	8	2	26
9CHATS	CHATSWORTH DRIVE	Benzene	8	4	4	8	2	26
BELHAMS	BELHAMS METALWORKS	Benzene	8	4	4	8	0	24
MOD	MINISTRY OF DEFENCE	Methane	5	2	4	2	2	21
STACKHSE	STACKYARD HOUSE	Cadmium	5	4	2	8	0	19
1CHATS	CHATSWORTH ROAD	Cadmium	5	4	2	8	0	19
2CHATS	CHATSWORTH DRIVE	Benzene	5	4	4	8	-2	19
BARN	BARN FARM ALLOTMENTS	Lead	8	4	0	4	2	18
CL105	XXX	Benzene	2	4	4	8	0	18
3CHATS	CHATSWORTH DRIVE	Cadmium	2	4	2	8	-2	14
SITE6	ENNEMIX CONSTRUCTION	Arsenic	2	4	2	4	-2	10
BARRC	BARRACK COTTAGE	Lead	2	4	0	4	-2	8

Figure 18 – Land Use Risk Assessment Report

The scoring system for land use is as default set up for a range of 0 to 26. The system can be adjusted to suit your tastes.

A suggested priority ranking is given in the table below.

Table 11: Land Use Risk Priority Ranking Scores

Priority Ranking	Score Range
High	15 – 26
Medium	5 – 14
Low	0 – 5

ASSESSING RISKS TO GROUNDWATER

The procedure for assessing risks to ground and surface water receptors is similar in that it uses a simple question and answer process that produces a final site risk score. Please refer to the methodology for a full explanation.

The Groundwater Risk Assessment tab folder is shown in the figure below.

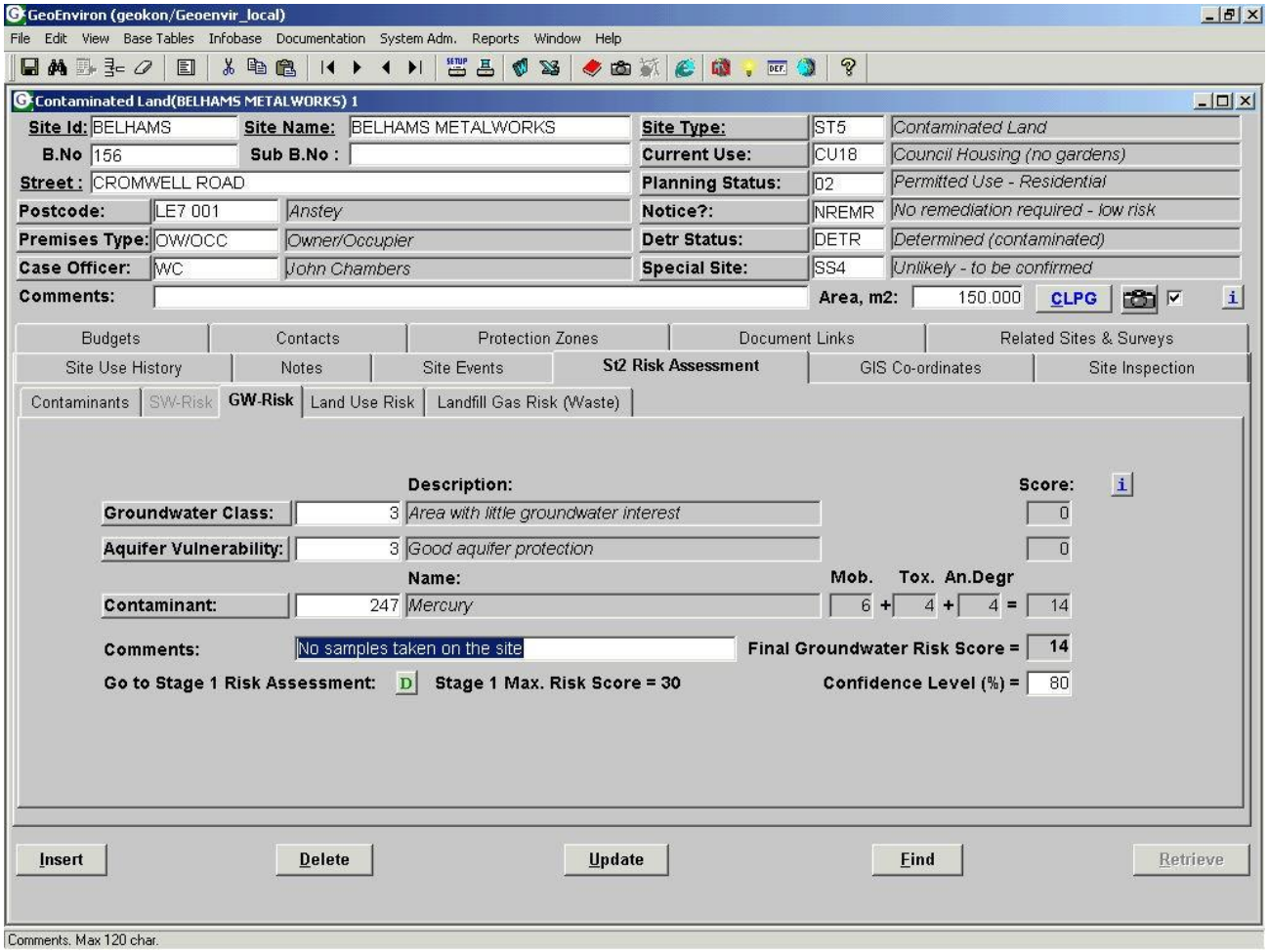


Figure 19 – Groundwater Risk Assessment Tab folder

As described above, there are three basic questions that you need to answer when prioritising a site based on risk to Groundwater. These are related to the groundwater"s class, the aquifer"s vulnerability and the contaminant under consideration.

Clicking on the „Groundwater Class" text label button causes the following dialog to pop up.

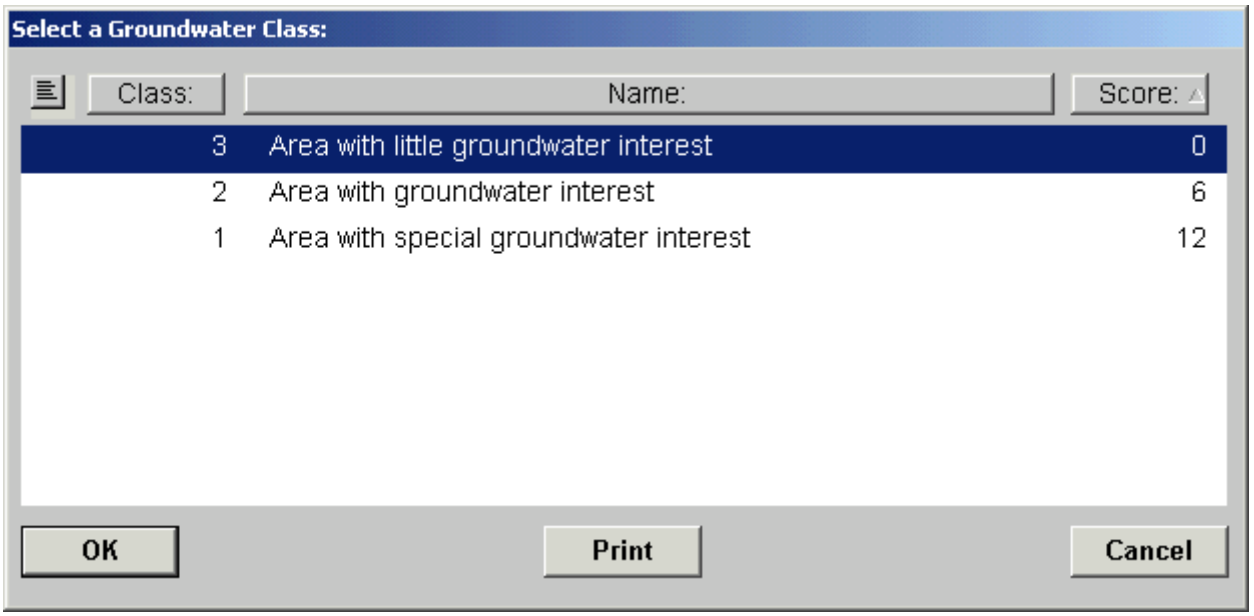


Figure 20 - Select a Groundwater Class Dialog

From this dialog you select the groundwater class for the aquifer of interest. A minor aquifer would be Class 3 and would get a low score. A major aquifer would fall into Groundwater Class 1 and would receive a high score.

You then need to consider how vulnerable the aquifer is to pollution from overlying sources. Clicking on the „Aquifer Vulnerability" text label button causes a dialog to pop up, from which you can select an „Aquifer Vulnerability Class".

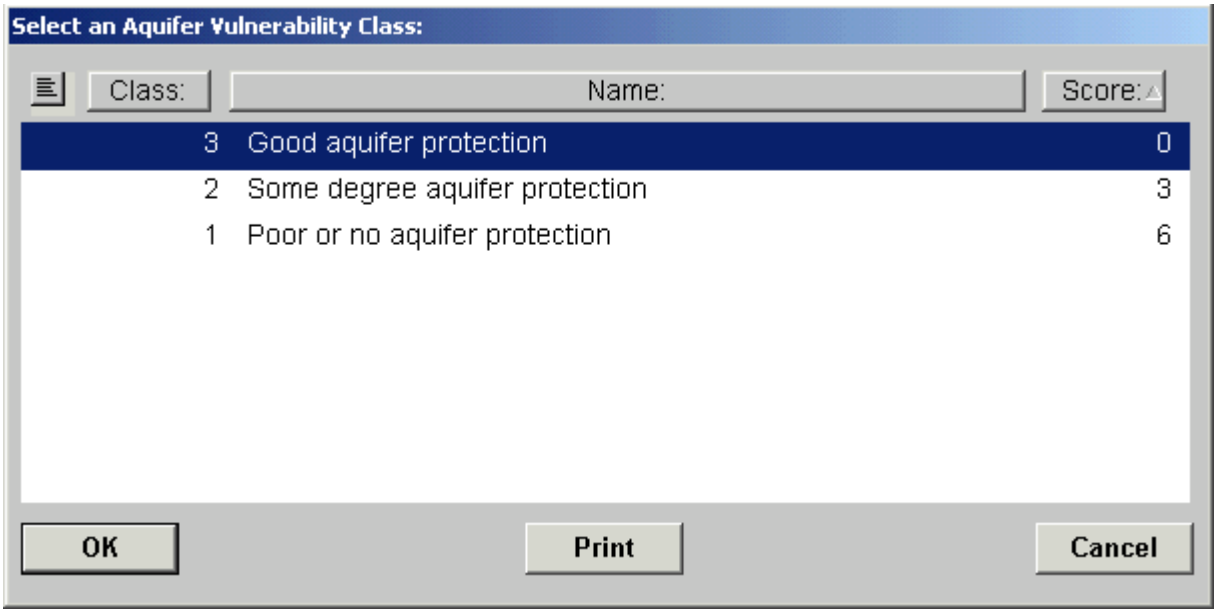
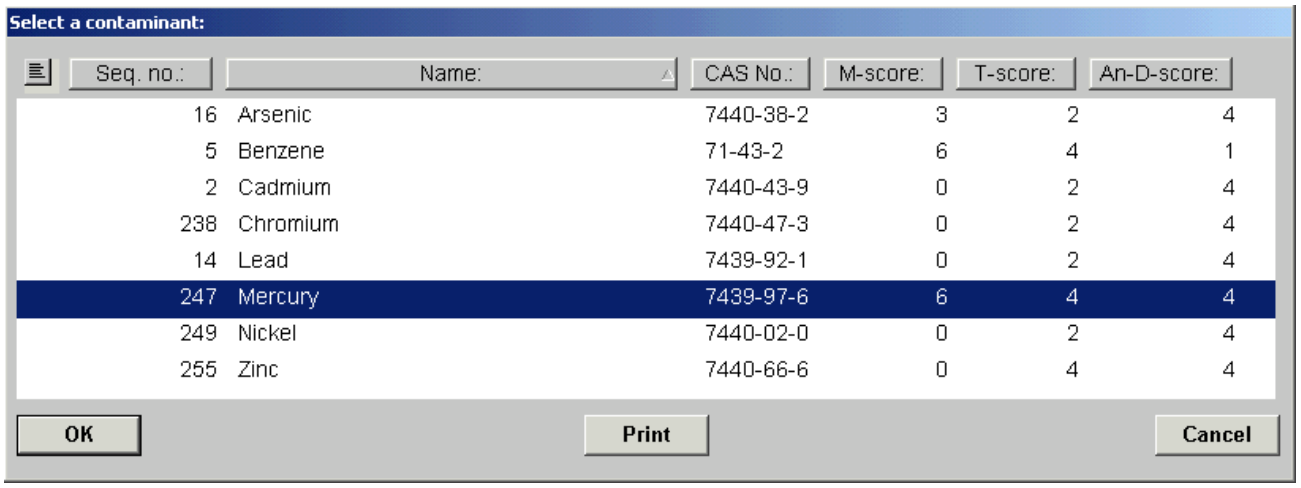


Figure 21 - Select an Aquifer Vulnerability Class

The Aquifer"s Vulnerability Class is determined by the overlying geology. For example an aquifer overlain with a thick layer of impermeable clay would be assigned an Aquifer Vulnerability class of 3.

The final step in assessing the site"s risk to groundwater involves selecting the significant contaminant. Clicking on the „Contaminant" text label button causes the following dialog box to pop up.



Seq. no.:	Name:	CAS No.:	M-score:	T-score:	An-D-score:
16	Arsenic	7440-38-2	3	2	4
5	Benzene	71-43-2	6	4	1
2	Cadmium	7440-43-9	0	2	4
238	Chromium	7440-47-3	0	2	4
14	Lead	7439-92-1	0	2	4
247	Mercury	7439-97-6	6	4	4
249	Nickel	7440-02-0	0	2	4
255	Zinc	7440-66-6	0	4	4

Figure 22 - Select a Contaminant Dialog (Groundwater)

As in the case of the land use risk prioritisation, you should select the contaminant with the highest hazard score. In the case of the groundwater receptor, the contaminants mobility, toxicity and anaerobic degradation properties are used to arrive at a hazard score. As can be seen from the figure above, for this example the contaminant with the highest hazard score is Mercury, with a total score of 14. Mercury gets a higher score than Benzene because it is very persistent (i.e. does not degrade) in an aquifer environment.

The final groundwater risk score for the site is arrived at by summing the Groundwater Class, Aquifer Vulnerability and Contaminant scores (see fig. 6).

After the site has been assessed, you can use the system"s standard risk assessment reports to see what priority the site has in relation to other sites.

ASSESSING RISKS TO SURFACE WATER

The Surface Water Risk assessment tab folder is shown in the figure below.

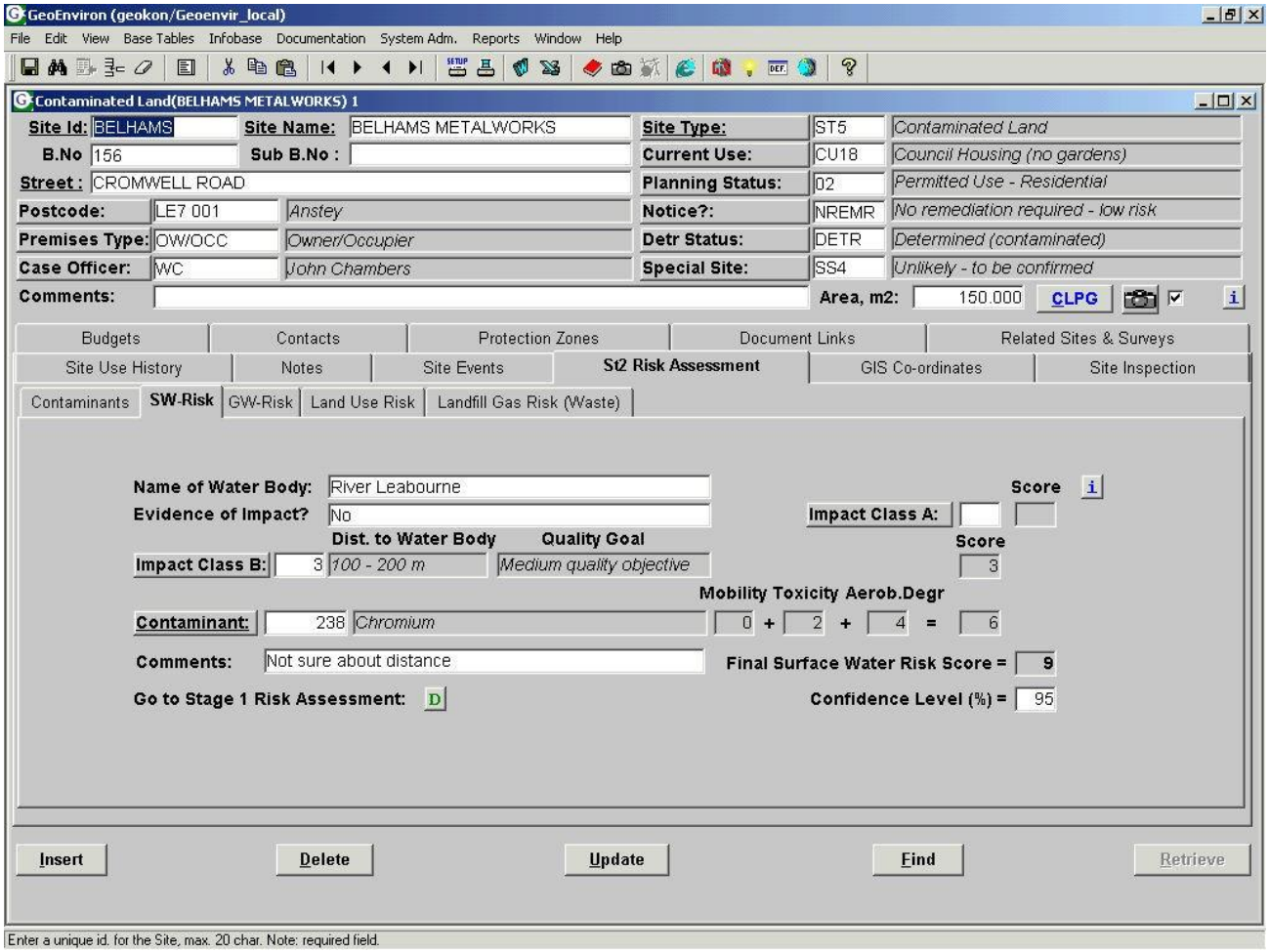


Figure 23 – Surface Water Risk Assessment Tab Folder

The first step is to enter the name of the surface water body being considered into the data window. The „Evidence of Impact" question relates to whether or not there is evidence that the site has been polluting the water body. If there is such evidence, then only the Impact Class A field should be filled out (i.e. you do not need to fill out the „Impact Class B" or the „Contaminant" fields). Clicking on the „Impact Class A" text label button opens up a dialog from which you can select an impact class. In the case of Impact Class A, the site risk is determined based solely on the water body"s quality objective. The site automatically obtains a high score (between 20 and 25).

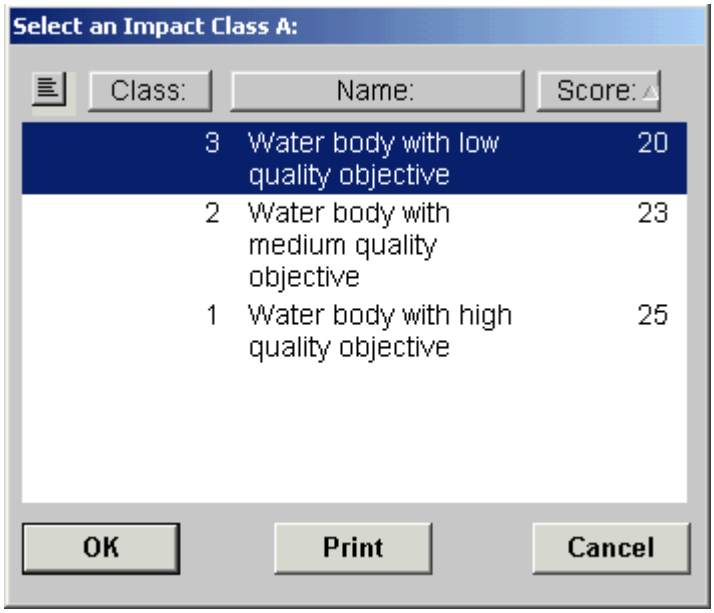


Figure 24 – Select an Impact Class Dialog

If there is no evidence that the site is polluting the water body then you should proceed to the „Impact Class B" and „Contaminant" fields.

Clicking on the „Impact Class B" button causes the following dialog box to open.

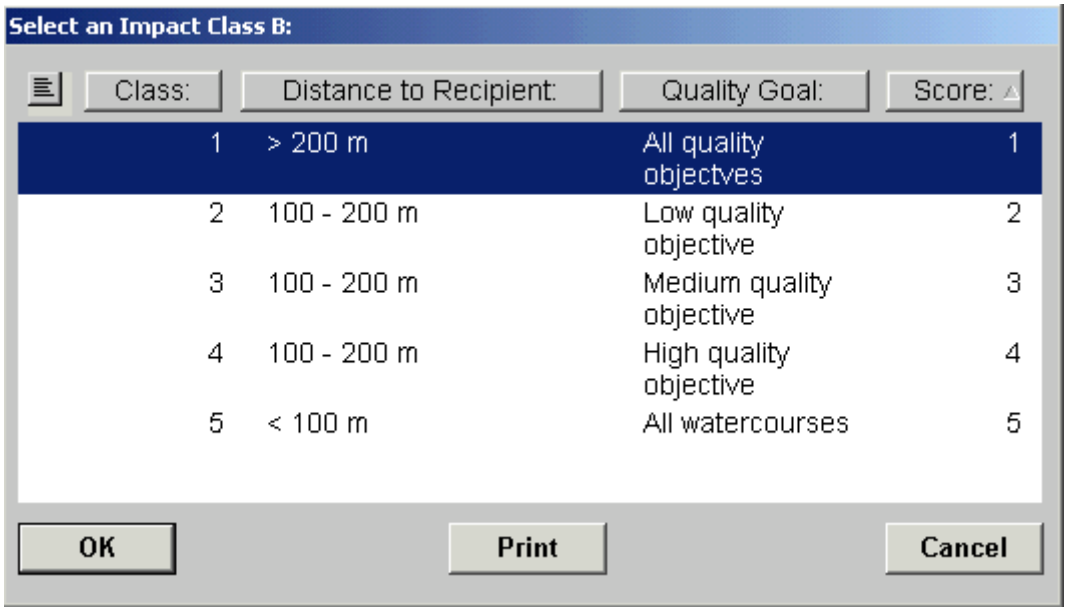
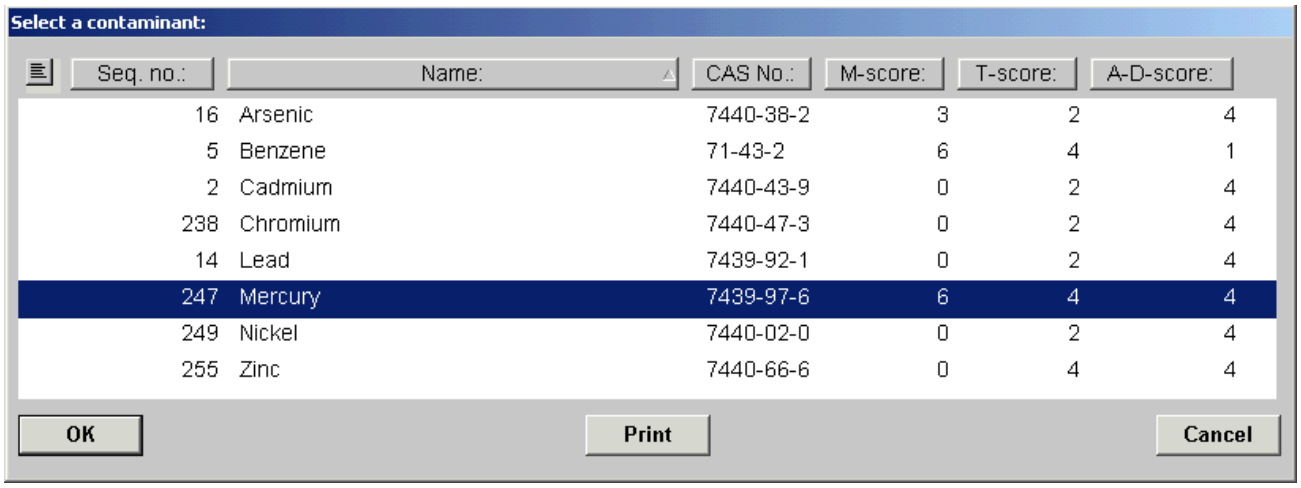


Figure 25 - Select an Impact Class B Dialog

Here you need to consider the distance from the site to the water body as well as the water body"s quality objective.

You then need to select the significant Contaminant (SC). Clicking on the „Contaminant" text label button causes the following dialog to pop up.



Select a contaminant:

Seq. no.:	Name:	CAS No.:	M-score:	T-score:	A-D-score:
16	Arsenic	7440-38-2	3	2	4
5	Benzene	71-43-2	6	4	1
2	Cadmium	7440-43-9	0	2	4
238	Chromium	7440-47-3	0	2	4
14	Lead	7439-92-1	0	2	4
247	Mercury	7439-97-6	6	4	4
249	Nickel	7440-02-0	0	2	4
255	Zinc	7440-66-6	0	4	4

OK Print Cancel

Figure 26 - Select a Contaminant (Surface Water)

As in the case of the land use risk prioritisation, you should select the contaminant with the highest hazard score. In the case of the surface water receptor, the contaminants mobility, toxicity and aerobic degradation properties are used to arrive at a hazard score for the contaminant. For this example, the contaminant with the highest hazard score is Mercury, with a total score of 14. Mercury gets a higher score than Benzene because it is very persistent (i.e. does not degrade) in the surface water environment.

Therefore in the case of sites with no proven impacts, the final surface water risk score for the site is arrived at by summing the Impact Class B and Contaminant hazard scores (see fig. 7).

After the site has been assessed, you can use the system‟s standard risk assessment reports to see what priority the site has in relation to other sites.

ASSESSING LANDFILL GAS RISKS FROM FORMER WASTE DISPOSAL SITES

Risks from Landfill gas are treated separately because of the distinct issues that need to be considered. Please refer to the methodology for a full explanation of the procedure.

The landfill gas risk assessment tab folder is shown below.

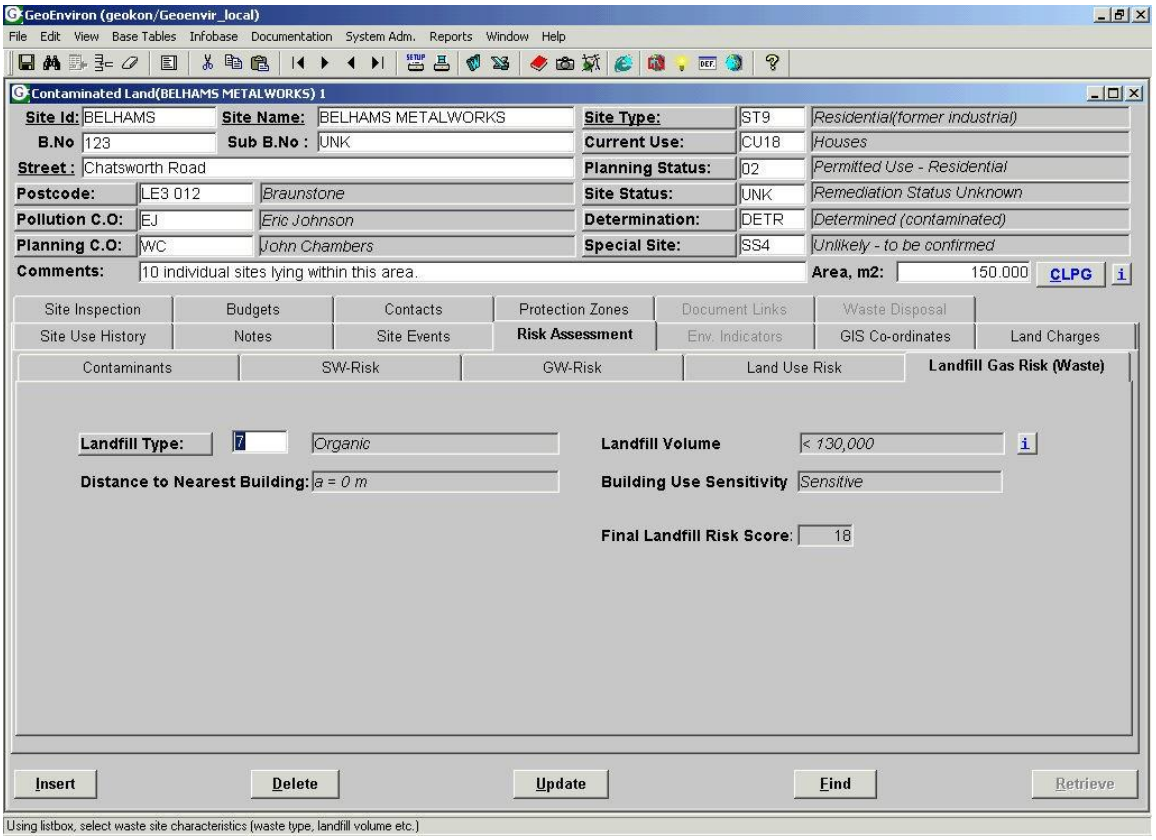
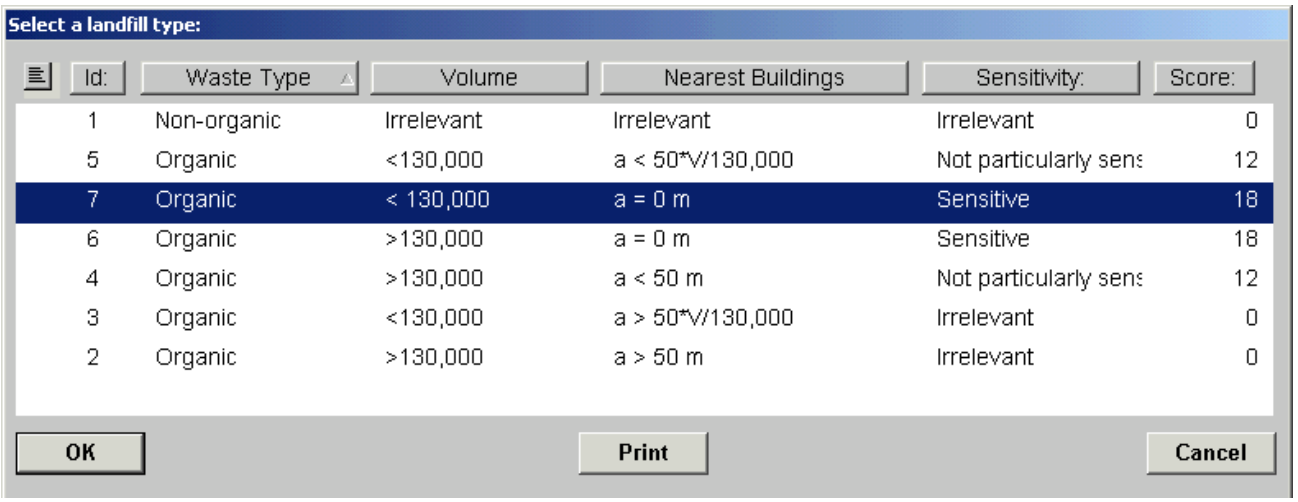


Figure 27 – Landfill Gas Risk Assessment Tab Folder

Clicking on the „Landfill Type" text label button causes the „Select a landfill type" dialog to pop up.



Select a landfill type:

Id:	Waste Type	Volume	Nearest Buildings	Sensitivity:	Score:
1	Non-organic	Irrelevant	Irrelevant	Irrelevant	0
5	Organic	<130,000	a < 50*V/130,000	Not particularly sens	12
7	Organic	< 130,000	a = 0 m	Sensitive	18
6	Organic	>130,000	a = 0 m	Sensitive	18
4	Organic	>130,000	a < 50 m	Not particularly sens	12
3	Organic	<130,000	a > 50*V/130,000	Irrelevant	0
2	Organic	>130,000	a > 50 m	Irrelevant	0

OK Print Cancel

Figure 28 - Select a Landfill Type Dialog

When selecting a type from the dialog you need to consider four questions. These are related to the type of waste that was deposited at the site; the volume of the landfill; the distance to the nearest buildings and the sensitivity of the use of those buildings.

The site is then awarded a score dependent upon the criteria selected. Sites where no organic waste has been deposited obtain a zero score. On sites where organic waste has been deposited, the size of the landfill, the distance to nearest occupied buildings and use sensitivity factors combine to determine the magnitude of the score the site receives.

After the site has been assessed, you can use the system"s standard risk assessment reports to see what priority the site has in relation to other sites.

...

Appendix M Funding and Resources

Central government funds the background work by grants to councils, and additionally there were grants for specific investigations and where necessary remedial works. The latter grants have now been stopped with the expectation that local council tax payers would meet these costs.

Primary funding streams:

- **Central Government Grants**
  Payments from central government direct to local authorities are calculated to cover the costs of implementing the administrative aspects of the contaminated land regime. This is intended to cover the cost of staff and resources for strategic inspection, and also provides associated benefits by way of additional knowledge when carrying out processes required by the Development Management team and other sections of the council such as Asset Management, Building Control and Parks.

- **Contaminated Land Capital Projects Programme**
  Central government provides funding via a grant system to investigate and remediate land that is likely to be polluted. This is currently known as the Contaminated Land Capital Projects Programme, and previously the 'Contaminated Land Supplementary Credit Approval'. The latter funding system supported the investigation of almost 30 sites across Portsmouth and the remediation of 11 sites. The current austerity drive has meant the government has implemented a moratorium on funding of all contaminated land projects, and it now expects local council tax payers to fund investigative works to identify and determine statutory contaminated land. The 2012 Statutory Guidance describes how the 'appropriate person' will be identified to pay for land remediation. Although intended to be the polluter, these costs more often fall to the current land owner.

- **Council Tax**
  Whilst the physical investigation and remediation of contaminated land is a statutory duty with substantial costs, central government expect such costs to be borne by local council tax payers.

Secondary funding streams:

- **Insurance recovery**
  In the United States the polluting company's insurance is normally used to pay for the remediation of contaminated sites (known as 'superfund sites'). Whilst a different regulatory regime is in force in the UK, the underwriters of the policies are mostly UK based and the same approach can be used in the UK. Previously whilst there was central government funding this approach was not used but now that funding has ceased insurance recovery is likely to gain favour for the larger sites. Minimum costs to make the approach worthwhile are likely to be about £1m, as it would require additional forensic insurance companies to locate the relevant insurance for the company that allowed the pollution and to prove linkage. Historic insurance policies are also likely to be capped at a monetary figure appropriate to when the policy was taken out. Taking into account inflation this may not be sufficient to works. It is important to note that once a claim has been made on a policy, no further claim can be made, so if a company has operated several sites, care must be taken to use the policy for the most polluted site or claim for all sites at once. This may mean the inspection priority is changed in practice to allow all sites to be considered at one time or liaison with other councils is required to not jeopardise the clean-up of sites in other local authority areas.

- **Waste Management capital**
  To avoid pollution of council owned land the council can direct money into contaminated land projects. Paulsgrove Landfill is the only active landfill within Portsmouth. It is currently

operating under a closure license and will close once work is complete and required hand-back standards are met.

- **Water Framework Directive**
  Langstone Harbour as part of the coastline will continue to receive diffuse pollution from various sources. There may be scope to use moneys to maintain its water quality and achieve good quality by 2027.

Other funding streams (extraneous to Council):

- **Landfill taxes**
  Charities (ENTRUST) running community projects near to landfill sites can apply for Landfill Community Projects. Often these are community gardens and nature projects. Remediation is not included although it could be used in combination to enhance the final end-point and usefulness. Local Authorities cannot apply for this funding.

- **Flood and coastal erosion risk - Grant In Aid & Local Levy**
  Grants are available for major works along the coastline to protect people. The works currently planned will retain the current coastline (largely created by land creation) and so include works that will protect landfills. This protects people by ensuring waste is not distributed onto beaches. On smaller schemes, that would not be funded using FCER-GIA, Portsmouth's MPs can direct Local Levy funding for coastal projects via the Regional Flood and Coastline Committee.

- **Coastal Access and Footpaths**
  Land owners with coastal footpaths can apply to Natural England for funding, however, as this relates to the coastal footpath, only the outer edge to ferry routes are covered.

Appendix N Assessments of Statutory Contaminated Land

Whilst the majority of both the assessment and remediation of Contaminated Land takes place through the Planning system, some sites have been investigated to ascertain of intervention is required. In most cases, when detailed assessment is undertaken to comprehensively understand the contamination and site, that physical remedial works can be avoided. Where this is uncertain remediation has been completed

Table K1

Assessments and Remediation of Contaminated Land

Site	PCC Land	Investigated	Remediated
Alexandra Park	Y	Y	n/a
Moneyfield Allotments	Y	Y	Y
Longmeadow Allotments	Y	Y	Y
Pembroke Park	Y (partial)	Y	n/a
Old Portsmouth Power Station		Y	n/a
Richmond House	Y (partial)	Y	n/a
Henderson Road Caravan Site	Y	Y	n/a
Victoria Park	Y	Y	n/a
Nelson Avenue		Y	n/a
Jervis Road / Twyford Ave	Y (partial)	Y	n/a
Hilsea Crescent	Y (partial)	Y	n/a
King George V Playing Fields	Y	Y	n/a
Horsea Lane Allotments	Y	Y	n/a
Salisbury Road Allotments	Y	Y	n/a
Milton Common	Y	Y	Y
North Harbour Allotments	Y	Y	Y
Stamshaw Park	Y	Y	n/a
Tangier Road Field	Y	Y	Y
Portsmouth College	Y	Y	n/a
Teignmouth Road Play Area	Y	Y	Y
Hope Cottage	Y	Y	Y
Eastney Lake Foreshore	Y	Y	Y
Great Salterns Estate	Y	Y	n/a
Burrfields Road Industrial Estate		Y	
Stamshaw School	Y	Y	Y
Fort Cumberland Road Pumping Station	Y		Y
Hilsea Lines	Y	Y	
Monkton Road Builders Yard		Y	n/a
Fawcett Road Clay Pit		Y	n/a
Cosham Gasworks		Y	n/a
Station Road Asphalt Works		Y	Y
Glory Hole Landfill		Y	
Victoria Rd South, Petrol Station		Y	
Canoe Lake		Y	

NB: Glory Hole, Canoe Lake, and the former Victoria Road Petrol station were assessed under the Part 2a regime. All others were assessed under the 1990 Environmental Protection Act but before the Part 2a regime came into force.