


Environmental Protection

Supplementary Planning Document

May 2013

WARRINGTON
Borough Council

1 Introduction

2 Toolkit

3 Air Quality

Contents

4 Contaminated Land

5 Light Pollution

6 Noise

Contents

1 Introduction

This Supplementary Planning Document sets out in detail, the Council's approach to dealing with Environmental Protection including;

- Contaminated Land
- Air Quality
- Light Pollution
- Noise and Vibration

and identifies associated impacts that could affect public health and wellbeing.

The planning system is very complex. It can also be very emotive and can affect individuals and communities in very different ways. The objective of this Environmental Protection Supplementary Planning Document is to help applicants and developers through the planning process and to ensure that the most important aspects of Environmental Protection are addressed at the most appropriate stage of the planning process.

The Supplementary Planning Document includes:

- A "Toolkit" which sets out when additional information may be needed to support a planning application.
- Guidance as to what such additional information should contain - this can be quite technical and will probably be used by specialists preparing such information.
- Guidance as to how the Council will assess such information and an indication as to conditions that may be attached to any planning permission to ensure sustainable development.

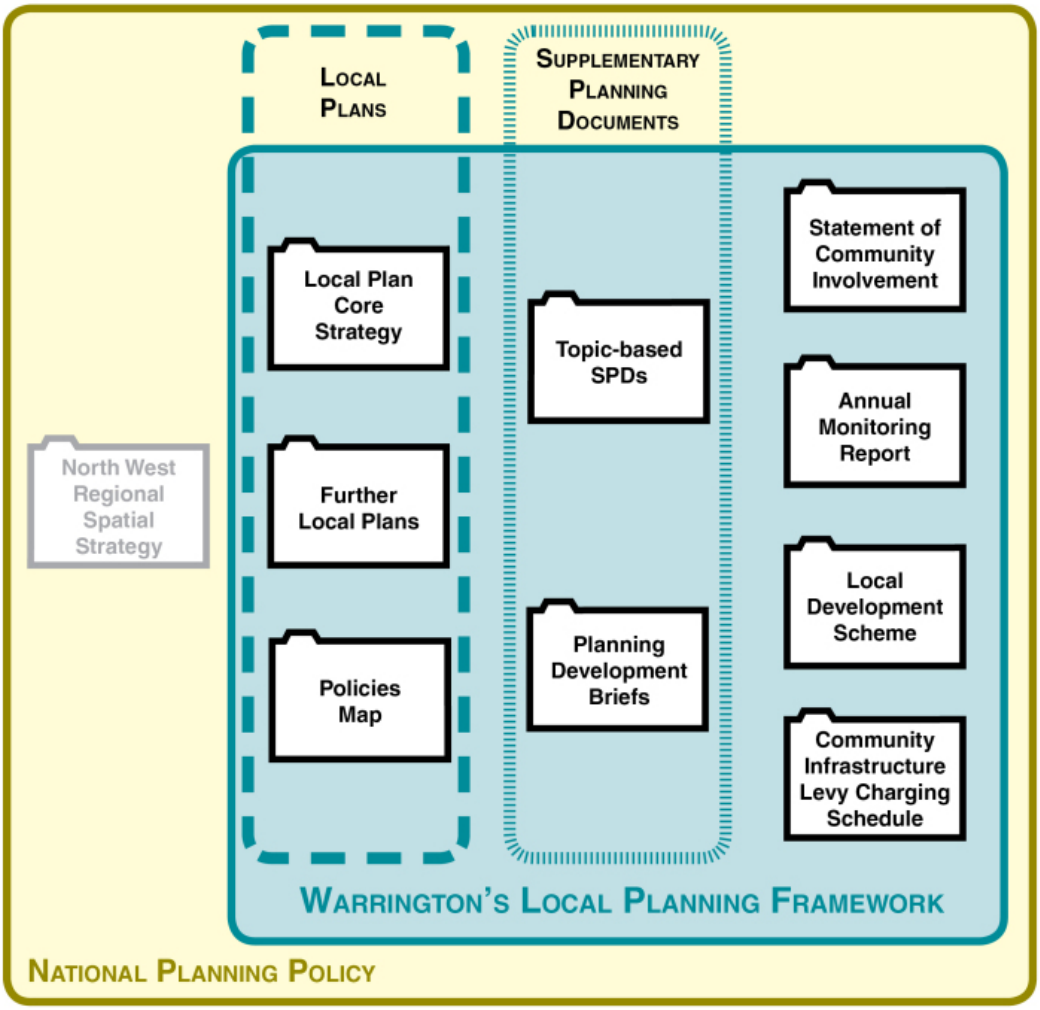
This document is written to serve as an informative and a helpful source of advice. Readers must note that legislation, guidance and practical methods may be subject to change. The Council has taken all reasonable precautions to ensure the information is correct. However, the Council, its officers, servants, or agents, will not accept any liability for loss or damage caused by any person relying on this information, or for any errors or omissions in the information provided.

1 Introduction

1.1 Status of the Document

This Supplementary Planning Document forms part of Warrington's Local Planning Framework. The Local Planning Framework comprises a series of plans and documents, as opposed to a single plan, as documents can be produced more easily and are more easily kept up to date.

Warrington's Local Planning Framework consists of a suite of documents as illustrated below:



Local Plans are part of the Statutory Development Plan and are subject to independent examination. The policies against which planning applications will be assessed are contained within Local Plans.

Supplementary Planning Documents (SPDs) such as this are documents that expand upon existing policy or provide further detail to policies in contained in the Development Plan. These documents are not subject to independent examination and do not have Development Plan status, but are a material consideration in decision-making.

This document should be read in conjunction with national planning policy set out in the National Planning Policy Framework (NPPF). This SPD specifically supplements Environmental Protection policies contained within the adopted UDP and the emerging Local Plan Core Strategy.

Environmental Protection policies in the Unitary Development Plan include:

LUT1 – Land Use / Transportation Strategy	GRN2 – Environmental Protection and Enhancement
HOU7 – The Residential Environment	REP1 – The Prudent Use of Resources
REP6 - Surface Water Quality	REP7 - Groundwater Quality
REP8 – Land Contamination	REP9 – Air Quality
REP10 – Noise	REP11 – Odours
REP12 – Development Near Existing Sources of Pollution	REP13 – Hazardous Uses / Installations
REP14 – Hazardous Uses / Installations	REP15 – Hazardous Uses / Installations

In addition, Policy QE6 within the emerging Local Plan Core Strategy covers Environment & Amenity Protection and sets out the following:

Policy QE 6

Environment and Amenity Protection

The Council, in consultation with other Agencies, will only support development which would not lead to an adverse impact on the environment or amenity of future occupiers or those currently occupying adjoining or nearby properties, or does not have an unacceptable impact on the surrounding area. The Council will take into consideration the following:

- **The integrity and continuity of tidal and fluvial flood defences;**
- **The quality of water bodies, including canals, rivers, ponds and lakes;**
- **Groundwater resources in terms of their quantity, quality and the ecological features they support;**
- **Air quality;**
- **Noise and vibration levels and times when such disturbances are likely to occur;**
- **Levels of light pollution and impacts on the night sky;**
- **Levels of odours, fumes, dust, litter accumulation and refuse collection / storage.**
- **Overlooking and loss of privacy;**
- **Sunlight, daylight and overshadowing;**
- **The effect and timing of traffic movement to, from and within the site and car parking including impacts on highway safety;**
- **The ability and the effect of using permitted development rights to change use within the same Use Class (as set out in the in the Town and Country Planning (General Permitted Development Order) without the need to obtain planning consent.**

The ability and the effect of using permitted development rights to change use within the same Use Class (as set out in the in the Town and Country Planning (General Permitted Development Order) without the need to obtain planning consent.

Proposals may be required to submit detailed assessments in relation to any of the above criteria to the Council for approval. Where development is permitted which may have an impact on such considerations, the Council will consider the use of conditions or planning obligations to ensure any appropriate mitigation or compensatory measures are secured.

Development proposals on land that is (or is suspected to be) affected by contamination or ground instability must include an assessment of the extent of the issues and any possible risks. Development will only be permitted where the land is, or is made, suitable for the proposed use.

Additional guidance to support the implementation of this policy is provided in the Design and Construction and Environmental Protection Supplementary Planning Documents.

1.2 Pre-Application Discussions

Whilst each section aims to provide clarity with regards to various aspects of Environmental Protection, it should be recognised that applicants are strongly encouraged to undertake pre-application discussions with Council officers and external consultees prior to the submission of a planning application.

The objective of pre-application discussion should be to confirm whether the principle of development is acceptable, establish key issues which the application should address, and to agree the submission of material needed to enable the application to be assessed.

Where applicable, joint pre planning discussions may be necessary with other organisations that have fundamental interrelated issues to establish at an early stage whether a development would be acceptable.

It is expected that each application,where pre-application involvement is appropriate, will be submitted with a statement outlining the extent of consultation completed and how the feedback from the consultation process has influenced the submitted scheme.

1.3 Environmental Impact Assessment

Certain planning applications may fall within the scope of the Environmental Impact Assessment Regulations 1999. Where this is the case an Environmental Statement will be required to support the planning application, as stipulated by these regulations. It is likely however, that additional information concerning each aspect of Environmental Protection will be required to fully assess an application, in addition to the consideration contained in a typical Environmental Impact Assessment.

2 Toolkit

Purpose of the Toolkit

For a planning application to stand the greatest chance of success it is important to work through all of the issues which the Council will be interested in, and attempt to address what is needed by providing good, relevant information. This Toolkit is designed to help you do this and aims to identify when further information, relating to Environmental Protection, is required in support of a planning application or proposal. It should be read in conjunction with the following chapters where necessary which are essentially guidance documents referring to technical issues for consultants / specialists.

Using the Toolkit

This Toolkit is split into four sections, relating to Environmental Protection:

As you work through each section it should become clear when further information or supporting documents may be required by the Council, when submitting a planning application.

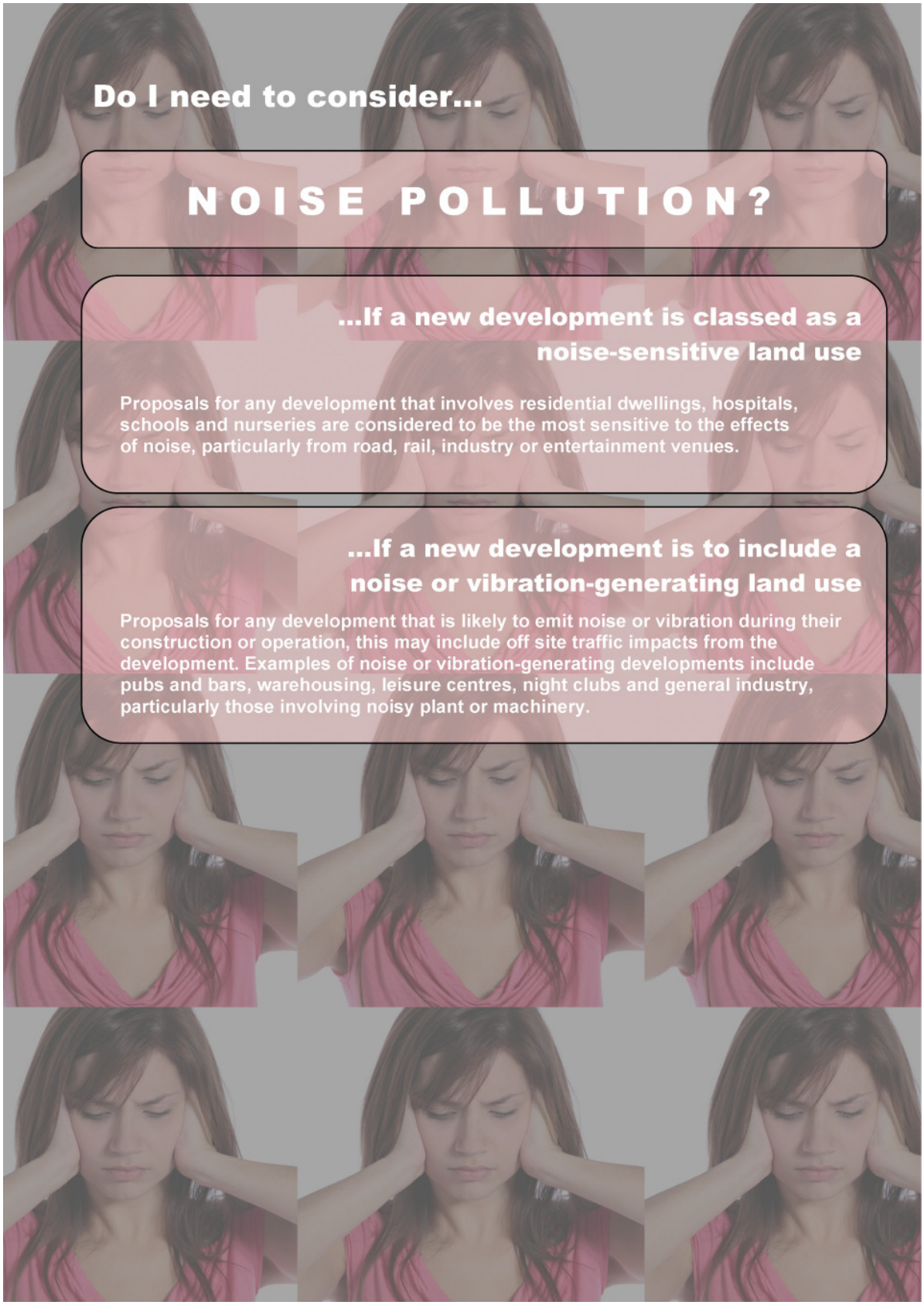
Who We Are

The Public Protection Service is responsible for addressing Environmental Protection issues via the planning system and provides advice to the Local Planning Authority (LPA) with regards to any risks to human health or amenity impacts within the wider environment. Our contact details can be found at the end of this toolkit.


Do I need to consider...
AIR QUALITY?
...If a new development is located in a sensitive area
Within or next to an existing Air Quality Management Area (AQMA) or that could significantly impact upon air quality in areas where objectives are currently not exceeded
...If a new development includes car parking
>50 spaces inside AQMA or >100 spaces outside AQMA
...If a new development will introduce new exposure
To an area close to or within existing sources of air pollutants
...If a new development will impact upon traffic
Significant changes in traffic volumes, increase in congestion or significantly change composition
...If a new development is located near railway lines
Introduce new exposure within 30m of a diesel railway line
...If a new development includes biomass boilers or Combined Heat & Power Plants
...If a new development is likely to have significant impacts during construction
...If a new development is likely to significantly affect nitrogen deposition to sensitive habitats
...If a new development has any other potential impact on air quality or odour not listed above


Do I need to consider...
CONTAMINATED LAND?
...If a new development is on or adjacent to 'Potentially Contaminated Land'
Proposals for any new developments located on land that is affected by contamination due to its previous use. A wide range of industrial uses may have historically caused land contamination such as cotton mills, metal works, chemical works, breweries, tanneries and gas works. At the same time, less obvious land uses such as domestic garages, electricity sub-stations and in-filled ponds or quarries can also lead to potential contamination.
...If a new development is within 250m of a Landfill site
Proposals for any new developments that are to be built within 250m or less of a landfill site or known ground gas source. Decomposing waste or organic material (eg: Peat) can produce gas, which can travel through the ground and affect developments. The main types of land use that can produce ground gas are landfill sites, marshes, peat bogs, coal mines and in-filled land, such as ponds, canals or quarries.
...If a new development is classed as a 'Sensitive End-Use'
Proposals that include residential developments (houses, flats, nursing homes etc.); Allotments; schools; nurseries and crèches; children's play areas and playing fields.


Do I need to consider...
LIGHT POLLUTION?
...If a new development is to include illuminated signage
Proposals for any developments, which include signs or advertisements that are illuminated internally or externally and could cause light pollution. There are many types of illuminated signs, but common examples include shop/retail fascias or billboard advertising.
...If a new development is to include a lighting scheme
Proposals for any developments, which include external lighting installations, such as flood-lighting or security lighting. Typical examples would include car parks, warehousing or sports pitches and courts.
...If a new development is adjacent to a significant light source
Proposals for any developments considered to be a sensitive end use. Such developments include residential dwellings, hospitals or any development where occupants stay overnight


Do I need to consider...
NOISE POLLUTION?
...If a new development is classed as a noise-sensitive land use
Proposals for any development that involves residential dwellings, hospitals, schools and nurseries are considered to be the most sensitive to the effects of noise, particularly from road, rail, industry or entertainment venues.
...If a new development is to include a noise or vibration-generating land use
Proposals for any development that is likely to emit noise or vibration during their construction or operation, this may include off site traffic impacts from the development. Examples of noise or vibration-generating developments include pubs and bars, warehousing, leisure centres, night clubs and general industry, particularly those involving noisy plant or machinery.

Warrington Borough Council **New Town House** **Buttermarket Street** **Warrington** **WA1 2NH**	Air Quality	Tel: 01925 4432581 Email: environmental.health@warrington.gov.uk
	Contaminated Land	Tel: 01925 442557 Tel: 01925 442652 Tel: 01925 442653 Email: contaminatedland@warrington.gov.uk
	Light Pollution	Tel: 01925 4432581 Email: environmental.health@warrington.gov.uk
	Noise and Vibration	Tel: 01925 4432581 Email: environmental.health@warrington.gov.uk
	Development Management	Tel: 01925 442819 Email: devcontrol@warrington.gov.uk
	Building Control	Tel: 01925 442554 Email: building.control@warrington.gov.uk
Environment Agency	National Enquiries	Tel: 08708 506 506 Email: enquiries@environment-agency.co.uk Web: www.environment-agency.gov.uk
Department of Environment, Food and Rural Affairs (DEFRA)	National Enquiries	Tel: 0207 944 5287 Web: www.defra.gov.uk
The National Housebuilding Council (NHBC)	Buildmark House Bucks HP6 5AP	Tel: 01494 735363 Web: www.nhbc.org.uk

2 Toolkit

3 Air Quality

3.1 Introduction

Air quality is a measure of how good our air is in terms of the type and quantity of pollution contained within it. A good level of air quality is an important factor in protecting human health.

The planning system is important to help us to manage our local air quality. Used positively, spatial planning has a pivotal and significant role in helping to improve local air quality and meet national emissions targets. The planning system for land use and transport are an important part of an integrated approach to air quality improvements. The importance of considering air quality at an early stage is essential in the application process.

Action plans for the current Air Quality Management Areas (AQMAs) have been developed and are included within Annex 1 of the current Local Transport Plan (LTP). The LTP has a specific policy relating to air quality so that the transport network aims to reduce the impact of traffic on air quality in Warrington. Any planning application that has a potential impact upon traffic levels or composition should take into account policies within the LTP and how they relate to air quality.

3.2 Air Quality Objectives

The Government has set out National Air Quality Objectives under the Environment Act 1995 and empowered local authorities to establish areas, known as AQMAs, where pollution levels are likely to exceed the national objectives for certain pollutants. Unacceptable levels of certain pollutants are assessed against the objectives set out in the National Air Quality Strategy 2007, and any amendment to that strategy. The Council is required to determine whether these health-based air quality objectives for seven pollutants will be achieved in the Borough.

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured As	Date to be Achieved by
Benzene			
All Authorities	16.25 µg/m^3	Running Annual Mean	31/12/2003
England and Wales only	5.00 µg/m^3	Annual Mean	31/12/2010
Scotland and N. Ireland	3.25 µg/m^3	Running Annual Mean	31/12/2010
1,3-Butadiene	2.25 µg/m^3	Running Annual Mean	31/12/2003
Carbon Monoxide			
England/Wales/N. Ireland	10.0 µg/m^3	Maximum daily running 8 hour mean	31/12/2003
Scotland only	10.0 µg/m^3	Running 8 hour mean	31/12/2003

3 Air Quality

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured As	Date to be Achieved by
Lead	0.5 µg/m^3 0.25 µg/m^3	Annual Mean Annual Mean	31/12/2004 31/12/2008
Nitrogen Dioxide	200 µg/m3 not to be exceeded more than 18 times a year 40 µg/m^3	1 Hour Mean Annual Mean	31/12/2005 31/12/2005
Particles (PM_{10}) (Gravimetric)			
All authorities	50 µg/m3 not to be exceeded more than 35 times a year 40 µg/m^3	24 Hour Mean Annual Mean	31/12/2004 31/12/2004
Scotland only	50 µg/m3 not to be exceeded more than 7 times a year 18 µg/m^3	24 Hour Mean Annual Mean	31/12/2010 31/12/2010
Sulphur Dioxide	350 µg/m3 not to be exceeded more than 24 times a year 125 µg/m3 not to be exceeded more than 3 times a year 266 µg/m3 not to be exceeded more than 35 times a year	1 Hour Mean 24 Hour Mean 15 Minute Mean	31/12/2004 31/12/2004 31/12/2005

Table 3.1 The Current National Air Quality Objectives

These objectives are subject to change, therefore the Public Protection Service should be contacted for the most up to date information.

Planning considerations are key in assisting the AQMA action plan and to prevent new areas of exceedance either by the emissions linked to the development or by locating new receptors in areas where air quality might then breach the objective levels.

The Council has declared AQMA's for exceedences in the annual nitrogen dioxide limit. Information on the current AQMAs is available on the Council website, or can be provided by the Public Protection service on request.

Source apportionment work has shown that poor air quality in Warrington is predominantly the result of traffic emissions. Because air quality is kept under annual review, the AQMA boundaries may change and, therefore, applicants are advised to check if these boundaries have changed with the Public Protection Service. These areas have been designated due to exceedences in the annual nitrogen dioxide (NO_2) objective levels linked to transport emissions, primarily HGVs and cars.

Further areas within Warrington are close to, but below the national objectives. The Developer / Applicant must consider air quality within current AQMAs, but also areas adjacent to these, and areas that are close to the objectives.

The fact that an AQMA has been declared does not mean that there will be an absolute restriction of new development in the area. However, it does mean that greater weight and consideration will be given to air quality issues and measures to reduce pollution. In determining a planning application, weight will be attached to air quality impacts, but will also need to be balanced against other planning considerations. The Council will also look closely at applications for new developments that are not within an AQMA if it is likely that the new development will increase pollution to unacceptable levels or introduce new exposure where people were not previously exposed. The Council shall ensure development has a beneficial impact on the environment, for example by exploring the possibility of securing mitigation measures that would allow the proposal to proceed. It may be appropriate in some circumstances for the developer to fund mitigation measures elsewhere inside the AQMA and assist the action taken by the Council in planning and air quality assessment work to offset any increase in local pollutant emissions as a consequence of the proposed development. These measures may be secured through Section 106 Agreements or unilateral undertakings.

Whilst the primary concern is exceedances of the annual NO_2 objective, there is also growing concern of particulate levels and their impact on health. Whilst larger particulates, known as PM10, have objective levels set within the national standards there is no objective level for the finer particles (PM2.5) as there is considered to be no trigger level before there is a health impact i.e. any exposure will have some health concerns. Therefore, whilst PM2.5 is not one of the pollutants within the national objectives for local air quality management, the Council may still require this pollutant to be assessed for comparison against background data if relevant for the development. Any increase in PM2.5 levels above background may require mitigation measures.

3.3 Technical Guidance for Consultants/Specialists

3.3.1 When is an Air Quality Assessment Required?

It is possible that air quality will still need to be considered outside areas of poor air quality if the scheme is likely to result in significant emissions. Professional judgement is required to determine whether an assessment is required and the applicant is strongly advised to contact the Council to check at pre-application stage. However, guidelines produced by the Environmental Protection UK publication *Development Control: Planning for Air Quality (2010)* provides a useful initial screen and are set out in Table 3.2.

1	**New developments within or adjacent to AQMAs** Proposals for any new developments that would impact upon air quality in areas where air quality objectives are exceeded, within current or potential AQMAs, where people would be exposed for significant periods of the day.
2	**New developments outside AQMAs** Proposals for any new developments that could impact upon air quality in areas where currently air quality objectives are not exceeded, but where there would be a significant impact from the development on the pre-development levels, where there are relevant receptors.

3	**Car Parking** Proposals that include significant new car parking. To be taken to be more than 100 spaces outside an AQMA, or 50 spaces inside or adjacent to an AQMA. Account shall also be taken of car park turnover, i.e. the difference between short-term and long-term parking, which will affect the traffic flows into and out of the car park. This should also include proposals for new coach or lorry parks. These criteria are designed to trigger the requirement for the assessment of traffic on the local roads. It may also be appropriate to assess the emissions from within the car park itself.
4	**New Exposure** When the development will introduce new exposure close to or within existing sources of air pollutants, including road traffic, industrial operations, agricultural operations etc.
5	**Change in Traffic Volumes** Proposals that will give rise to a significant change in either traffic volumes: Typically a change in annual average daily traffic (AADT) or peak traffic flows of greater than ±5% or ±10%, depending on local circumstances (a change of ±5% will be appropriate for traffic flows within an AQMA): or in vehicle speed (typically of more than ±10 kph), or both, usually on a road with more than 10,000 AADT (5,000 if 'narrow and congested')
6	**Traffic Congestion** Proposals that will generate or increase traffic congestion, where ‘congestion’ manifests itself as an increase in periods with stop start driving.
7	**Change in Traffic Composition** Proposals that would significantly alter the traffic composition on local roads, for example, increase the number of HGVs by 200 movements or more per day, due to the development of a bus station or an HGV park. (Professional judgement will be required, taking account of the total vehicle flow as well as the change).
8	**Railway Lines** Introduction of new exposure within 30m of a diesel railway line.
9	**Biomass Boilers** Proposals that include biomass boilers or biomass-fuelled Combined Heat and Power (CHP) plant (there is no established criterion for the size of plant that might require assessment.)
10	**CHP and boilers** Consideration should be given to the impacts of centralised boilers or CHP plant burning other non-biomass fuels (e.g. gas or oil) within or close to an AQMA.
11	**Construction Impacts**

	Proposals that could give rise to potentially significant impacts during construction for nearby sensitive locations e.g. residential areas, areas with parked cars and commercial operations that may be sensitive to dust. Large, long-term construction sites that would generate large HGV flows (>200 movements per day) over a period of a year or more
12	**Nitrogen deposition** Developments which may significantly affect nitrogen deposition to sensitive habitats
13	**Other** Any other development proposal within or adjacent to an AQMA and not listed in this table which may, in the professional opinion of the Council, be significant in terms of air quality impact and/or may impact on the working of measures detailed in the Air Quality Action Plan.

Table 3.2: Criteria for determining whether an application/development will require an air quality assessment.

3.3.2 Receptors

Any assessment should consider air quality levels at relative sensitive receptors. These are defined within the Environment Act 1995 as "All locations where members of the public might be regularly exposed, e.g. building facades of residential properties, schools, hospitals, libraries etc." For the 1 hour objectives it also includes kerbside sites (e.g. pavements of busy shopping streets) and outdoor locations to which the public might reasonably expect to spend 1 hour or longer, including car parks, bus stations and railways stations which are not fully enclosed.

3.3.3 Contents of an Air Quality Assessment

This Chapter does not set out a prescribed methodology for developments where an assessment is required. It is therefore important that appropriate methodology and data requirements are agreed with the Council before any assessment work is undertaken. It is considered that to prescribe methods does not allow for continuous improvements being made in methodology. Current detailed guidance is available in the *Defra Technical Guidance LAQM.TG(09)* and the Environmental Protection UK publication.

In principle, the intention of an air quality assessment is to demonstrate the likely changes in air quality or exposure to air pollutants, as a result of a proposed development. Some quantitative assessment will therefore be required. The basis of assessments will be to compare the existing situation with that following completion of the development and three basic steps are required:

1. Assess the existing air quality (baseline)
2. Predict future air quality without the development (future baseline)
3. Predict future air quality with the development (with development)

The Council can usually assist with the first two steps and information may be available from one of the Council's own annual air quality Review and Assessment reports. These reports are available on request or can be downloaded from the Council website.

Any air quality assessment report will normally be required to detail a minimum of information. Information on this is set out in Table 3.3:

3 Air Quality

1 Details of proposed development
An overview of the development proposal
Identification of on-site sources of pollutants
An overview of expected traffic changes or changes in emissions from the site for a specified year
Identification of local receptors including residential properties, other sensitive properties, ecologically sensitive areas and any specific locations where people are likely to be exposed for the appropriate averaging time (dependant on the air quality objective being assessed against)
Evidence of a site visit and assessment of local issues (as discussed above)
Set out the relevant air quality standards and objectives
An overview of the development proposal in the context of any local air quality issues (e.g. within an AQMA or area undergoing a Detailed Assessment), a review of the most recent Updating and Screening or Progress Reports or other Review and Assessment reports published by the Council is therefore essential
A justification of which pollutants requiring an assessment
Set out the assessment methodology, including the local input data and assumptions
Traffic data used in the assessment
Emission data (point source and road traffic)
Meteorological data
Baseline pollutant concentrations
Choice of baseline year and whether it is a low, typical or high pollution year (including an examination of any available long-term local air quality monitoring data for trend)
NOx:NO_2 relationship used; and
Any other relevant input parameters used
2 Set out the results and provide a summary
Details of the model verification including a comparison of predicted versus measured concentrations used to derive adjustment factors to account of systematic errors
Impacts of the construction phase of the development at local receptor locations
Impacts that changes in emissions will have on ambient air quality at local receptor locations
Any exceedances of the air quality objectives brought about by the development, or any worsening of a current breach (including their geographical extent)
Whether any measures or actions specified in an Air Quality Action Plan will be directly compromised or rendered inoperative by the development proposal
3 In some cases the following additional information may be required
Source apportionment (the contribution of specific sources and vehicle classes to the overall contribution). Longer-term air quality predictions (e.g. an assessment for 2010 air quality objectives and against EU Limit Values)

1 Details of proposed development
A wider/more detailed assessment scope which takes into account other permitted major development proposal(s) in the same area
Consideration of potential impact upon neighbouring local authorities
4 Set out and assess the significance of the results
Advice on assessing significance is given within this SPD and must be followed unless an alternative assessment criteria is agreed with the Council
5 Consider the options for, and effectiveness of, pollution reducing, mitigation or compensating measures
Advice is given within this Chapter on mitigation measures. This is not an exhaustive list of measures and alternative more appropriate ones for the development type may be submitted for approval.

Table 3.3: Requirements of an air quality assessment

3.3.4 Agreement of Data and Assessment Methodology

Prior to undertaking an air quality assessment, it is important that whoever undertakes the assessment obtains an agreement with the Council regarding the scope and methodology. This will include an agreement on appropriate datasets including appropriate local air quality data, meteorological data, background concentrations, traffic flows/trip generation data, model type and verification procedures.

3.3.5 Selection of Modelling Methodology

Air quality assessment is a scientific exercise and as such there are continuous improvements and scientific developments within the discipline. Consequently, as previously stated, this Chapter does not set out a detailed prescribed method or choice of modelling methodology to be followed. However, advice is given in Table 3.4 on selecting which of the three main types of assessment methods should be used:

	Screening Methods
1	These are quick to apply, generic approaches based upon a limited set of variables. They are intended to determine if an air quality problem exists and if a more detailed dispersion modelling assessment is required. Since they are based upon a simplification of detailed modelling approaches they will not be suitable for local development proposals which contain features that are not included in the screening method. A local screening study may be applicable for simple proposals involving, flat free-flowing/open roads (i.e. non-congested, non-street canyons without inclines) or for simple industrial point sources, especially where the changes in emissions is likely to be very small. Screening methods should only be used in areas where air quality is not approaching or exceeding the air quality objectives.
	Local Scale Dispersion Models
2	These are detailed, specialist methodologies with a broad range of local input variables. The models focus on the local road network or industrial source and background concentrations are added to the calculated values to predict the total pollutant concentration. As such, these models are typically the most suitable for the assessment of local development proposals. In any situation where a screening method cannot model specific features of the development proposal or the local topography then a local scale dispersion model should be used unless then assessment area is very large, where regional scale models are more appropriate. These models are suitable for use in areas where air quality is approaching or exceeding the air quality objectives.

	Regional Scale Dispersion Models
3	These are similar to local scale dispersion models but can be designed to model pollution sources over a very wide area (several square kilometres). Such modelling will rarely be required for local development proposals and should only be used where the study area is large.

Table 3.4: Assessment methods

3.3.6 Assessing Significance

Assessing the significance of air quality in the context of a planning application is an important part of the overall process. The aim is to remove as much ambiguity as is possible about how air quality should be considered in the planning process. Currently, there is no definitive, specific Government guidance for assessing the significance, although guidance provided by Environmental Protection UK offers a consistent approach and is recommended.

Significance is typically assessed at two stages in the overall process of examining air quality as a material planning consideration:

1. The requirement to set out the change in magnitude and significance of any air quality impacts within the air quality assessment, using the professional judgement of the assessment authors;
2. An evaluation by the local planning authority (LPA) of the assessment of the significance of any air quality impacts using the professional judgement of its officers, to help reach a decision on the planning application.

3.3.7 Significance within the Air Quality Assessment

The main requirement and outcome of an air quality assessment will be to describe significance in terms of the change in concentration of a specific pollutant and the absolute concentration after the change, in relation to air quality guidelines. An important aspect of considering significance will therefore be a comparison against the UK air quality objectives and the EU limit values. However, the assessment process also requires the magnitude of the changes to be set out and taken into account and a consistent descriptive terminology employed.

The use of assessment descriptors often has limitations, for example they may not include a judgement of the number of people affected or fail to account for the impacts of the construction phase of a development. Nonetheless, assessment descriptors are an important part of overall assessment. An example of possible descriptors for nitrogen dioxide and PM10 is given in Table 3.5. Further examples are given within the Environmental Protection UK guidance.

Magnitude of change	Annual Mean NO_2 / PM10	Days PM10 > 50µg/m^3
Very Large	Increase/decrease >15%	Increase/decrease > 15 days
Large	Increase/decrease 10-15%	Increase/decrease 10-15 days
Medium	Increase/decrease 5-10%	Increase/decrease 5-10 days
Small	Increase/decrease 1-5%	Increase/decrease 1-5 days
Very Small	Increase/decrease < 1%	Increase/decrease < 1 days

Table 3.5: Descriptors for changes in ambient concentrations of nitrogen dioxide (NO_2) and particulates (PM10)

These magnitudes of changes therefore need to be put into context when compared to actual air quality concentrations at relevant receptors to assess significance.

Absolute Concentration in Relation to Objective/Limit Value	Change in Concentration (Increase with Scheme)		
	Small	Medium	Large
Above Objective/Limit Value *With* Scheme (>40 µg/m^3)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value *With* Scheme (36-40 µg/m^3)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value *With* Scheme (30-36 µg/m^3)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value *With* Scheme (<30 µg/m^3)	Negligible	Negligible	Slight Adverse
Decrease with Scheme Above Objective/Limit Value *Without* Scheme (>40 µg/m^3)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value *Without* Scheme (36-40 µg/m^3)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value *Without* Scheme (30-36 µg/m^3)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value *Without* Scheme (<30 µg/m^3)	Negligible	Negligible	Slight Beneficial

Table 3.6: Air quality impact descriptors for changes in the annual NO2 concentrations at a receptor

3.3.8 Assessment of Significance by the LPA

The flow chart in Figure 3.1, taken from the Environmental Protection UK guidance, has been adopted by the Council as an approach to help evaluate the significance of air quality impacts from any proposed development. When using the flow chart the LPA will also consider the following points:

- Air quality has the potential to be a material consideration in all planning applications – this is a site-specific, application-specific judgement in terms of the development location and the nature of the proposed development;
- The significance of impacts will also depend on the context of the development;
- The flow chart can be used to consider increases in emissions (a deterioration in air quality) as well as increases in exposure;
- The respective weight given to EU limit values and UK air quality objectives;
- Increases in concentrations of pollutants for which no health-based threshold is apparent may be treated as significant at lower levels of concentration change than for threshold pollutants. Non-threshold pollutants commonly assessed are benzene and particulate. Threshold substances include oxides of nitrogen;
- Differences of significance of changes in concentration above an air quality objective than when it is substantially below an objective;
- Allowances should be made for uncertainty. For example, a concentration of 36 µg/m^3 nitrogen dioxide may be considered to be significantly close to the air quality objective of 40 µg/m^3 owing to uncertainties and therefore may be adopted as a conservative figure when evaluating potential exceedances of the objective.

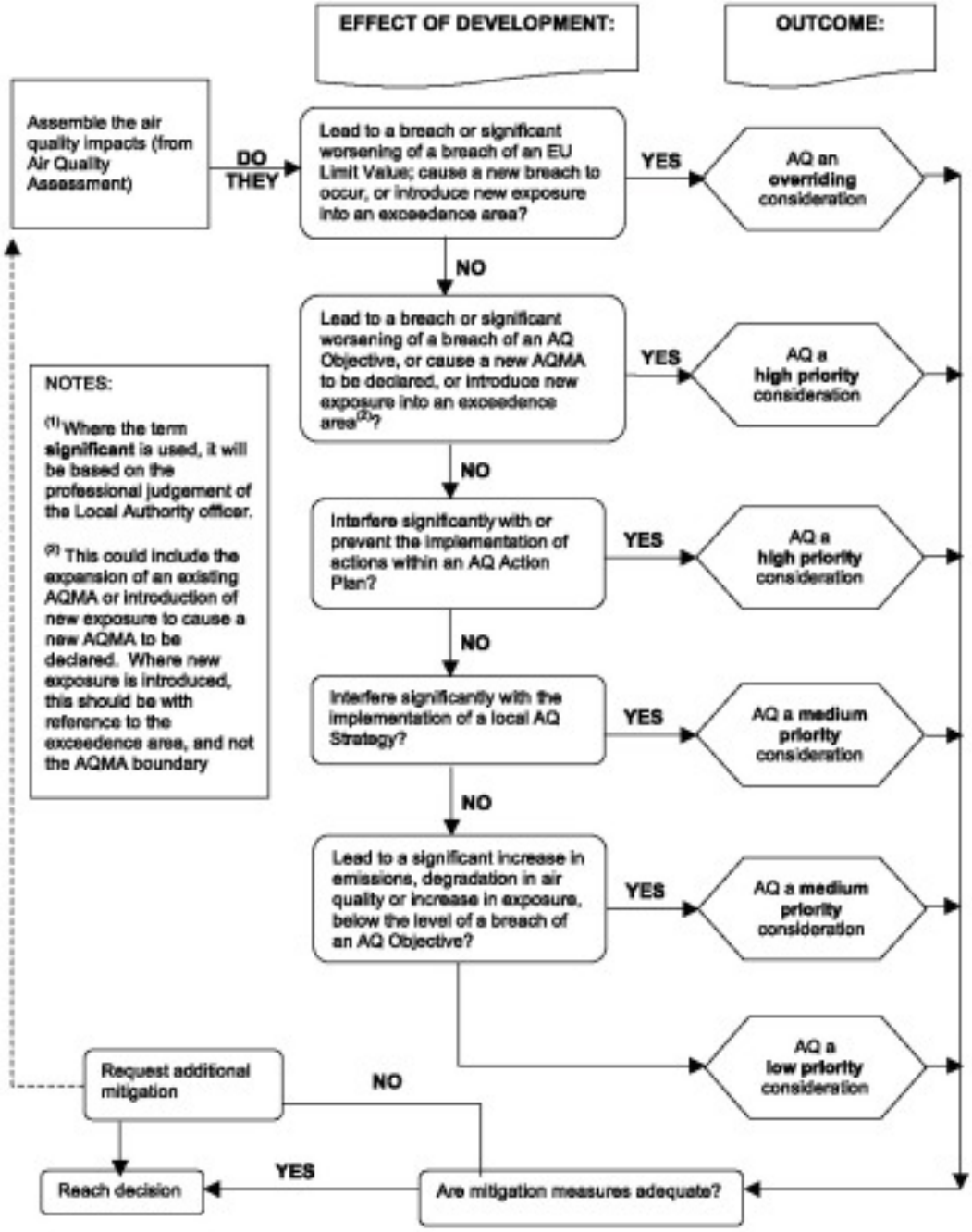


Figure 3.1 Steps for local authority to assess the significance of air quality impacts of a development proposal

This Chapter has adopted the Environmental Protection UK guidance recommendations following an assessment of significance. The Public Protection Service will then make planning recommendations on the proposed development to the LPA.

Impact significance from flow chart	Recommendation
Over-riding consideration	Require mitigation measures to remove 'over-riding' impacts. If the impact is still 'over-riding', there should be a strong presumption for a recommendation for refusal on air quality grounds.

Impact significance from flow chart	Recommendation
High priority consideration	Ensure that measures to minimise 'high priority' impacts are appropriate in the proposal. Recommend strengthening the measures if appropriate. Consideration may also be given to compensation/offsetting. Depending on the scale of the impacts, taking into account the number of people affected, the absolute levels and the magnitude of the changes, and the suitability of the measures to minimise impacts, it may be appropriate to recommend refusal.
Medium priority consideration	Seek mitigation measures to reduce 'medium priority' impacts. Offsetting and compensation measures may also be considered. It is unlikely that refusal would be recommended.
Low priority consideration	It is unlikely that refusal would be recommended, but mitigation measures should be incorporated into the scheme design to ensure that the development conforms to best practice standards, and is 'air quality neutral' as far as is reasonably practicable.

Table 3.7: Recommendations after assessment of significance

3.4 Cumulative Impacts and Mitigation

The impacts from a number of smaller developments that individually have relatively low polluting potential, but cumulatively result in a significant worsening of air quality, are of importance. This Chapter seeks to address this at a strategic level to ensure that all developments mitigate their cumulative effects and avoid 'background creep'.

A significant number of smaller developments may all add traffic to an urban location that already has an air quality problem. A process could be implemented where each development provides a financial contribution to implementing elements of the action plan relative to the nature, size and traffic generation of the proposal.

An air quality assessment may therefore need to take into account cumulative impacts from a number of developments.

3.5 Planning Conditions and Obligations

The Council will encourage design solutions, and use conditions, S106 Agreements and unilateral undertakings to mitigate impacts from any developments that are detrimental to air quality. The following should be considered although this is not an exhaustive list:

- Design of development proposals to mitigate against exposure on the development from existing air quality issues; for example the location of building inlet ventilation, or set back residential buildings away from roadside to reduce receptor exposure;
- Measures during the construction of new development including dust control, site monitoring and plant emissions;
- Contributions for the introduction of new or improved low emission public transport;
- The provision of on and off site facilities for cycling and walking;
- The provision of electric car charging points;
- Preferential permission and parking charges for low emission vehicles and car share;
- The management of car parking;
- Traffic management;
- Road infrastructure;
- Green Travel Plans;

- Monitoring of air pollution;
- Financial contribution towards local air quality review and assessment.

3.5.1 Developer Contribution

New developments in, or adjoining existing AQMAs, or other areas close to the objective levels that would lead to an increase in traffic and/or have a worsening effect on air quality, or that will add new receptors to areas where air quality levels are already breached, will be requested to provide for mitigation through contributions to aid towards implementation of the Council AQAP, and the Council local review and assessment work. The level of contribution will be guided by the 'Greenwich Formula' with the type of use set out in Table 3.8. The example of the expected financial level of developer contribution is reviewed annually but will be considered on a case by case basis based on the development impacts and merits. The developer contribution document is available from the Council website for download or available on request from the Public Protection Service. There maybe other developments that, depending upon their air quality impact or from the number of receptors affected, which may also be required to contribute.

Location of development, or where development generated traffic, or site emissions will impact upon	Minimum change in pollutant concentration	Type of development	£ Contribution
Above Objective/Limit Value *With* Scheme; or greater than 10% increase above background for PM2.5	Slight Adverse	Residential	per dwelling
		Employment	per m^2 gross floor area
		Retail Food	per m^2 gross floor area
		Retail Non-Food	per 100 m^2 gross floor area
		Car Parks	per car park space
Just Below (90% or above) Objective/Limit Value *With* Scheme	Moderate Adverse	Residential	per dwelling
		Employment	per m^2 gross floor area
		Retail Food	per m^2 gross floor area
		Retail Non-Food	per 100 m^2 gross floor area
		Car Parks	per car park space

Table 3.8: Developer contribution

3.6 Biomass

The whole of the Borough, except for Hatton and Stretton, is designated as a Smoke Control Area. Therefore the Council will require a detailed air quality assessment for any proposals for biomass-fuelled (including biofuels) individual or Combined Heat & Power (CHP) systems. This is due to health concerns relating to increasing of emissions of particulate (PM10 and PM2.5) and NO_2 in urban areas. All planning applicants proposing the use of biofuel and biomass-fuelled systems should submit a detailed air quality assessment to the Council, and should demonstrate that the heat generated from biomass is an effective alternative to conventional fuels and is not in conflict with the AQAP adopted by the Council and the Clean Air Act.

Air quality assessments should be conducted referencing LAQM TG(09) and Technical Guidance: *Screening Assessment for Biomass Boilers (08)* and any subsequent revisions.

3.7 Air Quality During Construction

The impact of the construction phase of a development on air quality should be considered as part of any air quality assessment. In the majority of instances the primary concerns relate to emissions of dust and particulate matter arising from the movement and storage of materials and from the various construction activities. In addition emissions from vehicles and plant used on the site including HGV vehicles bringing material to and from the site should also be considered for the local area.

Dust from a development site can be a major problem. It is important to minimise the generation of dust wherever possible. Development sites should have a means for damping down temporary haul roads and storage compounds should be located away from housing. The local authority can take action under its statutory nuisance provisions if dust or emissions are adversely affecting the health or the amenity of local residents or relevant receptors. The BRE guide *'Control of dust from construction and demolition activities'* or subsequent revisions, provides further information.

For **all** developments, best practicable means should be adopted to control and reduce emissions and therefore any assessment should also detail measures that will be used to mitigate the various sources.

It should also be noted that mobile crushing plant used on site should be permitted under the requirements of the Pollution Prevention and Control Act 1999 and the Environmental Permitting 2010 Regulations.

Burning is not an appropriate method of disposing of waste and therefore no burning should take place during construction works. Fires on demolition sites are likely to be expressly forbidden by either the Environment Agency (EA) or under the Building Control approval. The Council can also take action under its statutory nuisance provisions.

3.8 Industrial Pollution Prevention and Control

Certain industrial operations due to their potential environmental impact require a permit under the Environmental Permitting (England and Wales) Regulations 2010, as amended. New installations may require an air quality assessment to be provided to assess the impact from their operation. Whilst the Pollution Prevention and Control (PPC) regime is separate from the planning system both should be considered complementary and not in isolation. Therefore the Council should be contacted prior to any planning application or permit application being submitted for an agreement on the type and scale of any assessment that maybe required.#

Where a development requiring planning permission will also require a permit, it is recommended that the operator makes both applications in parallel, whenever possible, to allow a consistent approach. This will allow the local authority to begin its formal considerations early on, thus allowing it to co-ordinate both the planning process and permit application process.

For proposals that will require an Environment Agency regulated permit, joint pre planning discussions with the Environment Agency, the planning authority and the developer are recommended in order that all interrelated issues can be considered at an early stage. This is particularly important where fundamental issues exist which may affect whether the development is acceptable. Guidance on developments requiring planning permission and environmental permits is available on the Environment Agency website.

3.9 Odour and Planning

An odour assessment will be required for any development with a potential for emitting odour, or that will add receptors to an area that may be subject to odour.

Unlike Local Air Quality Management, there are no prescribed limits for odour. The subjectivity of the human response to odour means that it is often not easy to set objective odour exposure standards. However, these difficulties must not preclude the use of objective measurements, in assessing potential nuisance and in identifying control measures, where these can be justified and are considered to be appropriate.

In all cases where the generation of odours from the development can be readily anticipated, the Council shall expect to be provided with objective evidence that demonstrates that odour emissions will be adequately controlled to prevent any significant loss of amenity to neighbouring sensitive land uses. This is important not least because possible odour mitigation measures could in themselves have land use and amenity implications.

Careful consideration should be given to the location of new odour sensitive developments such as residential developments, schools and hospitals near to existing odour sources. Encroachment of odour sensitive development around such odour sources may lead to problems with the site becoming the subject of complaint, essentially creating a problem where there was not one before.

Ideally a robust screening process at the application submission stage should help to identify new developments where adverse odour impacts may arise. Screening should aim to identify applications where odours are a potential issue, whether the application site is the source, or the application site is close to potential odour sources. If such new developments are identified early on, this allows early consultation with the Council.

3.9.1 Odour Impact Assessments

At the pre-application stage, sources of odour from or near to proposed developments need to be identified and assessed for potential impact. Odour Impact Assessment (OIA) is a useful tool in support of applications where the potential for odour problems has been clearly identified and where such studies are considered to be necessary and proportionate to the extent of odour problems. A properly structured OIA should seek to identify:

- All potential sources of odour and their estimated rates of emission from the new development;
- The potential for fugitive emissions of odour together with the means to control these emissions;
- The location of sensitive receptors;
- A wind rose for the site in question;
- Potential pathways to sensitive receptors;
- A description of the potential impacts including evidence provided by dispersion models taking cognisance of topographical features;
- Details of any necessary odour abatement systems or other mitigation measures with justifications for the measures being proposed; and
- Details of an Odour Management Plan (OMP) with contingency arrangements for responding to any unforeseen or unusual odour emission episodes.

3.9.2 Odour Modelling

Planning applications for developments which have the potential to cause off-site odour impact should be supported by an evaluation of the expected odour impact and proposals for mitigation measures, where necessary. The degree of detail provided in such assessments should be proportionate to the risk of odour impact, taking account of factors including the proximity of receptors, the scale of the proposed activity and the nature of the proposed development.

At one extreme, for small scale developments such as a new hot food takeaway, a relatively simple risk assessment based approach is likely to be appropriate, providing it is carried out in a thorough manner. An example of an Odour Risk Assessment Protocol for commercial kitchens is provided in the Defra Guidance on the *'Control of Odour and Noise from Commercial Kitchen Exhaust Systems'*. The Council has a published guidance note on Commercial Kitchen Extraction Systems titled *'Planning Guidance Note for Developers: Ventilation/Extraction Systems for Catering Establishments'* providing more detailed advice on this area, available upon request from Development Management.

In higher risk examples, such as a new sewage treatment works, a more rigorous approach to evaluating odour impact may be appropriate. Odour Impact Assessments are typically based on computer models which predict odour dispersion from the proposed development based on local weather records and estimated or predicted odour emissions from the proposed development. The outputs from dispersion modelling are usually presented as odour contours or "isopleths" on a base map of the area, and this allows potential odour impact to be predicted at odour sensitive receptor locations, such as residential developments, in the area and for this impact to be compared with 98th percentile impact benchmarks. Dispersion models can also be used to determine the level of odour mitigation required to control odour impact, or to determine the maximum permissible odour emissions from a site to avoid off-site impact or loss of amenity. These predictions, and the mitigation measures which can be prescribed as a result of objective measurement, can play a key role in preventing long term impact of odours downwind of the site.

Larger scale industrial developments with odour potential are likely to fall under the Pollution Prevention and Control Regime. Odour assessment should be considered jointly for any permit and planning application.

Any odour assessment for higher risk sites should relate to the most appropriate and current guidance for example to the Environment Agency H4 Odour Management Guidance and the Odour Guidance for Local Authorities published by Defra. An example of the tools available to estimate odour impact is given in Table 3.9.

The Public Protection Service should be contacted prior to any odour assessment for agreement on the most suitable method.

Tool	Comments
Source emission characterisation combined with computer dispersion modelling	Usually used as a predictive tool to assess the impact of proposed plant but also successfully used to identify causes of off-site odour impact, establish long-term odour exposure levels and to rank relative efficacies of odour abatement strategies. Requires the input of source emission data (in odour units) that may require specialist input. Allows comparison with numerical odour standards, for advantages and disadvantages of this. Source emissions can be characterised using measurement at source EN 13725:2003 (or latest current method)
Field odour assessment using "sniff test"	For existing that may impact upon the development. Usually suitable for sites with less odour impact. Surveys must be designed in agreement with the local authority. 'FIDOL' factors from the Defra guidance or similar should be used to assess significance.

Table 3.9: Main Tools Available to Estimate the Significance of Odour Impact

3.9.3 Odour Control Mitigation

The option of preventing and controlling odours relies on an ability to intervene effectively at one or more stages of the *'Source–Pathway–Receptor'* process, as follows:

- Preventing the release of odorous air to the atmosphere by containment and odour control
- Preventing the formation of odorants in solid and liquid material within a process;
- Preventing the transfer of odorants from a mixture to gas phase [air];
- Preventing the transportation of odorants from the source reaching receptors;
- Influencing the quality of the odour to reduce the perception of odours as a nuisance by receptors; and
- Ensuring effective communication

Odour Source	Proactive / Planned Measures
Sewage treatment	Closed-containment process over high emission areas; Odour control systems / filters
Hot food takeaways, food processing and commercial kitchens	Ventilation design; Extraction & filtration system; Vents located away from residents
Paints & solvents	Ventilation design; Solvent extraction & recovery system; Vents located away from residents
Animals, livestock & poultry	Site assessment and building design for odour control; Stocking density planned and agreed
Industrial / chemical processes	Ventilation design; Extraction & filtration system; Vents located away from residents
Storage & spills	Design of containment and covered areas for moving liquid

Table 3.10: Examples of odour control measure

3.10 What Information is Available?

The Council holds an inventory of emissions and routinely monitors air quality across the Borough. Annual air quality review and assessment reports are written which should be referenced for any air quality assessment. This information can be made available upon request or be downloaded from the Council website. Other information and guidance is available from the air quality section of the Defra website.

3.11 How the Council will decide whether the development is appropriate

The Council will consider the relative merit of the application with regard to national and local planning policy. The relative weight given to air quality will depend on the significance of any impact. The Council is committed to reducing air quality levels in places where people live, work and relax and it accepts that the National Air Quality Objectives provide the basis for assessing significance as detailed in this document. Any development that would interfere with an Air Quality Management Plan, result in a breach of a relevant objective or create a potential new AQMA will be treated as significant.

3.12 References

1. Technical Guidance LAQM. TG(09), Defra (2009)
2. Development Control: Planning for Air Quality, Environmental Protection UK (2010)
3. Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Defra (2007)
4. House of Commons Environmental Audit Committee Report on Air Quality, 2010
5. Technical Guidance: Screening Assessment for Biomass Boilers, AEA (2008)
6. House of Commons Environmental Audit Committee Report on Air Quality (2010)
7. BRE guide 'Control of dust from construction and demolition activities'
8. Odour Guidance for Local Authorities, Defra (2010)
9. H4 Odour Management Guidance, Environment Agency (2009)
10. Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems, DEFRA, 2005
11. Specification for Kitchen Ventilation Systems DW/172 Heating and Ventilation Contractors Association 2005
12. Planning Guidance Note for Developers: Ventilation/Extraction Systems for Catering Establishments, Warrington Borough Council (2007)
13. Guidance for Developments Requiring Planning Permission and Environmental Permits, Environment Agency (2012)

3.13 Glossary

AADT: Annual average daily traffic.

AQAP: Air quality action plan: required by a local authority to identify and implement actions to reduce air quality concentrations below the objectives.

AQMA: Air quality management area: a local authority is required by the Environment Act 1995 to declare an AQMA where it believes UK air quality objectives prescribed in Regulations are being exceeded.

AQO: Air quality objective: targets set by the Government and Devolved Administrations as minimum acceptable standards of air quality.

CO: Carbon monoxide.

CO_2: Carbon dioxide.

Defra: Department for Environment, Food and Rural Affairs: responsible for environment policy, including the production of the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, and the supervision of the LAQM and LAAPC regimes.

EA: Environment Agency (England and Wales). Regulatory body with responsibility for PPC Part A1 Permit control.

EIA: Environmental impact assessment.

EPR: Environmental Permitting Regulations: regulatory system of permits controlling certain emission from specified industry sectors.

EU: European Union.

HIA: Health impact assessment. Assessment of the health impact from emissions associated with a development

LAQM: Local air quality management: system introduced by the Environment Act 1995 to address local air quality "hot spots". It includes the Review and Assessment process, the designation of AQMAs and the development of action plans.

LTP: Local Transport Plans in England provide mechanism by which local highways authorities set out strategies for improving public transport, roads and other transport within their authority.

NO2: Nitrogen dioxide.

NOx: Oxides of nitrogen: NOx is the sum of NO and NO_2 (plus other minor oxides) and is often used to express the emitted pollutant quantity. NO_2 is largely a secondary pollutant, being formed by the oxidation of nitric oxide (NO) after emission, although some NO_2 is directly emitted, the proportion of which is related to the exhaust treatment technology.

PAH: Polycyclic Aromatic Hydrocarbon: a complex group of pollutants some of which are powerful carcinogens. Usually represented in concentration terms by the marker compound Benzo[a]pyrene (B[a]P).

PM10 and PM2.5: Particulate matter with an aerodynamic diameter of less than 10 microns (µm) (PM10) or less than 2.5 µm (PM2.5), expressed in units of $\mu g/m^3$.

PPC: Pollution prevention and control: Europe wide system which replaced the earlier UK based integrated pollution control (IPC) system. Legislations delivered through the Environmental Permitting Regulations (2010), as amended.

SO2: Sulphur dioxide.

TA: Transport Assessments consider the potential impact from new development on a transport network.

VPH: Vehicles per hour.

3 Air Quality

4 Contaminated Land

4.1 Introduction

Certain types of contamination are known to be hazardous to human health, property and the wider environment. Typical causes of land contamination include previous industrial or commercial usage, mining, and the land-filling of wastes. Land may also become contaminated due to its close proximity to contaminated areas. Contaminating substances include metals, organic substances, ground gases and high/low pH. Contamination may not occur solely as a result of human activities; land can become contaminated as a result of natural processes or its natural state.

4.1.1 What is Contaminated Land?

The definition of contaminated land (from Section 78A(2) of the EPA 1990) is:

> **" …any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:**
>
> **(a) Significant harm is being caused or there is the significant possibility of such harm being caused; or**
>
> **(b) Pollution of controlled waters is being, or is likely to be, caused…"**

With respect to controlled waters, the Water Act 2003 (Chapter 37, Section 86) has amended the second part of the definition so that it applies only where:

> **"Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused"**

Part 2A of the EPA 1990 (known as 'Part 2A'), as inserted by Section 57 of the Environment Act 1995, was brought into force on 1st April 2000. In most cases, Councils are the enforcing authorities for the contaminated land regime under Part 2A. They have a duty to identify contaminated land within their area and, except for certain categories, decide what remediation is required and ensure that it takes place.

A key element of the Part 2A regime is the Source-Pathway-Receptor pollutant linkage model. Each element is defined as follows:

- The source is the contamination in, on or under the land;
- The pathway is the route by which the contamination reaches the receptor; and
- The receptor is defined as living organisms, ecological systems or property which may be harmed.

Without the clear identification of all three elements of the pollutant linkage, land cannot be identified as contaminated land under the regime (Table 4.1).

To fall within the statutory definition of Part 2A, the land, when assessed in the context of its current use must be capable of causing significant harm to human health or other specified receptors and/or pollution of controlled waters. Part 2A addresses "unacceptable risk". These and other key terms are defined within Part 2A and also in the statutory guidance.

HUMAN HEALTH
1) *Uptake of contaminants by food plants grown in contaminated soil* – heavy metals (e.g. cadmium, lead) and persistent organic pollutants including certain pesticides and veterinary products may result in an accumulation in food plants to concentrations where they exceed legal limits and/or may pose a hazard to human health. Uptake will depend on concentration in soil, its chemical form, soil pH, plant species and prominence in diet.
2) *Ingestion and inhalation* – substances may be ingested directly by young children playing on contaminated soil, by eating plants which have absorbed metals or are contaminated with soil or dust. Ingestion may also occur via contaminated water supplies. Metals, some organic materials and radioactive substances may be inhaled from dusts and soils.
3) *Skin contact* – soil containing tars, oils and corrosive substances may cause irritation to the skin through direct contact. Some substances (e.g. phenols) may be absorbed into the body through the skin or through cuts and abrasions.
4) *Irradiation* – As well as being inhaled and absorbed through the skin, radioactive materials emitting gamma rays can cause a radiation response at a distance from the material itself.
5) *Fire and explosion* – materials such as coal, coke particles, oil, tar, pitch, rubber, plastic and domestic waste are all combustible. If heated by contact with buried power cables or careless disposal of hot ashes they may ignite and burn underground. Both underground fires and biodegradation of organic materials may produce toxic or flammable gases. Methane and other gases may explode if allowed to accumulate in confined spaces.
BUILDINGS
1) *Fire and explosion* – underground fires may cause ground subsidence and cause structural damage to buildings. Accumulations of flammable gases in confined space leads to a risk of explosion. Underground fires may damage building services.
2) *Chemical attack on building materials and services* – sulphates may attack concrete structures. Acids, oils and tarry substances may accelerate corrosion of metals or attack plastics, rubber and other polymeric materials used in pipe work and service conduits or as jointing seals and protective coatings to concrete and metals.
3) *Physical* – blast-furnace and steel-making slag (and some natural materials) may expand if ground conditions are changed by development. Degradation of fills may cause settlement and voids in buried tanks and drums may collapse as corrosion occurs or under loading from construction traffic.
NATURAL ENVIRONMENT
1) *Phytotoxicity (prevention/inhibition of plant growth)* – some metals essential for plant growth at low levels are phytotoxic at higher concentrations. Methane and other gases may give rise to phytotoxic effects by depleting the oxygen content in the root zone.
2) *Contamination of water resources* – soil has a limited capacity to absorb, degrade or attenuate the effects of pollutants. When this is exceeded, polluting substances may enter into surface and groundwater.
3) *Ecotoxicological effects* – contaminants in soil may affect microbial, animal and plant populations. Ecosystems or individual species on the site, in surface waters or areas affected by migration from the site may be affected.

Table 4.1: Examples of Pathways and Effects from Land Contamination

The planning system uses a slightly different definition for contaminated land, which is not based solely on the legal definition set out in Part 2A. A wider range of contamination and receptors is relevant to planning but the degree of harm or pollution and the approach to remediation are essentially the same.

However, to avoid confusion with the term 'contaminated land' the planning regime uses the wider term "land affected by contamination". This is intended to cover all cases where:

"The actual or suspected presence of substances in, on or under the land may cause risks to people, human activities or the environment, regardless of whether or not the land meets the statutory definition in Part 2A".

Part 2A was introduced specifically to address the historical legacy of land contamination, whereas the planning system aims to control development and land use in the future. Therefore assessing risks in relation to the future use of any land is primarily a task for the planning system. Applicants/Developers should always to take into account Part 2A because a change in use may cause the land to fall within the statutory definition of contaminated land by creating a pollutant linkage.

As stated above, **the NPPF states that "As a minimum, the land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990".**

Part 2A was designed and intended to encourage voluntary remediation and should only be used where no appropriate alternative solution exists. The Contaminated Land Strategy published by the Council provides details of the planning system to ensure that land is made suitable for use when it is redeveloped and/or encouraging polluters and owners of land to deal with problems without the need for Part 2A to be used directly.

4.2 Roles and Responsibilities

4.2.1 Role of the Owner/Developer

The Applicant/Developer of any land is responsible for ensuring that the proposed development is safe and suitable for use or can be made so by remedial action. In order to demonstrate this, the Applicant/Developer should determine:

(i) Whether the land in question is already affected by contamination through Source-Pathway-Receptor pollutant linkages;

(ii) Whether the proposed development will create new linkages, e.g. new pathways by which existing contaminants might reach existing or proposed receptors; and

(iii) What action is needed to break those linkages and avoid new ones, deal with any unacceptable risks and enable safe development and future occupancy of the site and neighbouring land.

The Applicant/Developer should satisfy the LPA that unacceptable risk from contamination will be successfully addressed through remediation without undue environmental impact during and following the development. It is the responsibility of the Applicant/Developer to ensure that the investigation and remediation of land contamination is carried out by a suitably qualified person with experience in contaminated land i.e. an environmental consultant. Carrying out unacceptable/insufficient work or submitting unsuitable reports to the LPA may lead to delays, as work may need to be redone.

Applicants/Developers must be aware of their responsibility to deal with pollution issues that may present risk, and also the liability they may be exposed to under environmental legislation e.g. the Environmental Damage Regulations (2009). Where an agreed remediation scheme includes future monitoring and maintenance schemes, arrangements should be made to ensure that any subsequent owner of the site is fully aware of these requirements and assumes on-going responsibilities associated with the land.

The Applicant/Developer should be aware that actions or omissions on their part could lead to future liability being incurred under Part 2A, e.g. where development fails to address an existing unacceptable risk or creates such a risk by introducing a new receptor or pathway. Additionally the developer has a responsibility to protect the welfare of construction workers operating on potentially contaminated sites and to manage other potential environmental impacts arising from the site and/or the proposed development works on the site.

4.2.2 Role of the LPA

The LPA has a duty to take account of all material planning considerations including land contamination during the preparation of Local Plans and when considering an application for planning permission. Usually where there is reason to believe land may be contaminated, or the proposed development is of particular sensitivity e.g. housing a full assessment may be required in advance of planning approval being issued, a planning condition requiring assessment of possible contamination may be recommended by the LPA and applied to the decision notice.

When considering development on land affected by contamination, the principal objective of the LPA is to ensure that any unacceptable risks to human health, property and/or the wider environment are identified so that appropriate action can be considered and then taken to address those risks. In achieving this objective, the LPA should assist in providing the necessary confidence to owners and occupiers of the land after development, regarding the condition and the ranking of the land in relation to relevant environmental protection regimes, such as Part 2A.

4.2.3 Role of the Public Protection Service

Contaminated Land Officers within the Public Protection Service are responsible for addressing contaminated land issues using Part 2A and the planning system. The Public Protection Service and also the EA act as consultees to the LPA regarding risks to human health and controlled waters. The Public Protection Service may consult with the Health Protection Agency (HPA) and/or Primary Care Trust (PCT) where necessary on matters relating to human health, including radiation, in respect of planning applications.

4.2.4 Role of other organisations

The EA are a consultee for any planning applications, where development is proposed on potentially contaminated land. Where the EA are consulted and land contamination is an issue they will seek to implement the objective of the water framework directive to prevent and limit the entry of pollutants into groundwater.

Within the LPA, Building Control will also need to be satisfied that any risks to the development from potential contamination have been adequately addressed. The Building Regulations 2000 require developers to demonstrate that hazards from potential contamination have been properly assessed and appropriate measures put in place to address any risk.

4.3 Contaminated Land & Planning

The following flowchart below shows the typical contaminated land and planning procedure:

Figure 4.1 Flowchart showing idealised Planning & Contaminated Land Procedure

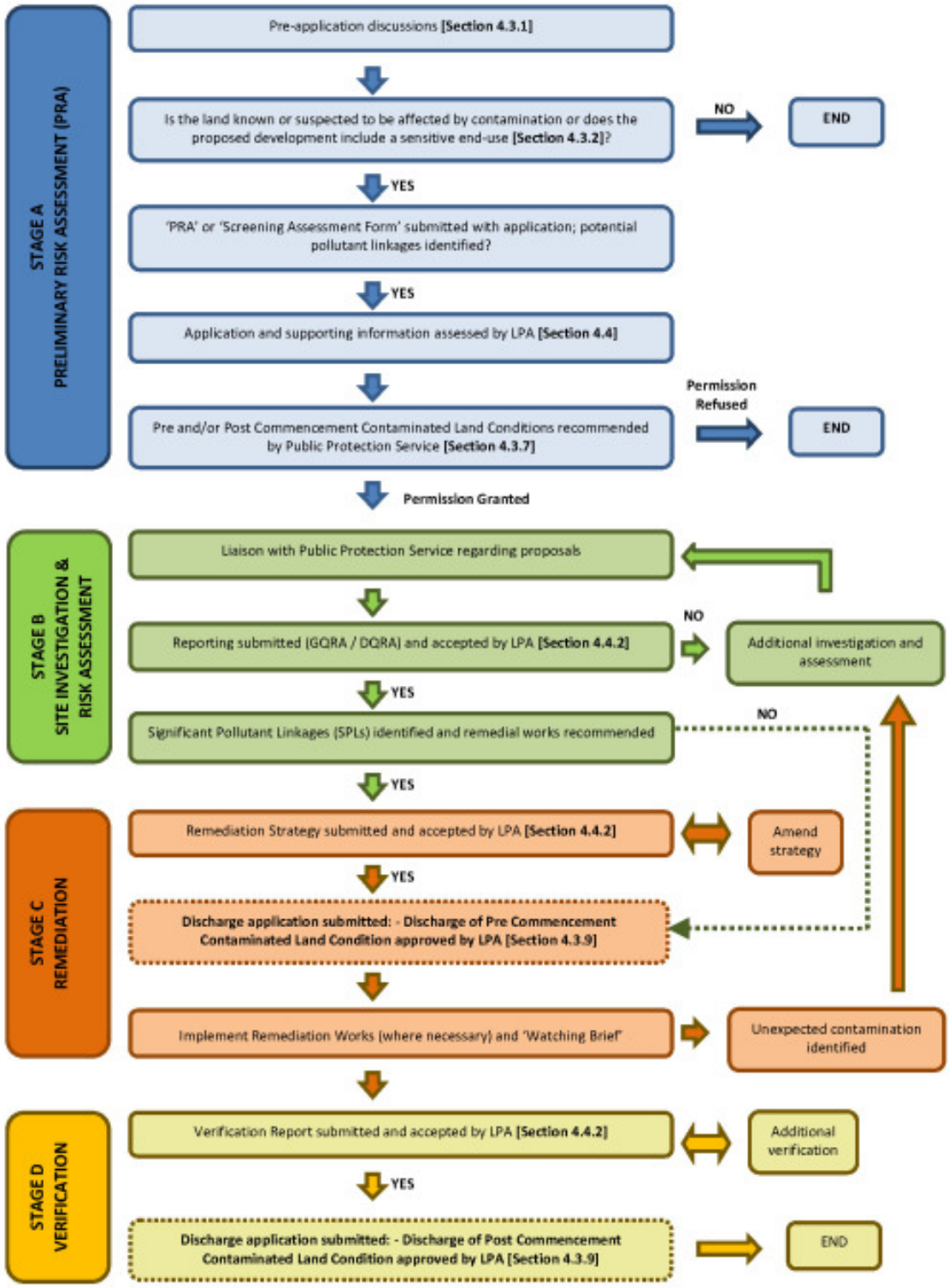


Figure 4.1 Flowchart showing idealised Planning & Contaminated Land Procedure

4 Contaminated Land

A precautionary approach should be assumed when considering planning applications in relation to any land affected by contamination. This includes land subject to or adjacent to previous industrial use (Table 4.2) and also where uses are being considered that are particularly sensitive to contamination, as follows:

- All residential developments (houses, flats, nursing homes etc.);
- Allotments;
- Schools;
- Nurseries and crèches;
- Children's play areas and playing fields;
- Mixed use developments including vulnerable proposals.

Where development is proposed on land that is or may be affected by contamination, an assessment of risk should be carried out by the Applicant/Developer for consideration by the LPA before an application is determined. Any existing or new unacceptable risks should be identified and proposals made to deal with them effectively as part of the development process.

When a planning application is submitted to the LPA, the Public Protection Service will be consulted and the application (with supporting information) assessed to determine whether there is the potential for contamination to influence the land or 'site', whether suitable measures have been proposed to address any risks and whether the proposed development is acceptable.

If there is the potential for contamination to affect the site, or the end-use is particularly sensitive, recommendations will be made that certain conditions be imposed upon the development. These are intended to ensure that the site is made suitable for its proposed end-use and ensure the safety of site workers, future site users, and the protection of property and the wider environment and are discussed in more detail in Section 4.3.7.

It is essential that the developer provides as much information to the LPA at every stage of the planning process. However trivial, withholding information may cause a delay to the application process. The onus is on the Applicant/Developer to keep the LPA well informed about the development at all times so that decisions can be made swiftly and the application process completed as quickly as possible. If a response from the LPA is not immediately forthcoming, this should not be taken as confirmation that document submissions have been approved or that work on site can proceed. Again, the onus is on the Applicant/Developer to obtain written approval from the LPA for any documents/information submitted in support of a planning application.

A wide range of industries may historically have contaminated, or have the potential to contaminate the land they are sited upon (and neighbouring land) — The DOE Industry Profiles give further details:
• Smelters, foundries, steel works, metal processing & finishing works;
• Coal & mineral mining & processing, both deep mines and opencast;
• Heavy engineering & engineering works, e.g. car manufacture, shipbuilding;
• Military/defence related activities;
• Electrical & electronic equipment manufacture & repair;
• Gasworks, coal carbonisation plants, power stations;
• Oil refineries, petroleum storage & distribution sites;
• Manufacture & use of asbestos, cement, lime & gypsum;
• Manufacture of organic & inorganic chemicals, including pesticides, acids/alkalis, pharmaceuticals, solvents, paints, detergents and cosmetics;
• Rubber industry, including tyre manufacture;
• Munitions & explosives production, testing & storage sites;
• Glass making & ceramics manufacture;
• Textile industry, including tanning & dyestuffs;
• Paper & pulp manufacture, printing works & photographic processing;
• Timber treatment;
• Food processing industry & catering establishments;
• Railway depots, dockyards (including filled dock basins), garages, road haulage depots, airports;
• Landfill, storage & incineration of waste;
• Sewage works, farms, stables & kennels;
• Abattoirs, animal waste processing & burial of diseased livestock;
• Scrap yards;
• Dry cleaning premises;
• All types of laboratories.
Other uses & types of land that might be contaminated include:
• Radioactive substances used in industrial activities not mentioned above – e.g. gas mantle production, luminising works;
• Burial sites & graveyards;
• Agriculture – excessive use or spills of pesticides, herbicides, fungicides, sewage sludge & farm waste disposal;
• Naturally-occurring radioactivity, including radon;
• Naturally-occurring elevated concentrations of metals and other substances;
• Methane & carbon dioxide production & emissions in coal mining areas, wetlands, peat moors or former wetlands.

Table 4.2: Examples of Potentially Contaminating Uses of Land and Situations Where Land may be affected by Contamination

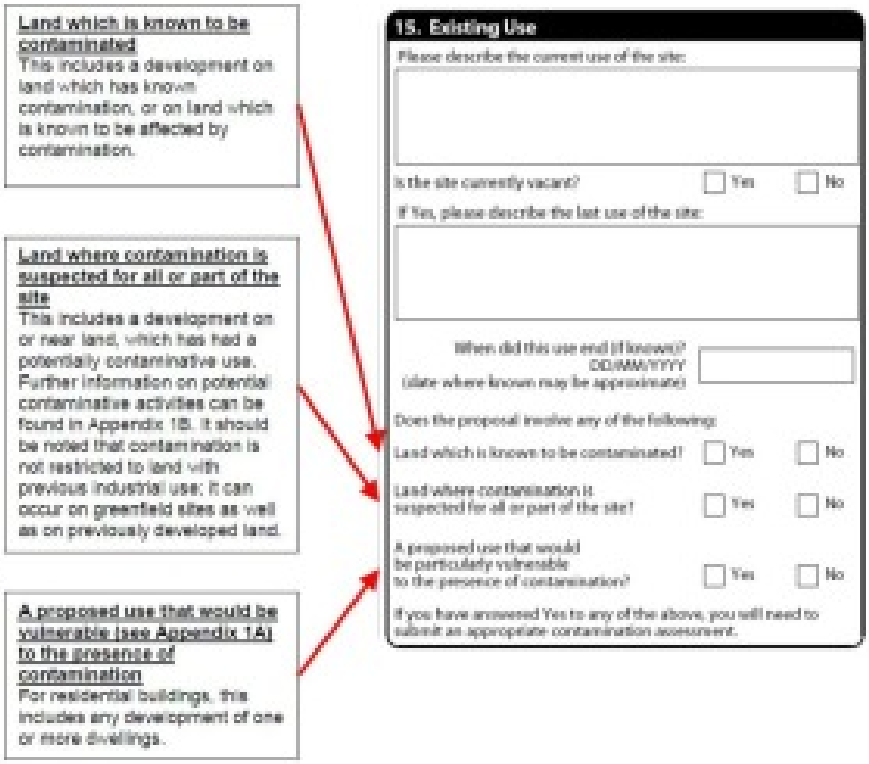
4.3.1 Pre-Application Discussions

Where a large scheme or development is proposed on land that is or may be affected by contamination, it is strongly recommended that an assessment of risk should be carried out by the Applicant/Developer for consideration by the LPA in advance of submitting an application. Any existing or new unacceptable risks should be identified and proposals made to deal with them effectively as part of the development process. Where practicable, Applicants/Developers should arrange pre-application discussions with the LPA and other regulators. Such discussions will also help to identify the likelihood and possible extent and nature of contamination and its implications for the development being considered. They will also assist in scoping any necessary Environmental Impact Assessment and identify the information

that will be required by the LPA to reach a decision on the application when it is submitted. The LPA will advise intending Applicant/Developers to undertake these steps where they appear necessary but have not yet been addressed.

4.3.2 Completing the 'Existing Use' Section of the Planning Application Form

Some of the national planning application forms (1APP) include a section on land contamination. The 'Existing Use' section is either Question 15, 16, or 19, depending on the relevant 1APP form used. The Applicant/Developer should identify if there is a potential for land contamination at the site or if a sensitive/vulnerable use is being introduced as outlined above. Applicants must address the questions in the 'Existing Use' section (shown below) when preparing a planning application.



Source: Yorkshire and Humberside Pollution Advisory Council, March 2011

If the answer to any of the questions in the 'Existing Use' section is 'Yes', then an appropriate contamination assessment must be submitted with the planning application; for further details/information refer to Section 4.4.

If the application is for an individual residential property (i.e. one dwelling with a garden), a Screening Assessment Form, may be used as a basic contamination assessment. This proforma is available for download on the Council website or by contacting the Public Protection Service. This form guides the applicant through the development proposal and previous uses of the site to aid in the decision as to whether land contamination is an issue. If no potential sources of contamination are identified, then no further work is required however this is dependant on review and agreement by the Public Protection Service. If potential sources of contamination are identified, then further investigation may be required and the Public Protection Service should be contacted for advice. Please note that this form is for individual residential property developments only and will not be accepted for multiple dwellings.

4.3.3 Determining Planning Applications

When considering any applications, the LPA will need to be satisfied that the development does not create or allow the continuation of unacceptable risk arising from land contamination. Therefore any significant pollutant linkages should be broken by removing the source, blocking the pathway or removing receptors. The Applicant/Developer should also ensure that the development will not create new pollutant linkages by changing or creating exposure pathways e.g. creating new pathways to groundwater by site investigation drilling or piling.

The Applicant/Developer and LPA should recognise that contamination may pose problems on and other than the originating site. For example, contaminants may migrate or be transported by wind or water onto land that has no specific association with its former use. Contaminants may also be present on land where there is no specific record of former contaminative use. This is often the case where Made Ground or other unsuitable fill materials have been historically deposited on land, leading to the introduction of potential contaminants to surface geology.

While the most severe examples of contamination are often found in developed or former industrial areas, rural and urban fringe areas can also be affected. In addition, some areas may be affected by the natural occurrence of potentially hazardous substances, such as arsenic, lead or copper, which are the product of the underlying geology and bear little relation to previous or current land use.

The LPA will pay particular attention to the condition of a site and of neighbouring land where the proposed use would be particularly vulnerable to contamination, where the current circumstances or past use suggest that contamination may be present or where it has other relevant information. Full account should be taken of whether the proposed use or development is likely to be adversely affected by contamination. For example, the addition of a new storey to an existing building is unlikely to be significantly affected by contamination whereas lateral expansion onto former industrial land potentially carries a higher risk and building extensions or undertaking landscaping that disturbs the ground may breach protecting layers.

The standard of remediation to be achieved through the grant of planning permission for new development (including permission for land remediation activities) is the removal of unacceptable risk and making the site suitable for its new use, including the removal of existing pollutant linkages. All receptors relevant to the site should be protected to an appropriate standard.

For any development or change in use requiring remediation, the LPA should consider the impact of remediation activities on neighbouring land uses and the environment, including any offsite works such as those needed to control methane migration beyond the site boundaries. While some aspects may also be covered under separate pollution control regimes, the LPA should consider issues such as dust, noise and traffic movements arising from the remediation activities and the possible need for measures to control or mitigate them.

A balance should be struck between the overall social and economic benefits from the development, including the remediation proposals, and the temporary impacts of the remediation process. Applicants/Developers are recommended to carefully consider the waste management implications when deciding the best approach to remediation and the handling and treatment of contaminated soils and other material.

The LPA will need to be satisfied that the development can be carried out safely without unacceptable risks to workers, neighbours or other offsite receptors. It is important that risk to workers is managed using standard hierarchy of control measures under the Control of Substances Hazardous to Health (COSHH) Regulations 2002, the Construction (Design and Management) Regulations 2011 and other relevant legislation.

4.3.4 Outline Planning Applications

When considering outline planning applications, the LPA will need to be satisfied that it has sufficient information from the applicant about the condition of the land and its remediation and the full range of environmental impacts arising from the proposals to be able to grant permission in full at a later stage. The LPA should be satisfied, therefore, that the risks have been properly assessed and, if there is an unacceptable risk, the options appraised sufficiently to identify a viable remediation scheme that will reduce the risks to acceptable level, just as it would with a full application.

4.3.5 Consultation

In many cases, inspections carried out under Part 2A will have identified appropriate consultation areas. Where land has been or is being formally determined as contaminated land under Part 2A, the Public Protection Service will need to be satisfied that the Remediation Statement provided by the Applicant/Developer meets requirements in order to avoid a Remediation Notice being served.

The LPA should also consult the EA where they are carrying out a Part 2A inspection on behalf of the Council or where there appears to be risk to controlled waters that may need to be addressed as part of the development process. Other statutory bodies also have relevant responsibilities, including English Nature and English Heritage in relation to particular receptors. They should be consulted by the LPA where appropriate. LPAs should also consult other relevant Council departments, such as Building Control, Conservation & Archaeology, Engineering & Reclamation as necessary. Other bodies, such as water companies and local community and conservation or amenity groups may be able to advise on issues related to specific receptors.

4.3.6 Granting Planning Permission

The LPA may grant planning permission where it is satisfied that the proposed development will be appropriate, having regard to the information currently available about any land contamination at the site and the proposed remediation measures/standards. This will be subject to conditions where necessary, as discussed in Section 4.3.7.

The LPA may refuse permission if it is not satisfied on the basis of the information provided by the Applicant/Developer and that available from other sources, including the responses of those consulted, that the development would be appropriate. This could include cases where:

- Circumstances, including information available to the LPA, clearly suggest the possibility of contamination or of unacceptable risk and no information has been provided or obtained that excludes the reasonable possibility of such contamination or risk;
- The LPA considers that unacceptable risk exists and cannot be dealt with adequately to deliver a development that is suitable for its intended use and which results in the removal of such risks; or
- The steps needed to deliver an appropriate development and deal with unacceptable risk are not already in place and cannot be secured by suitable planning conditions, e.g. because these are not within the powers of the applicant/developer since action is needed on other land outside the applicant's/developer's control or influence.

4.3.7 Planning Conditions

In some cases, the information available when a planning application is being considered will be sufficient to resolve the main issues regarding land contamination from a planning perspective but insufficient to resolve all the details. Therefore, it may be appropriate to grant permission subject to conditions relating to the condition of the land, as stated above. General guidance on the use of planning conditions is provided in DOE Circular 11/95; and includes the following advice:

The LPA should consider the use of three-stage conditions that aim to:

- Provide for further investigation and characterisation of the site to confirm the nature and extent of contamination and validate the conceptual model and allow more refined risk assessment and appraisal of remedial options;
- To propose and receive approval for a remediation scheme that ensures the removal of unacceptable risks to make the site suitable for use; and
- To submit and receive approval for a validation report that demonstrates the effectiveness of the remediation carried out, preferably before building begins and certainly before the site is occupied by future users.

The Public Protection Service, in consultation with Development Management, has devised six conditions relating to land contamination; these are available to view on the Council website, along with a flow chart summarising the protocols for attaching a condition.

There are two main classifications of planning conditions that are attached to applications with respect to contaminated land:

- Pre-commencement Conditions: These are conditions or parts of conditions that are required to be satisfied prior to site works commencing;
- Completion Conditions: These are conditions or parts of conditions that are required to be, or can only be satisfied once site works have completed.

Pre-commencement conditions include the requirement to investigate and risk-assess the development site as well as (if applicable) the submission of an approved remediation scheme or strategy. Completion conditions include the requirement to report unexpected contamination; provide verification of remedial action taken; and the results or outcome of any on-going monitoring works required to be completed when site works have ceased.

During the development of any site there is the possibility of discovering previously unidentified contamination or risks. As such, each condition includes a section on the reporting of 'unexpected' contamination as well as submitting for approval an assessment of the risks and proposed remediation scheme, or alternatively confirming on completion of development the absence of any unacceptable risk from contamination.

In some cases, it may be necessary to require subsequent monitoring for the purposes of providing information on any changes that may occur in the status of a pollutant, pathway or receptor identified as part of a pollutant linkage when permission was originally granted. This will enable the LPA to consider the continuing integrity of any remediation scheme and any changes in circumstances affecting the pollutant linkages in question. The inclusion of post-development monitoring or maintenance programmes is a provision within each version of the Condition.

4.3.8 Permitted Development Rights

Where a site has been investigated and risk-assessed in terms of land contamination and remediation or remedial measures have been deemed necessary, the inclusion or reflection of the existing remedial measures is required where any new development takes place at that site. This is of particular relevance to extensions or works covered under the auspices of Permitted Development Rights (PDRs). Where sites or buildings have received remedial measures or remediation, the LPA may rescind the PDRs associated with the original planning consent to ensure that any alterations or redevelopment on the site will require planning permission and as such, take existing remediation or remedial measures into account when granting consent.

4.3.9 Discharge of Conditions

Once the appropriate information has been submitted to the LPA, and subsequently approved, the Public Protection Service will make recommendation to the LPA that conditions, or parts of conditions, relevant to the submitted information can be discharged. The LPA will then act upon these recommendations and formalise the discharge of conditions or parts of conditions.

Regardless of the type of condition to be discharged or the nature of recommendation made by the Public Protection Service, any discharge of condition must be the subject of a formal discharge application, made to Development Management at the following address: *devcontrol@warrington.gov.uk*

Development Management will charge a fee to process and administer the discharge application.

4.4 What Information Is Required?

It is essential that redevelopment of land affected by contamination is undertaken with a sufficient degree of transparency and openness. This will maintain public confidence in the development and minimise any potential for blight. Maintaining a comprehensive set of records will assist the LPA, and other regulators, and ensure that any future enquiries about the development can be answered effectively.

All assessments of land affected by contamination should be carried out by or under the direction of a suitably qualified competent person i.e. a consultant and in accordance with BS10175 (2011) Code of Practice for the Investigation of Potentially Contaminated Sites. Considerable effort and expense can be saved if an applicant and LPA agree to place reliance on the expertise of a single impartial expert of this kind with regard to technical matters. All aspects of investigation and risk assessment relating to land contamination should also follow the guidelines laid out within *CLR11 'Model Procedures for the Management of Land Contamination'*.

The Applicant/Developer is responsible for ensuring the safe development and secure occupancy of a site and that appropriate competent professional advice is available to:

- Carry out any necessary investigations;
- Assess risk; and
- Design and execute any necessary remediation works, including verification of their effectiveness and appropriate monitoring and maintenance where these may be needed.

The LPA will need to consider the presence of contamination and any risks posed in the public interest. In doing so, it should consult appropriately. However, it is entitled to require the Applicant/Developer to provide at application stage, suitable information and expert advice on its implications. It is entitled to rely on that advice in considering the application and the circumstances of the land or to challenge it on the basis of similarly-qualified expert advice accessible to it in-house or externally. Those providing expert advice to Applicants/Developers should be aware of the future reliance that may be placed on it.

4.4.1 Submission Format

It is strongly encouraged that draft copies of any reports are issued to the Public Protection Service as part of any on-going discussions. This is often useful for the purposes of seeking an informal view on findings or proposals before proceeding to formal submission.

Formal submission of reports, for the purposes of discharging planning conditions, should be sent directly to Development Management.

4.4.2 Assessing the Adequacy of Submissions

Information submitted in support of planning applications must be of an acceptable minimum standard in order to satisfy the LPA. The guidance contained within this section aims to inform Applicants/Developers of the procedural requirements of a risk-based approach to land contamination, as defined in current UK legislation and guidance. A detailed technical framework for investigating and dealing with land affected by contamination is contained within the EA and Defra guidance document *CLR 11, 'Model Procedures for the Management of Land Contamination'*. The process involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a

way that is consistent with government policies and legislation. The approach outlined below is consistent with the CLR 11 technical framework and is based on a staged or tiered approach to risk assessment, which includes the following four key elements:

- Risk Screening;
- Generic Quantitative Risk Assessment (GQRA);
- Detailed Quantitative Risk Assessment (DQRA);
- Verification / Validation.

Risk screening generally involves developing a Conceptual Site Model (CSM), which identifies whether there could be any potentially unacceptable risks at the site. The CSM may then be used to determine if any further assessment is required. If this preliminary assessment clearly demonstrates that contamination at the site poses no unacceptable risks (i.e. no source-pathway-receptor linkages) then quantitative assessments may not be required.

The procedure for investigating a potentially contaminated site would be expected to meet the criteria outlined in British Standard *BS10175:2011 'Investigation of Potentially Contaminated Sites – Code of Practice'*. Typical components of a report submitted in support of a planning application would generally include the following stages (A-D):

- **STAGE A**: Preliminary Risk Assessment (PRA) (often referred to as a Phase 1 Investigation or Desk Study);
- **STAGE B**: Site Investigation & Risk Assessment (GQRA/DQRA);
- **STAGE C**: Remediation Scheme;
- **STAGE D**: Verification Report (often referred to as a Validation or Completion Report).

A more detailed step by step guide of the site assessment can be found on the Council's website. The guide gives an overview of the stages and reporting required at each stage. A helpful checklist of requirements in relation to each of the stages (A-D) outlined above can be also found on the website.

STAGE A: Preliminary Risk Assessment (PRA)

A PRA (sometimes referred to as a 'Phase 1 Investigation' or 'Desk Study') should provide a preliminary assessment of risk by interpreting information on a site's history, considering the likelihood of contamination being present and making an initial hazard assessment. A PRA typically consists of a desk study, site reconnaissance, development of a Preliminary CSM and a basic hazard assessment.

A PRA comprises a search of available information and historical maps, which can be used to identify the likelihood of contamination being present. The two main indicators for the likely presence of contamination at a site are past industrial uses and/or close proximity to a landfill. A detailed appraisal of documentary research can be found in the Department of Environment (DoE) guidance document, *CLR3 'Documentary Research on Industrial Sites'*.

Industry profiling is another key component of a PRA. Where a site has comprised a former land-use, it is possible to derive potential contaminants that may be present according to the type of former land use at the site. These potential contaminants or 'Contaminants of Concern' can then be used to inform site investigation proposals, which are also often included in PRA recommendations. The DoE *'Industry Profile'* series of guidance documents provide potential contaminants for a range of industrial land uses and are available on th EA website.

A simple Site Reconnaissance or Walkover survey is conducted to identify if there are any obvious signs of contamination at the surface. Further information regarding site inspections can be found in *CLR2 'Guidance on Preliminary Site Inspection of Contaminated Land'*. A CSM is a representation (text and/or graphics) of the relationship(s) between contamination source(s), pathway(s) and receptor(s) developed on the basis of hazard identification. Developing a CSM should be viewed as an iterative process that should be refined during subsequent phases of assessment. Using the information gathered, the CSM is constructed and a basic hazard assessment is carried out.

The minimum requirement that should be provided by an Applicant/Developer is the reporting of a PRA and Site Reconnaissance. While they may provide a useful indication of the possible presence of contamination, commercial environmental searches will not be sufficient to establish the presence or absence of contamination and will not fully meet the requirements that should accompany a planning application, since these searches only provide factual information. Interpretation is necessary to develop a CSM, which identifies plausible pollutant linkages as a basis for assessing the risks and appraising the options for remediation.

A PRA and site reconnaissance will assist in determining the need for and scope of further investigation, the problems that may require remediation and whether remediation can be secured by means of planning conditions. It may provide sufficient evidence that the planning decision can be made based on an appropriate CSM and the LPA being satisfied that there is a viable remedial solution. Where the PRA and Site Reconnaissance do not provide sufficient information to assess the risks and appraise remedial options, further investigations will need to be carried out before the application is determined.

If the PRA findings indicate that no contamination concerns exist at the site then further action may not be necessary, although it is a requirement to submit the report and confirm this with the Public Protection Service before proceeding.

STAGE B: Site Investigation & Risk Assessment (GQRA/DQRA)

A GQRA (often referred to Phase 2 site investigation) aims to reduce the uncertainties identified in the initial CSM by quantifying potential contamination at the site. The data obtained will be used to inform a decision as to whether the site is potentially harmful. A GQRA report generally consists of an intrusive site investigation and a subsequent generic risk assessment. The investigation process should seek to clearly identify and characterise plausible source-pathway-receptor linkages at the site and provide information for the refinement of the initial CSM.

A DQRA may be required where levels of contaminants are identified above the GQRA criteria or where large amounts of contamination are encountered to determine whether there are actual risks to identified receptors. DQRA can also be used to derive clean-up concentrations for levels of contamination which will remain on site following any proposed remedial works.

If the GQRA/DQRA findings indicate that no contamination concerns exist at the site, then further action may not be necessary, although it is a requirement to submit the report and confirm this with the Public Protection Service before proceeding further.

STAGE C: Remediation Scheme

Often known as a 'Remediation Strategy', this is a document detailing what action is to be carried out so that contamination no longer presents a risk to site users, property or ecological systems. The document is produced after an 'Options Appraisal', where various remedial options are considered and may include measures such as the removal of contamination, encapsulation of contaminants, treatment of contaminants or measures to break pollution linkages. Please note that Government policy encourages sustainable methods of remediation.

A Remediation Scheme should be submitted where a site investigation identifies levels of contamination that will require remediation prior to the site being suitable for its intended use. This strategy should include full details of how contamination at the site will be addressed and demonstrate that the standard of remediation work complies with current best practice and guidance.

The Remediation Scheme should be submitted to the Public Protection Service and the EA for approval before site works commence.

STAGE D: Verification / Validation / Completion Report

Where contamination has been found and/or remediated, the Applicant/Developer should submit a verification report to confirm remedial works, fill imports/exports and whether unexpected contamination was encountered. In certain circumstances it may be necessary for the Applicant/Developer to conduct

post-completion monitoring. This should be undertaken to the approval of the LPA and results of the monitoring should be submitted for review. For limited remediation works or protective works a verification statement alone may be acceptable, but prior confirmation of this should be obtained from the LPA.

The Verification Report should provide confirmation that all measures outlined in the approved Remediation Scheme/Strategy have been successfully completed, including where appropriate, validation testing. Recommendations to discharge contaminated land conditions will only be made once the Public Protection Service has received and approved a satisfactory verification report.

4.4.3 Timescales and Programming

Applicants/Developers should note that an intrusive investigation and subsequent risk assessment can take up to three months to complete. This excludes sites where ground gas is an issue, as monitoring may need to be carried out for longer periods (e.g. 6-12months) to ensure adequate characterisation of the site. Therefore, sufficient time should be set aside in the development programme to enable the necessary reports and drawings to be prepared and allow a period of time for consultation with the Public Protection Service and for the Public Protection Service to consult with other organisations, such as the EA or HPA. For this reason, Applicants/Developers should allow a minimum period of 21 days from the date of document submission for completion of the consultation or approval. It should also be noted that remediation works may need to commence/complete in advance of the development and allowances should be made for this when determining timescales.

Where Applicants/Developers proceed from one stage to the next without first obtaining the approval of the LPA for submitted documentation, they do so at their own risk. If the information submitted proves to be inadequate, the Applicant/Developer will be responsible for re-submitting adequate documentation and undertaking any additional site investigation or remediation works subsequently shown to be necessary. This could have a major cost implication, especially if construction work has already commenced and has to be aborted to facilitate the additional investigative work. If the LPA, or Public Protection Service become aware that the Applicant/Developer has not submitted the necessary documentation to comply with the condition, enforcement action may be taken, potentially resulting a Stop Notice being served on the Applicant/Developer.

4.5 Access to Environmental Information

Information held by the Council is governed by the requirements of the Environmental Information Regulations (2004), Freedom of Information Act (2000) and Data Protection Act (1998) and can be accessed in one of two ways:

- **Environmental Search Service**: The Public Protection Service offers an Environmental Search Service, which can provide additional information to companies or individuals wishing to determine if a particular site or parcel of land is affected by contamination. There are several different types of search available. Details of search types and associated charges can be obtained by emailing contaminatedland@warrington.gov.uk and requesting information about the Environmental Search Service, or by contacting an officer directly;
- **Viewing of Planning Documents by Appointment**: The Public Protection Service holds a large amount of historic and current information about contaminated land within the Borough. In addition, the Council also holds copies of all contaminated land investigation and risk assessment reports submitted under the planning system. Companies or individuals can view information or reports at Council Offices by prior appointment. Intellectual property rights are required to be respected and duplicate copies of material subject to copyright laws will not be made or allowed. For further details or to make an appointment, contact contaminatedland@warrington.gov.uk.

The Town and Country Planning Act also requires that all information submitted in support of a planning application be placed on the Planning Register and be publicly available, unless certain restrictive circumstances apply. It should therefore be routinely assumed that all information submitted to the LPA will be available for public inspection via the website.

4.6 Technical Guidance for Consultants/Specialists

The complexity of contaminated land technical guidance, coupled with individual site variability, makes it difficult to produce comprehensive guidance applicable to every situation. However, when assessing the adequacy of a site investigation, a number of common problems frequently arise. These generally relate to areas where technical guidance may be complex or incomplete. In an attempt to minimise the occurrence of these problems, the Public Protection Service apply consistent criteria for certain technical aspects of a site investigation. This section is intended to highlight recurring problem areas and key points that are of particular importance.

4.6.1 Generic Assessment Criteria/Screening Vales

The Department for Environment, Food and Rural Affairs (Defra) formally withdrew the 1987 ICRCL trigger and action values in December 2002, following the implementation of the Contaminated Land Exposure Assessment Model (CLEA) and associated publication of the Soil Guideline Values (SGVs). In 2008, the CLEA UK model and the SGVs were withdrawn by Defra and a revised CLEA model known as CLEA 1.04 was launched. Several versions of the CLEA model subsequent to 1.04 have been introduced since 2008, with the current version being 1.06. This is available for download on the EA website. The Public Protection Service would expect all future site investigations and assessments to make no reference to the withdrawn standards.

GQRA and DQRA should now be carried out using assessment criteria derived via the new CLEA model (1.06). Where site-specific target levels are used they should be calculated based on suitable and reasonable assumptions as well as current best practice and associated briefing notes and guidance. Reference should also be made to statistical analysis of the resulting data from the intrusive investigation.

The CLR7 report *'Assessment of Risks to Human Health from Land Contamination: An Overview of the Development of Soil Guideline Values and Related Research'* was withdrawn in 2008. Consultants, or suitably qualified persons appointed by the Developer / Applicant should adopt a suitable statistical approach (when assessing site investigation data). The CIEH and CL:AIRE set out in the guidance document *'Guidance on Comparing Soil Contamination Data with a Critical Concentration'* an approach that is a useful starting point for statistically assessing data.

It is usually inappropriate to apply quantitative criteria developed outside the UK, to UK sites, as assumptions underlying the models used to derive these criteria often reflect different behaviour patterns, local soil types or other technical factors. Where other contaminated land quantitative criteria are used e.g. Dutch or USEPA, the reasoning behind not using current UK guidance should be given and their use should be fully justified and referenced within the report. This would be expected to include a discussion of the CSM and assumptions used to derive the generic criteria together with an assessment of the underpinning toxicological data.

Given the uncertainty regarding GACs, new generic screening values were published in 2009 by the CIEH and Land Quality Management Limited (LQM). These GACs were developed for a selection of end uses and when combined with the remaining Soil Guideline Values (SGVs), cover a wide range of potential contaminants. To this end, the CIEH/LQM GACs are now widely used in contaminated land risk assessments and are accepted by many local authority regulators. Further details regarding these GAC can be found in the CIEH/LQM guidance document *'Generic Assessment Criteria for Human Health Risk Assessment (Second Edition)'*.

4.6.2 Ground Gas Risk Assessment

If the development is situated within 250m of a ground gas generation source, or is suspected of having the potential to generate ground gas, potential risk should be assessed and, if required, appropriate gas protection measures should be incorporated into the development design.

Guidance for assessment of the risks associated with the presence of hazardous ground gases on or in the vicinity of development sites can be found in:

- CIRIA guidance C665 'Assessing Risks Posed by Hazardous Gas Ground Gases to Buildings';
- BRE guidance Report 414 'Protective Measures for Housing on Gas Contaminated Land';
- National House Building Council (NHBC) guidance on ‘Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide Are Present;
- British Standard guidance BS8485 'Code of Practice for the Characterisation and Remediation of Ground Gas in Affected Developments';
- Chartered Institute of Environmental Health (CIEH) guidance 'Local Authority Guide to Ground Gas'.

The guidance in CIRIA C665 sets out a phased, risk-based approach to ground gas assessment.

If the PRA identifies a potential source of ground gas that may affect the site, gas monitoring is required. Measurements should be taken from suitably installed and equipped monitoring boreholes and the details and locations of the boreholes should be supplied. The spacing and number of the monitoring wells required at a site depends on the generating potential of the gas source and the sensitivity of the end-use (housing being the most sensitive). The response zone of a monitoring installation should be designed to intersect the suspected sources of gas. Spike testing and data obtained from trial pit installations are not acceptable for gas risk assessment.

The number of monitoring visits required and the length of time for which monitoring should be carried out, depends on the gas generation potential of the gas source and sensitivity of the proposed end-use. For example, a site which is to be developed for residential properties with gardens, but is situated over a very low gas generation source (e.g. Made Ground greater than 1 metre thick) may require a minimum of 6 visits over 3 months, while residential with housing over a very high gas generation source (e.g. a modern landfill) may require 24 visits over 24 months. In order to obtain any worthwhile data to use in a risk assessment, at least two readings over the monitoring period should cover the 'worst case' scenario (i.e. low and falling atmospheric pressure, ideally below 1000 millibars) and different weather conditions, such as rainfall, frost and dry.

Monitoring should be undertaken in accordance with the CIRIA C665 guidance and where deeper Made Ground (greater than 1 metre deep), organic material or hydrocarbon spills are unexpectedly encountered, additional monitoring should be considered.

Once sufficient gas monitoring data has been obtained, a ground gas risk assessment should be carried out to determine if gas protection measures are required. C665 sets out two risk assessment methodologies:

- Modified Wilson and Card methodology (for use on all development types except low rise houses with gardens). The gas regime characteristic situation determines the number and type of protection measures required;
- NHBC Traffic Light System, proposed by Boyle and Witherington (for use on developments with conventional low-rise housing with gardens with block and beam floor and ventilated under floor void only). Gas results are initially compared to Typical Maximum Concentrations and then to Gas Screening Values if the Typical Maximum Concentrations are exceeded. The worst-case protection measures are adopted.

4.6.3 Cover Systems

The main function of an engineered cover system should be to provide a safe and permanent barrier between any ‘significant’ levels of buried contamination and residents/site users.

Any sub-soil or top-soil imported on to a proposed development site should be from a Greenfield source or certified remediated source. Soil of unknown origin or from a Brownfield site may still be accepted, but its use is actively discouraged by the Public Protection Service. Any proposed importation of material from a Brownfield source should be accompanied by substantial justification and will be subject to more stringent validation and screening prior to import.

Documentary evidence should always be sought when importing fill materials. Evidence verifying the source will assist in validation of the suitability of the material for use on-site. This information may inform the type of chemical testing carried out on the material and will, in-part, determine the frequency of testing to be implemented to ensure that it is suitable for use.

If the source of the material proposed for import is unknown, the Public Protection Service may refuse import, with the onus of responsibility being with the Applicant/Developer to prove suitability for use. Where site-won materials are to be re-used, the source/origin will be that of the subject, i.e. Greenfield, Brownfield or Remediated.

Chemical Analysis

Where possible, the geographical source/origin of material considered for importation should be known and confirmed by formal certification and/or reliable anecdotal evidence. Specific reference should be made to source origin, i.e. Greenfield, Brownfield or Remediated.

Chemical analysis should be provided for top-soils and sub-soils considered for importation, regardless of the proposed end-use, (i.e. soft-landscaping, garden areas) Chemical testing of proposed imported and site-won materials proposed for re-use should comprise a standard suite of contaminants including metals; metalloids; speciated TPHs; speciated PAHs; and an Asbestos screen.

Regarding Chromium analysis specifically, data should be provided for Total Chromium concentrations. This is due to the inherent difficulties encountered when analysing for the hexavalent form only and that current analytical methodologies favour a guideline value for Total Chromium rather than speciated results.

Chemical Standards

Top-soil and/or sub-soil imported onto site may be subject to chemical testing prior to import to ensure the material is chemically suitable for use. This is not mandatory and is recommended entirely for the benefit of the applicant to ensure the quality of the material purchased. However, chemical testing to prove suitability for use should then be carried out once the material has been imported to site, ie: in-situ.

When screening imported (or site-won) fill materials for chemical suitability, GAC used to determine threshold concentrations preferred by the Public Protection Service include:

- Existing Soil Guideline Values (SGVs);
- Atkins AtRisk^{SOIL} 2009 Values;
- CIEH/LQM 2009 Values;

Other generic screening values will be accepted by the Public Protection Service, providing the values are fully justified. In the absence of suitable GACs, Site Specific Assessment Criteria (SSACs) may need to be generated.

Top-soil or sub-soil imported to site should adhere to the appropriate organic content, pH value, nutrient content and Carbon: Nitrogen ratio as described in the British Standard Institution (2007) guidance document BS3882 *Specification for Top-soil and Requirements for Use guidance document*.

Physical Composition

The term 'imported fill material' refers to any soil, sand or aggregate-based material brought to site for use within the proposed development. This can include both top-soils and sub-soils and any intended end use, with special consideration given to materials destined for proposed garden areas and/or soft-landscaping. In terms of composition, the imported material should be suitable for the intended end use. Materials imported to site will fall into four broad categories:

1. **Natural top-soil**: Upper layer of an in-situ soil profile, usually darker in colour and more fertile than the layer below (sub-soil), and which is a product of natural chemical, physical, biological and environmental processes;

2. **Manufactured top-soil**: Also known as 'recycled top-soil'. This is material produced by combining mineral matter and organic matter (and, where appropriate, fertiliser and lime), and which provides the same function as top-soil;
3. **Sub-soils**: Soil layer extending between the top-soil and the little-weathered material below, or material that functions as sub-soil in a constructed soil in a landscaping project on to which top-soil can be spread. Sub-soil usually has a lower concentration of organic matter and available plant nutrients than top-soil;
4. **Other**: All other fill material types imported to site other than those listed above.

Top-soil or sub-soil imported to site should adhere to the appropriate texture, structure and electrical conductivity as described in the British Standard BS3882.

Regarding manufactured top-soil, the Public Protection Service strongly discourages the use of such material and will only accept material of this type being imported to site if extenuating circumstances can be justified. This is due to the fact that information pertaining to the origin and/or composition of the material is often unknown, unavailable or unreliable. Frequently the organic content of this fill type is formed from sewage sludge or other high-organic-content wastes and as such, the Council deems its use within sensitive end uses (such as garden areas and/or soft-landscaping) to be an unnecessary potential risk.

Sampling Ratios & Statistics

As stated previously/above, all fill materials intended for import to site, as well as some site-won materials proposed for re-use, are required to be subject to validation testing to ensure their chemical suitability for use. This is usually in the form of a series of chemical tests performed on a number of soil samples taken from the imported material intended for use on-site.

This validation should be performed at an appropriate frequency for the volume of material imported and must test for a suitable suite of chemical determinands. Details of suitable suites of chemical to test for are given above.

Required sampling frequencies are dictated by the source of the fill material intended for (re)use on-site:

1. Material of Greenfield origin: This is material sourced from a recognised Greenfield site (ie: land which has not previously been subject to development or industrial use) and supporting documentation is available to corroborate this fact;
2. Material of Brownfield, remediated or unknown origin: This is material sourced from either:

    - A Brownfield site (i.e. that which has been previously-developed or subject to industrial use);
    - A remediated site (i.e. that which has previously been a Brownfield site, but has been remediated to the satisfaction of the LPA);
    - An unknown site (i.e. no supporting information/certification is available to corroborate origin/quality/composition of the imported fill material).

Recommended sampling frequencies are also dictated by the proposed end use of the fill material intended for (re)use on-site:

- Material intended for garden areas: This is fill material which is to be used within areas of the proposed development described as 'gardens'. Typically, any area of private lawns, soft-landscaping or planting areas, where there is the potential to grow vegetables and/or for prolonged exposure of human health receptors to imported fill materials.
- Material intended for soft-landscaping: This is fill material which is to be used within areas of the proposed development described as soft-landscaping, common or public open spaces. Typically, any area of public lawns, soft-landscaping or planting areas, where there is no potential to grow

vegetables and the potential for prolonged exposure of human health receptors to imported fill materials is more limited.

- Material intended for other areas of the site: This is fill material which is to be used in or on any area of the proposed development site other than those listed above. This may include beneath building footprints, carriageways, footways or car-parking areas.

Recommended sampling frequencies (per cubic metre) attracted by the varying sources and/or intended end uses are presented in Table 4.3:

Intended End-Use:	SOURCE / ORIGIN OF FILL MATERIAL:			
	GREENFIELD	REMEDIATED	BROWNFIELD	UNKNOWN
GARDENS	1:250 m^3	1:100 m^3	1:50 m^3	1:50 m^3
SOFT-LANDSCAPING	1:250 m^3	1:150 m^3	1:150 m^3	1:150 m^3
OTHER	1:250 m^3	1:250 m^3	1:250 m^3	1:250 m^3

Table 4.3: Sampling frequencies recommended by the Public Protection Service for imported or site-won fill materials

In the interest of statistical confidence, a minimum of at three samples per soil type should be collected and samples identified as outliers will require further sampling. All statistical analysis and calculation should be carried out in accordance with CIEH/CL:AIRE *Guidance on Comparing Soil Contamination Data with a Critical Concentration* document.

Depth of Growth Mediums & Planting

Typically, the depth of sub-soil should be at least double the depth of top-soil installed within the cover system or capping layer, although topsoil depth shall not normally exceed 300 mm as per British Standard BS3882. Total minimum rooting depth for planting (that is, top-soil and sub-soil combined) within growth mediums, whether gardens, soft-landscaping or common areas are described in British Standard BS3882 and is summarised in Table 4.4:

Total Minimum Rooting Depth:	Vegetation Type:			
	GRASS	PLANTS	SHRUBS	TREES
	450 mm	450 mm	600 mm	900 mm

Table 4.4: Idealised total growth medium rooting depths for various vegetation types

Depth of Cover Systems & Capping Layers

Where used as a capping layer of cover system, fill materials should be installed at prescribed depths according to their soil type and the role they play within the cover system. As cover systems are almost always site-specific, the various depth of fill can vary greatly depending on how complex or engineered the cover system is to be, but there are a few minimum standards to be observed, which are described below.

Typical cover system design requires a capillary break layer at its base, which is then overlain by various depths/types of fill material. These individual layers working in unison form the cover system or capping layer.

The minimum acceptable total depth for fill materials (including the break layer) within private garden areas should be 600 mm. This figure is recommended and has been adopted for the following reasons:

1. Root systems for shrubs are typically up to 600 mm;
2. Excavations are unlikely to be deeper than 600 mm in typical gardening activities;

3. Bio-turbation (soil-mixing by biological organisms) is typically limited to the top 600 mm of the soil profile;
4. Excavations by children or pets are unlikely to exceed 600 mm.

The minimum acceptable total depth for fill materials (including the break layer) within areas of soft-landscaping, common areas or public open spaces is 450 mm. This relaxation of cover depth is designed to reflect the reduced risk afforded by diminished exposure of human health receptors to potentially contaminated soils within these public areas via direct contact (dermal, ingestion, inhalation).

On-site or Off-site Validation

Fill material imported onto site should be stored in a designated area, which is clearly identified on an appropriate scale plan. Stockpile management protocols consistent with best practice apply.

The Public Protection Service does not routinely accept off-site validation of fill material (whether this is top-soil, sub-soil or other substrate), as this often results in chemical testing of different material to that actually imported to site. It is therefore difficult to prove the exact chemical nature of the material eventually imported, as off-site validation tends to involve composite samples taken from a 'typical batch' of the material intended for import. As such, validation testing of imported fill materials should be carried out in-situ, after materials have been imported to site.

Documentary Evidence

- **Chemical analysis**: All raw laboratory data should be submitted with the analytical test certificate;
- **Statistical analysis of datasets**: Calculations in line with CIEH/CL:AIRE guidance should be provided;
- **Photographic evidence**: Photographs of installed remedial measures (of any type) are required. Photographic evidence should be representative and where necessary, include a scale/ruler. This is of particular importance when photographing cover depths to verify the agreed depth of cover has been installed;
- **Plans**: Showing pertinent information relating to remediation, such as stockpile locations, areas subject to remedial measures or areas of further investigation;
- **Import/export data**: Pertinent data relating to fill materials/wastes, including volumetric data (ie: how much was imported to site), source data (ie: where the material came from) and waste transfer data (where applicable).

Obtaining Representative Samples

All sampling strategies should be designed to provide data that is representative of the site conditions as a whole. Sampling should be undertaken in accordance with recognised sample collection methodology and guidance, with reference made to recommendations within the British Standard BS10175 guidance document. It is essential to derive a CSM using the information obtained from the PRA to target possible sources of contamination and also to ensure that an appropriate suite of analysis is performed. Justification for the chosen sampling regime and analysis suite should be clearly set out in the site investigation report.

A suitably accredited laboratory should be used to undertake analysis of samples. The site investigation should include a detailed plan showing the location of sampling points and accreditation details of the laboratory used, together with summary tables of results. A full set of results, including exploratory hole logs, should be submitted.

4.6.4 Japanese Knotweed

Neither the EA nor the Council are responsible for controlling Japanese knotweed, other than that growing on Council-owned land. Managing knotweed is the responsibility of the landowner of a site.

Further Information:

Link to Environment Agency Japanese Knotweed Guidance:

http://www.environment-agency.gov.uk/homeandleisure/wildlife/31364.aspx

Link to Environment Agency Invasive Species Guidance:

http://www.environment-agency.gov.uk/homeandleisure/wildlife/31350.aspx

Contact Details:

Environment Agency

Telephone: 08708 506 506 (Mon-Fri, 8am - 6pm)

E-mail: enquiries@environment-agency.gov.uk

Postal Address: National Customer Contact Centre PO Box 544 Rotherham S60 1BY

4.6.5 Asbestos

There are three issues related to Asbestos that may require the applicant to contact the Public Protection Service:

1. Dealing with Asbestos as part of a contaminated land condition or in relation to the planning process;
2. Members of the public concerned about asbestos in their homes, in/on neighbours property or on current developments close by, and;
3. Members of the public working with, and/or being exposed to asbestos in their workplace.

Further Information:

Asbestos and Contaminated Land

If the presence of asbestos within made ground is suspected or within a building due for demolition then contact the Public Protection Service on Tel: 01925 442 653

Asbestos, Neighbours and Current Developments

If the issue is with members of the public having concerns with their house, neighbours or building sites dealing with asbestos sheeting or similar, then please contact Council Contact Centre on Tel: 01925 443 000

Asbestos at Work

If the issue is work related then please review the Health and Safety Executive (HSE) website at the following link for information and contact details: http://www.hse.gov.uk/asbestos/

4.7 References

1. Department of Environment, Food & Rural Affairs/Environment Agency, 2004, CLR Report No 11, Model Procedures for the Management of Land Contamination;
2. British Standards Institute, 2011, BS10175, Investigation of Potentially Contaminated Sites – Code of Practice;
3. Department of the Environment, 1994, CLR Report No 3, Documentary Research on Industrial Sites;
4. Department of the Environment, 1994, CLR Report No 2, Guidance on Preliminary Site Inspection of Contaminated Land;
5. Chartered Institute of Environmental Health (CIEH) / Contaminated Land: Applications in Real Environments (CL:AIRE), 2008, Guidance on Comparing Soil Contamination Data with a Critical Concentration;
6. CIRIA, C665, 2007, Assessing risks posed by hazardous ground gases to buildings.
7. Building Research Establishment 414 (2001) Protective Measures for Housing on Gas Contaminated Land;
8. National House Building Council (NHBC), Report Edition No. 4 (March 2007) Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are present;
9. British Standards Institute BS8485 (2007) Code of practice for the characterisation and remediation of ground gas in affected development, Draft for Public Comment;
10. Chartered Institute of Environmental Health (2008) Local Authority Guide to Ground Gas;
11. British Standards Institute BS3882 (2007) Specification for Topsoil and Requirements for Use;
12. Chartered Institute of Environmental Health (CIEH) and Land Quality Management Limited (2009) Assessment Criteria for Human Health Risk Assessment (Second Edition).
13. Environment Agency (2010) Guiding Principles for Land Contamination.

4.8 Glossary

Borehole - A hole drilled into the ground in order to obtain samples

Brownfield Sites - A term generally used to describe previously developed land, which may or may not be contaminated

Conceptual model - A representation of the characteristics of the site in diagrammatic or written form that shows the possible relationships between contaminants, pathways and receptors.

Contaminant - A substance that is in, on or under the land and that has the potential to cause harm or to cause pollution of controlled waters.

Controlled waters - Defined by Water Resources Act 1991, Part III, section 104, which includes all groundwater, inland waters, estuaries and coastal water to three nautical miles from the shore.

Desk study - Interpretation of historical, archival and current information to establish where previous activities were located, where areas or zones that contain distinct and different types of contamination may be expected to occur, and to understand the environmental setting of the site in terms of pathways and receptors.

Detailed quantitative risk assessment - Risk assessment carried out using detailed site-specific information to estimate risk or to develop site-specific assessment criteria.

Generic assessment criteria - Criteria derived using generic assumptions about the characteristics and behaviour of sources, pathways and receptors. These assumptions will be protective in a range of defined conditions.

Generic quantitative risk assessment - Risk assessment carried out using generic assumptions to estimate risk or to develop generic assessment criteria.

Ground gas - A general term to include all gases (i.e. including VOCs or vapours) occurring and generated within the ground whether from made ground or natural deposits

Hazard - A property or situation that in particular circumstances could lead to harm or pollution.

Land affected by contamination - Land that might have contamination present which may, or may not; meet the statutory definition of contaminated land.

Made ground - Ground where there are deposits that have not been formed through natural geological processes. These may comprise a combination of natural deposits together with products and materials and waste produced by man.

Maintenance - Activities carried out to ensure that remediation performs as required over a specified design life.

MCERTS - The Monitoring Certification Scheme is a quality assurance scheme for providers of monitoring services, equipment and systems that is administered by the Environment Agency and accredited by UKAS.

Monitoring - A continuous or regular periodic check to determine the ongoing nature and performance of remediation, which includes measurements undertaken for compliance purposes and those undertaken to assess performance.

Pathway - A route or means by which a receptor could be, or is exposed to, or affected by a contaminant.

Pollutant linkage - The relationship between a contaminant, pathway and receptor.

Preliminary risk assessment - First tier of risk assessment that develops the initial conceptual model of the site and establishes whether or not there are any potentially unacceptable risks.

Receptor - In general terms, something that could be adversely affected by a contaminant, such as people, an ecological system, property or a water body.

Remediation - Action taken to prevent or minimise, or remedy or mitigate the effects of any identified unacceptable risks.

Remediation strategy - A plan that involves one or more remediation options to reduce or control the risks from all the relevant pollutant linkages associated with the site.

Response zone - The perforated section of a standpipe/borehole which allows gas in the unsaturated zone to enter a standpipe

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

Risk assessment - The formal process of identifying, assessing and evaluating the health and environmental risks that may be associated with a hazard.

Sampling - Collection of a portion of material for experimentation such that the material taken is representative of the whole

Sensitive receptors - Receptors which are more likely to be affected by a hazard

Site reconnaissance - A walk-over survey of the site.

Site investigation - An intrusive investigation, which involves the collection and analysis of soil, surface water, groundwater, soil gas or other media as a means of informing the conceptual model and the risk assessment. This investigation may be undertaken in a single or a number of successive stages.

Site-specific assessment criteria/target values - Values for concentrations of contaminants that have been derived using detailed site-specific information on the characteristics and behaviour of contaminants, pathways and receptors and that correspond to relevant criteria in relation to harm or pollution for deciding whether there is an unacceptable risk.

Verification - The process of demonstrating that the risk has been reduced to meet remediation criteria and objectives based on a quantitative assessment of remediation performance.

Verification report - Provides a complete record of all remediation activities on site and the data collected as identified in the verification plan to support compliance with agreed remediation objectives and criteria.

4 Contaminated Land

5 Light Pollution

5.1 Introduction

The problems and issues associated with the provision of outdoor lighting are becoming more widely recognised. Obtrusive lighting may cause an environmental and intrusive visual nuisance arising predominantly from glare and light spillage. Light pollution in the countryside can lead to the illusion of a suburban environment with the sense of distinctiveness associated with the countryside being lost.

5.1.1 What is Light Pollution?

Light pollution is the term used to describe unwanted light from artificial light sources. Light pollution can occur as:

- Sky Glow - the orange glow visible around urban areas resulting from the scattering of artificial light by dust particles and water droplets in the sky;
- Glare - the uncomfortable brightness of a light source when viewed against a dark sky;
- Light Trespass - light spillage beyond the boundary of the property on which a light is located.

Excessive artificial lighting

There is growing recognition of the potential problems arising from artificial light within the environment. Problems can arise from:

- Illuminated shop windows and advertising signs left on overnight;
- Badly designed lighting in car parks and shopping centres;
- Domestic security lighting which is poorly angled thereby flooding the neighbourhood in light and accentuating the darkness of the surrounding areas;
- Badly floodlit sports facilities, such as golf driving ranges, or motorway service areas which bathe rural areas in brightness;
- New housing estates or shopping complexes with discordant lighting, often much more intrusive than neighbouring lighting; and
- Excessive lighting of churches and other architecturally interesting buildings.

By establishing the objectives of any lighting scheme and agreeing guidelines a compromise can be met to reduce the impact of any scheme and potentially save energy and expense to the Applicant/Developer.

5.2 Light & Planning

5.2.1 Will a Lighting Scheme Require Planning Permission?

Maintenance, improvement or other alterations to any building works, which affect only the interior of the building or do not materially affect the external appearance of the building, do not require planning permission (unless the building is listed, in which case listed building consent may be required for both internal and external works). Most work involving lighting particularly of the householder 'DIY' type, will fall within this category e.g. home security lights. However, the installation of a lighting scheme of such nature and scale that it would represent an engineering operation and typically be undertaken by specialist lighting engineers could be deemed "development" and as such, is likely to require planning permission.

Large-scale lighting installations such as the floodlighting of a football stadium or public tennis courts are clearly a form of development, which comes within this statutory definition and would require planning permission. Listed building consent is required for lighting schemes if it is deemed that the character of the building would be materially affected by the lighting. Advice should be sought from the LPA prior to installation.

The Council would advise prospective Developers/Applicants to check with the LPA before installing any lighting scheme. Developers/Applicants are encouraged to submit details of lighting schemes (nature and extent), including light scatter diagrams, as part of the planning application in order to demonstrate that the proposed scheme is appropriate in terms of its purpose and setting. In so doing, the LPA aims to minimise potential pollution from glare and spillage to neighbouring properties, roads and rural areas. It may be necessary to condition a planning approval to allow the LPA to monitor the development and enforce the condition if necessary, this is discussed in Section 5.3.3.

5.2.2 Determining of Planning Applications

The Council has identified a number of factors that will be taken into consideration when determining of planning applications for proposals that include lighting. These are:

1. An Assessment of the Need for Lighting

The LPA will request the applicant assess the need for the lighting scheme proposed.

2. The Location of the Proposal in Relation to Neighbouring Uses

The LPA has identified the following environmental zones against which impacts of external artificial lighting will be judged:

Zone	Surrounding	Lighting Environment	Examples
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc.
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

The Institution of Lighting Professionals has provided guidance on acceptable levels of illumination for specific environmental zones, which relate to the areas identified above.

The LPA recommends that any applications for lighting schemes to adhere to the relevant guidance for the appropriate environmental zone in the *Institute of Lighting Professionals: Guidance Notes for the Reduction of Obtrusive Light GN01:2011*

3. The Nature of the Use of the Lighting Proposed

For all lighting proposals, the Applicant/Developer should identify the purpose and use of the lights, the potential users of the lighting scheme (e.g. for recreation facilities) and the hours the lights will be in operation (summer-time and winter-time). The hours of operation will be expected to be kept to a working minimum and Applicants/Developer should show this in their application. Keeping the use of the lighting to a minimum will reduce the impact the lighting may have on the environment.

4. The Design of the Lighting Proposed

To achieve the necessary minimisation of obtrusive light the Applicant/Developer should adhere to the following general principles taken from the Institute of Lighting Professionals, Guidance Notes for the Reduction of Obtrusive Light, GN01: 2011.

1. Lighting is directed downwards wherever possible to illuminate its target. If there is no alternative to up lighting, then the use of shields and baffles will help reduce spill light to a minimum. Up lighting is a particularly bad form of obtrusive light and contributes to sky glow;
2. Lighting is designed so as to minimise the spread of light near to, or above the horizontal. Again any light that shines above the horizontal line of the light adds to the sky glow effect;
3. Lighting should be designed to the correct standard for the task and should not over light. 'Over' lighting is a cause of obtrusive light and also represents a waste of money and energy;
4. The main beam angle of all lights proposed directed towards any potential observer is kept below 70 degrees. It should be noted that the higher the mounting height, the lower the main beam angle could be. This will help reduce the effect of glare and light spill on neighbouring dwellings, passing motorists, pedestrians, etc.;
5. Lighting should be directed to minimise and preferably avoid light spillage onto neighbouring properties;
6. Wherever possible use floodlights with asymmetric beams that permit the front glazing to be kept at or near parallel to the surface being lit;
7. The lights used should be the most efficient taking into account cost, energy use, colour rendering and the purpose of the lighting scheme required. All lighting schemes should meet British Standards.

5.2.3 Planning Conditions

Where the LPA grants planning consent for a development proposal it may impose conditions controlling the lighting scheme provided. These may include:

- Limiting the time of use of the lighting;
- Limiting the light levels to a designed uniformity;
- Limiting the use of lighting schemes to identified uses or users;
- Specifying lamps, luminaires and columns;
- Specifying the need for full horizontal cut-off;
- The design, height and position/angle of the lighting;
- The retention of screening vegetation;
- The use of planting and bunding to contain lighting effects;
- The future maintenance of the lighting schemes and post-installation checks in accordance with the original design and planning approval; and
- In exceptional circumstances, the granting of temporary planning permission to enable a review of lighting impacts after installation.

These conditions will be applied as necessary by the LPA to help reduce obtrusive light from new proposals, particularly glare and spillage, from areas of wildlife importance, open countryside and residential amenity.

These conditions may be subject to change dependant on any updates in guidance.

5.3 What Information is Required?

Any proposal for artificial lighting should be accompanied by that information normally required for any other planning proposal and additionally the information set out below.

- A statement setting out why a lighting scheme is required, the proposed users, and the frequency and length of use in terms of hours of illumination;
- A site survey showing the area to be lit relative to the surrounding area, the existing landscape features together with proposed landscaping features to mitigate the impacts of the proposed lighting;
- A technical report prepared by a qualified Lighting Engineer or lighting company setting out the type of lights, performance, height and spacing of lighting columns. The light levels to be achieved over the intended area, at the site boundaries and, for large schemes, 50m outside of the boundary of the site should be superimposed on a map of the site and its surrounding area.

Any proposal for the display of illuminated advertisements should be accompanied by that information normally required for any other planning proposal and additionally the information set out below.

- Details of the proposed location, positioning and dimensions of the sign face;
- The sign face maximum luminance in candelas per square metres;
- The number, size and type of light sources and details of the sign face materials;
- The type of illumination – internal or external; static or intermittent;
- Details of the make and catalogue number of any luminaires/floodlights;
- Size, type and number of lamps fitted within any luminaire or floodlight;
- The mounting height of the luminaires/floodlights specified;
- The location and orientation of the luminaires/floodlights.

Provision of this information may require professional advice and potential advisors can be found in Section 5.8. For significant lighting schemes professional advice from a lighting manufacturer or from a qualified lighting engineer is recommended.

5.3.1 Requirements for Specific Lighting Schemes

A list of land uses/developments are contained below with the requirements set out for each one. These extracts have been taken from the Department of the Environment and the Countryside Commission publication, *Lighting in the Countryside: Towards Good Practice, 1997*.

A. Advertisements

- Acceptable lighting levels for illuminated signs are given in *'Brightness of Illuminated Advertisements'* – Technical Report Number 5 produced by the Institute of lighting Engineers (now Institute of Lighting Professionals). All advertisement applications should conform to the recommendations set out in this report;
- Signs should not positioned where they may affect the clarity of traffic signs or disturb those living close by;
- Position promotional lighting/signs so that they are not visible from the open rural areas i.e. concentrate at public.

N.B: Planning permission is not required for certain categories of illuminated advertisements displayed on business premises. The Town and Country Planning (Control of Advertisement) Regulations 1992 states luminance values and criteria for such proposals.

B. Security Lighting

- Passive infrared detectors should control lighting. Avoid sensors that can be tripped by road or footway users. Lamps of higher intensity create too much light, more glare and darker shadows. For all-night lighting at low brightness use a compact fluorescent porch light of 9W (600 lumen);
- Lighting should be directed downwards to illuminate its target and mounted below the property boundary height so as to reduce light spill;
- Develop an integrated approach to security lighting, balancing levels of light with other lighting in and around the site to avoid glare and light spill as well as dark spots.

C. Commercial & Industrial Developments

- Avoid use of lights simply to create a 'presence' at night;
- Concentrate lights where they are needed and establish a clear hierarchy, with minimum lighting around the outer, perimeter of the complex.

D. Decorative Building Lighting

- Keep lighting understated and aim to enhance rather than swamp architectural character;
- Ensure light is directed only at the structure, resiting lights and using baffles and shielding where possible;

- Minimise up-lighting where it distorts architectural detailing;
- Consider timing of lighting to maximise the visual beauty of the building to the public at night-time but not to floodlight the building at dusk or nightfall;
- Consider the choice of surface materials being illuminated, the reflectance value may be high causing reflected light to generate excessive sky glow.

E. Agricultural/Horticultural Uses

- Mount lights below the roof height of buildings and direct light downwards, to where it is needed reducing light spillage;
- Avoid use of sensors that can be tripped by animals;
- As far as possible, position lights so that they are shielded by buildings and are not visible from the surrounding countryside;
- The potential impact of light from glasshouses will be considered as part of the planning application.

F. Lighting railway stations & Road/Rail Interchanges

- Design the lights for the station as a whole, balancing the need for lighting in different areas and considering the impact of light in views from the surrounding countryside;
- Concentrate on lighting to enhance the architectural character of the station building rather than on creating an 'urban' level of light on the platform and in the station forecourt;
- Direct car park and security floodlights downwards and to where the light is required.

G. Mineral Extraction

- Mount lights below the roof height of buildings, and perimeter fencing, and direct light downwards, to where it is required;
- Position lights so that they are shielded by buildings or permanent plant and are not visible from the surrounding rural areas;
- Avoid lights mounted on the side of the buildings that shine directly out, dazzling users of the facility.

H. Petrol Filling Stations

- Canopy lights should be positioned to avoid light spill from the sides of the canopy;
- Avoid the use of dish diffusers, which cause additional glare.
- Reduce lighting or avoid it during daylight hours;
- Integrate design for promotional signage with that of the canopy.
- Avoid lighting internal fascia around canopy;
- Design and position signs so that they are visible only from the carriageway and not from the surrounding landscape.

I. Car Parks

- Direct lighting downwards and design equipment to control levels of light spill and glare;
- Site lighting equipment carefully, making use of the backdrop provided by any existing vegetation and introducing new planting within the car park to help integrate the lighting structures and minimise the visual impact of both equipment and lighting;
- Use new hedgerows or tree planting to help minimise the impact of car park lights around the car park boundaries;
- All vegetation needs to be maintained and trimmed once it has been established otherwise it will block out the light.

All of the above lighting schemes should be balanced with securing safe and efficient operation of the proposed facility especially where external guidance expresses the need for defined illumination levels for Health & Safety reasons. Lighting installations which require higher illumination levels for Health and Safety reasons can still be designed following the spirit of the guidance from the Institute of Lighting Professionals.

5.4 Technical Guidance for Consultants / Specialists

For a list of guidance documents when considering lighting schemes please refer to Section 5.9. Different development proposals will warrant more specific guidance. It is the policy of the LPA that this more specific guidance is complied with as relevant.

5.4.1 Crime Prevention and Security Safety

It is assumed that a generous use of artificial lighting, whether street lighting or domestic security lighting, will reduce the risk of crime. However, studies have shown that whilst lighting can reduce the fear of crime, bright, poorly positioned, misdirected lights and security lighting can assist would-be criminals finding easy access points and can create deeply shadowed areas for concealment.

Guidance suggests *"Those installing security lighting need to strike a balance between their desire to increase the security of their properties and the possible effect that unnecessarily obtrusive and glaring light, due to badly installed or designed lighting fixtures, may have on neighbours. Care should be taken to ensure that the intensity and focus of security lighting respects the amenity of others."*

5.4.2 Floodlighting for Sports Pitches and Courts

Regarding the placement of floodlighting for sports pitches and courts in Warrington, careful consideration will need to be given to any proposals for the provision of floodlit sports facilities in areas of special landscape value and also where they immediately adjoin housing.

New sports facilities are almost always accompanied by artificial lighting schemes. Whilst recognising the advantages that lighting can bring in making more effective use of recreational facilities, the Council is also conscious that such proposals can have an adverse environmental impact in terms of obtrusive light.

The ever increasing interest in sport has prompted many sports centres and schools to install floodlighting to enable extra activities to take place after dark. The inclusion of floodlights to upgrade sports facilities enables a pitch or court to be used during the winter evenings and provides an opportunity for the community to utilise the facilities and in doing so, will be contributing financially towards the maintenance costs.

Design of Floodlighting

It is recommended that Applicants/Developers should commission a professionally produced design, including light scatter diagrams that will accurately predict the performance of the scheme, both inside and outside the pitch area, before any equipment is procured. This will avoid expensive mistakes and also provide the LPA with the necessary details needed when considering the planning application.

For further technical advice regarding sports floodlighting, guidance can be obtained from the Sports Council and also the Chartered Institute of Building Services Engineers (CIBSE).

Most sporting facilities require lighting of a uniform level over the whole playing area. This is normally best provided by downward facing lights mounted on columns. The Institution of Lighting Professionals recommends that the most effective way of achieving this and preventing light spillage into surrounding areas is to use floodlights with an asymmetric beam that, while producing the main beam at around 60-70 degrees, permits the front glass to be kept horizontal. The upper limits of the beam will also need to be specified depending on circumstances, but should normally not exceed 70 degrees downward from the vertical.

Different sporting activities require different light levels on the playing surface. Sports such as hockey, with a fast moving small ball, require a much higher level of illumination than, for example, netball. It is usually the case that the higher level at which a sport is played, for example County or National standard, the higher the level of illumination required. Training or more informal use may be undertaken with a lower level of illumination. For guidance on the relevant illuminance for particular sports see the Sports Council's Fact file Two, *Floodlighting for Sport*.

Some sports facilities such as golf driving ranges present particular difficulties for floodlighting. Most sites tend to be in rural areas and have floodlights aimed either horizontally or slightly above the horizontal plane to enable players to follow the flight of the ball. These lights, which are often of considerable intensity and with a wide beam, can cause inconvenience to neighbouring properties and can be a safety hazard; particularly where dazzle affects highway users. Golf driving range lights are probably one of the most polluting forms of floodlighting in that they invariably illuminate a much larger area than is required. The only circumstance where a horizontal beam of this nature may be permitted is where the natural landform or a permanent natural or manmade landscape feature can effectively contain/attenuate the light.

Careful consideration needs to be given to the positioning and height of lighting columns if an even light distribution over the playing surface is to be achieved, whilst maintaining light spillage into adjacent property to a suitable level. Floodlighting columns may vary in height from around 5m - 25m depending upon the type of illumination required and the area to be lit. The higher the lighting columns, the easier it is to ensure that the beam is directed downwards as indicated above and to minimise light spillage to surrounding areas. A judgement in all cases will need to be made on the visual impact of the lighting columns during daylight hours as well as the impact of the floodlighting system when in use.

Floodlighting systems can utilise a number of different light sources each with its own particular characteristics in terms of colour rendering, operating costs, and the amount of glare produced. The type of light source will need to be carefully matched with the level of illumination required and the height and positioning of columns, the visual impact of which will be a material planning consideration. It is also essential that the fittings are sufficiently robust to ensure that lamps carefully aimed minimise light spillage outside the floodlit site are not knocked out of alignment by high winds or heavy snowfall.

In coming to a decision on the merits of a particular proposal, the Council will take into account the use of the facility and the likely benefits to the general public. By definition, floodlighting allows sports facilities to be used for longer hours and throughout the winter. Floodlights must be operational for long hours to justify their initial capital cost and provide for the needs of the community. The English Sports Council recommends a curfew time of 22:00hrs for floodlighting. Consideration will be given to the relationship between the use of the facility and the interests of conservation, amenity and safety. Where the impact of a proposal is considered to be unacceptable or cannot be mitigated through ameliorative measures, the protection of those recognised interests will prevail.

5.4.3 Advertisements

Paragraph 2 of Schedule 3, Part II of the Town and Country Planning (Control of Advertisement Regulations 2007) states that *"the permitted levels of luminance for advertisements where the illuminated area is not more than 10 square metres, should be 600 candela per square metre and where the illuminated area is more than 10 square metres, 300 candela per square metre".*

5.5 Excessive Lighting

Effective illumination should be well directed and almost invisible from a distance. The lighting scheme should not exceed that which is required for the satisfactory undertaking of the task involved.

5.5.1 Proper Design and Planning

It is possible to reduce many of the negative effects of lighting through proper design and planning. This can be achieved by using lighting only where and when necessary; using an appropriate strength of light; and by adjusting light fittings to direct the light to where it is required. Luminance should be

appropriate to the surroundings and character of the area as a whole. 'Over lighting' should be avoided and shields, reflectors and baffles used to help reduce light spill to a minimum. Use specifically designed equipment that once installed, minimises the spread of light above the horizontal should also be considered.

5.5.2 Direction of Light

Light should be directed downwards wherever possible to illuminate its target and not upwards. Many floodlit buildings are lit from the ground with the light beams pointing into the sky. This often leads to columns of stray light pointing up into the sky creating vast amounts of light pollution and wasting energy. Consideration should be given to providing lighting that does not glare on approach and which places light onto the ground and not into the sky where it is wasted. In other cases, simply lowering the angle of the beam will stop light from overshooting the building into the sky. To ensure glare is kept to a minimum, the main beam of all lights directed towards any potential observer should be kept below 70°. It should be noted that the higher the mounting height, for the light source the lower the main beam angle can be. In places with low ambient light, glare can be very obtrusive and extra care should be taken in positioning and aiming light sources. Wherever possible, floodlights with asymmetric beams that permit the front glazing should be kept at or near parallel to the surface being lit.

5.5.3 Amount of Light

Rural lighting should be kept to a minimum necessary for safety. Highway authorities should be encouraged to apply this principle when building new roads or bypasses in the open countryside or upgrading existing installations with the use of low energy, light efficient fittings. Consideration should be given to taken where and when lights are activated.

5.5.4 Sensor Switches

For domestic and small-scale security lighting there are two options: (1) The use of 'Passive Infra-Red Sensors' (PIR); (2) All-night lighting at a level of low brightness. If correctly aligned and installed, a PIR Sensor that switches on lighting when an intruder is detected, often acts as a greater deterrent than permanently floodlit areas, which allow the potential intruder to look for weaknesses in security (e.g. open windows).

5.5.5 Types of Lamps

Low pressure sodium (LPS) street lamps which scatter their orange light all around, including skywards, are a common sight along many streets and in residential areas. However an increasingly popular alternative is the full cut-off, high pressure sodium (HPS) lamp. Although these are more expensive to install, full cut-off lamps prevent any light from being emitted above the horizontal and they create a bright pinkish white light, which is carefully directed to avoid light trespass. In a recent survey, 85% of drivers stated that they prefer the light from HPS lamps and for the same reasons HPS lamps are the preference for lighting sports pitches.

5.5.6 Wasted Energy

It is recommended that lights are switched off when not required for safety or security. Large quantities of energy are consumed and vast amounts of greenhouse gases are produced due to the wastefulness of all night shop advertising and display lighting, building illumination, upward floodlighting and permanent domestic and industrial security lights.

5.6 Advisory Organisations

- The Institute of Lighting Professionals
- British Standards Institution
- Dept of Environment, Transport and Regions
- DoE & DoT Publication Sales Unit

- The Chartered Institute of Building Services Engineers (Lighting Division) CIBSE
- Council for the Protection of Rural England (CPRE)
- British Astronomical Association: Campaign for Dark Skies (CfDS)
- Lighting Industry Federation
- International Commission on Illumination (CIE)
- English Sports Council

5.7 References

1. *Institute of Lighting Professionals: Guidance Notes for the Reduction of Obtrusive Light,* GN01:2011 (2011)
2. *Brightness of Illuminated Advertisements* – Technical Report TR5, Institute of lighting Engineers (now Institute of Lighting Professionals) (1991)
3. *Sports Lighting,* CIBSE Lighting Guide LG4 (London: Chartered Institution of Building Services Engineers) (1990)

5.8 Glossary

Asymmetrical Beam - Floodlights giving a fan shaped lighting pattern – available in wide, medium and narrow beams.

Beam Angle - The angle formed by the centre of the beam of light from a lamp relative to the vertical. When light is emitted from a lamp it forms a cone from the light source. The shape of this cone will depend on the reflector design in the lamp.

Candela - The unit of luminous intensity of a light source in a given direction.

Front Glazing - The front face of the lighting unit through which the light passes.

Glare - The discomfort or impairment of vision, which is experienced when part of the visual field is excessively bright in relation to the general surroundings. Direct glare normally occurs when the viewer can see the light source. Glare can cause discomfort or disability to see detail.

Illumination - The process of lighting an object or surface.

Light Trespass - Any light which illuminates beyond that which needs to be lit, particularly into residential areas or properties, which is perceived to be a nuisance.

Lumen - The unit of luminous flux (light) emitted by a light source or falling on a surface.

Luminance - A term which expresses the intensity of the light emitted in a given direction by unit area of a luminous or reflecting surface. It is the physical equivalent of what is subjectively called brightness. The unit most commonly used is the candela per square metre.

Luminaire - Formerly known as a lighting fitting. The apparatus which controls the distribution of flux from a lamp or lamps, and which includes all the components necessary for fixing and protecting the lamps and for connecting them to the local supply circuit. Floodlights and some other luminaires retain their individual names.

Luminous Flux - The light emitted by a source or received by surface. The unit is the lumen (lm).

Luminous Intensity - The power of a source or illuminate surface to emit light in a given direction. The unit is the candela (cd)

Lux - A measurement of illumination. One lux equals one lumen per square metre.

Main Beam Angle/Horizontal Cut-Off - A term applied to a luminaire. The angle measured from the downward vertical upwards to the first line of sight at which the lamp(s) or surface of high brightness is no longer visible. This angle is usually measured from the downward vertical or, for a floodlight, from the beam axis. Horizontal cut-off refers to the limiting of light above an imaginary line at horizontals with the luminaire.

Mounting Height - The vertical distance between the luminaire and the ground or floor.

Obtrusive Light - Any light, which illuminates areas beyond that, which needs to be lit can be considered to be a form of light pollution. The extent to which it is perceived as being a nuisance will often depend on the background light from other sources and the intensity of the light.

Statutory Nuisance - An obtrusive light which is considered to have an adverse impact on surrounding land – as determined by the Council. The Council may serve an abatement notice requiring the nuisance to be stopped – which may result in the operator being unable to use any such light or restrict hours where it can be used.

Sky Glow - A phenomenon where light – usually from a major light source such as an urban area or industrial/recreational floodlight installation is seen, often from many miles distance, as a glow in the sky. Some of the light is reflected from the illuminated surfaces although most is emitted directly skyward

from poorly designed lighting systems. Sky glow resulting from poorly designed systems is particularly noticeable in dark landscapes where there are few other light sources. Most rural areas and in particular the Area of Best Landscape would fall into this category.

6 Noise

6.1 Introduction

Noise is defined as unwanted sound and is an unavoidable part of everyday life. It is often a source of stress and irritation for many individuals, but noise pollution may also have a significant impact on health and well-being.

6.1.1 What is Noise Pollution?

Noise pollution can occur as an intrusive or offensive sound. An intrusive sound may be noticeably louder than, or significantly different to, background noise and is considered likely to disturb or interfere with individuals who are able to hear it. An offensive sound can be dependent on the times of day or duration of the noise.

Typically any developments involving residential dwellings are the most noise-sensitive, whilst industrial developments such as general industry are one of the least noise-sensitive. However, industrial uses are amongst the most likely to cause a noise impact off-site. This is discussed in more detail in Section 6.2 of this document. Developments which are particularly noise-sensitive may require noise control or protection measures to mitigate against the effects of noise from outside sources, which include the effects of noise from road or rail, industry or entertainment premises.

6.2 Noise & Planning

Noise is a material planning consideration for the following developments:

- A new potentially noisy development on a proposal site, which may adversely impact upon existing land uses surrounding the site;
- A new noise sensitive development on a proposal site which, may be adversely affected by existing noise sources in the area of the proposal.

Noise pollution could arise as a result of the land use itself (e.g. a factory or leisure centre) or as a result of ancillary activities associated with that land use (e.g. transport movements, loading/unloading, etc.).

6.2.1 Planning Use Classes

The Town and Country Planning Order 1987 puts uses of land and buildings into various categories known as 'use classes'. Sufficient knowledge of where development proposals fit into the use class system may provide an indication of the key considerations with respect to noise.

It is important to note that noise impact from transport networks can only be dealt with at the planning stage, as current legislation prevents action being taken either to increase insulation at affected properties or to take action against road users for noise. As such, on a legislative basis, noise which is likely to affect development from traffic must be addressed at the planning stage if it is to be addressed at all.

Potentially noisy development may cover a large range of different activities and planning use classes. Typically the following use classes would be considered to have a greater impact on noise sensitive land uses at or around the proposal site:

- A3/A4/A5 Retail Food and Drink activities
- B2/B8 General Industry and Warehouse activities
- D1/D2 Non Residential Institutions and Assembly and Leisure activities

Sui Generis uses are inherently more varied therefore specific consideration of any proposal within this category is required to ensure that any noise impacts are minimised.

An individual noise impact review will be carried out by the Public Protection Service when determining an application to assess the suitability of a proposed development and end use. The applicant/developer may also carry out a similar review when preparing a development proposal to identify potential noise impacts and to ascertain whether any protection or mitigation measures are required to counteract the impacts of noise.

The determination of a noise review may be sufficient for the Public Protection Service to consider recommending refusal of a planning application, if the proposed works are deemed to be incompatible with existing uses. However, pre-application discussions and liaison with the LPA during the application process may help to identify suitable noise protection or mitigation measures, which may result in re-designs/revisions of development proposals rendering an application more suited to the proposal site.

Due to the complex nature of noise and noise control engineering, it may be necessary to engage an acoustic consultant to address the requirements of any noise conditions attached to the consent. The acoustic consultant may need to carry out noise surveys and recommend appropriate noise mitigation measures either in order to respond to pre-determination requests from the LPA or in support of applications to discharge conditions; noise conditions are discussed in more detail in Section 6.2.3.

It may be necessary for the Applicant/Developer to obtain the services of a suitably qualified acoustic engineer to assess the existing noise levels in the vicinity of the proposed development and to calculate/predict potential noise levels following the development, if planning permission was granted. Determining the difference between the calculated noise levels and the existing noise levels should inform the Applicant/Developer whether any acoustic mitigation measures or other controls are necessary to allow development to progress without undue impacts on amenity in the local environment/area.

6.2.2 Determining Planning Applications

Consideration of noise will depend upon the development proposal. If a particular development is for a noise-sensitive end use then consideration of the locality of the proposal is imperative. The LPA will assess/review the local transport networks as well as local businesses and commercial developments. The review will also consider the operational times of local businesses as well as any noise that they may emit. Transport noise sources may also affect recommendations made by the LPA, especially if the development proposal is near to a busy road or major railway line.

Noise conditions may include recommendations for upgraded glazing, which can be a vital means of protecting future occupiers from transport noise or industrial noise sources. However, upgraded glazing may only protect or mitigate against noise if windows are kept shut. As such, some developments may also need to provide acoustic trickle vents and/or acoustically-treated forced ventilation, to help reduce the need to open windows in the first place.

Consideration for new businesses will typically involve a review of the noise likely to be emitted from the business. This can include plant or equipment associated with that business and its operation, but may also consider transport noise from deliveries or dispatched merchandise as well as possible increased traffic flows from visitors or staff arriving or leaving the site. Certain types of business may also be expected to have similar patterns of operation; for example, public houses and hot food takeaways tend to concentrate on afternoon and evening trade, whereas warehousing is likely to include overnight operation.

All development proposals should consider the ambient noise levels already present in a given area. The LPA is unlikely to grant planning permission to a development that will massively increase existing noise levels in an area, as this may significantly change the character of the local environment. For developments that are likely to have a significant noise impact, then consideration of appropriate acoustic mitigation measures will be necessary to reduce the impact from the development site to an acceptable level.

The Public Protection Service may make recommendations for basic mitigation measures to be adopted on smaller scale developments, which will attain the correct acoustic standards within the development. These recommendations will be made in discussion with the Applicant/Developer where possible.

Noise emitted by new plant and equipment should not exceed the existing background noise level by more than -10dB(A). Once the background noise level has been established and specific plant or equipment selected, acoustic calculations can be made to determine whether the plant or equipment will meet requirements including the effect of separation distance (i.e. the further away from a noise source, the quieter the noise will become). Quieter equipment is also usually available, which may assist in achieving the required/desired noise levels.

In some circumstances, no matter what equipment is selected, it may not be feasible to achieve the desired acoustic levels, meaning additional acoustic shielding may be required or alternatively, the relocation of equipment or plant to achieve the required/desired levels.

In rural areas the background noise level may be significantly quieter than that found in urban/built-up areas. It can be technically much more difficult to achieve target noise levels in these areas. A flexible approach will be considered where it is clear that the Applicant/Developer has tried all reasonable methods to reduce noise to an acceptable level.

Specific problems may arise for residential developments near to town centre locations or entertainments premises. Additional acoustic requirements above and beyond the usual recommendations of BS8233 may be considered necessary for such locations. These noise sources can be particularly bass-heavy, meaning the resulting noise has the ability to bypass some of the normal acoustic mitigation measures. Up-rated acoustic mitigation measures can be recommended in these circumstances or alternatively, Noise Rating (NR) curves may be used to specify noise limits at specific locations or premises.

The recommended design criteria for these dwellings are as follows:

- Noise rating curve NR25 in bedrooms (11pm-7am)
- Noise rating curve NR35 in all habitable rooms (7am–11pm)
- (Noise rating curves should be measured as a 15 minute linear Leq at the octave band centre frequencies).

6.2.3 Planning Conditions

Noise conditions may require standard provisions such as specialist plant and equipment to achieve levels below the background noise level. Alternatively, noise conditions may require direct measures to be carried out, such as specialist glazing specifications or acoustic ventilation systems. Noise conditions may also relate to operating hours, opening hours or delivery hours where these are considered to be a key element for controlling noise levels.

Noise conditions may require an assessment of noise and the submission of a scheme of works to achieve target or previously agreed noise levels.

Where complex or a combination of issues is likely within a development proposal, it is possible that the LPA may require a 'Noise Management Scheme' to be submitted. This would require the Applicant/Developer to consider the range of issues presented by the development and identify suitable and appropriate noise mitigation measures to be implemented. These schemes generally require proactive re-assessment on a regular basis or when complaints arise.

Any application for the discharge of a condition must be supported by all information requested in the condition. If any element of the condition has not been addressed either in part or fully, then it is likely that the condition discharge application will be recommended for refusal.

6.2.4 Noise During Construction/Demolition Works

Noise from construction or demolition works can be intrusive or disruptive to local businesses and/or noise sensitive land uses. For this reason construction or demolition activities should be restricted to daytime periods and have finite start and finish times. It is usually recommended that all noisy works (i.e. those that are audible beyond the site boundary), are restricted before 08:00 hrs and no later than

18:00 hrs on Monday to Friday to minimise disruption. Noisy activities occurring on Saturday should be restricted to 08:30 hrs to 13:30 hrs and no noisy works should take place on Sundays or Public or Bank Holidays. These restrictions apply to anyone working on site or deliveries to the site.

By utilising set working hours for activities on site as well as deliveries to the site, respite is provided for local residents and businesses/workers near to the development. Noise and disruption to local residents will occur during development works, so it is important to remember that local residents may not necessarily be in favour of the development or all aspects of it. By keeping an open dialogue and attempting to placate any complaints or grievances, the development may be allowed to progress more smoothly.

For larger developments or developments that are likely to progress over a long period of time, it may be worth considering a 'Considerate Contractors Scheme'. These schemes suggest guidelines to minimise disruption to local residents and businesses and provide a code of conduct for employees on site so that their work does not unduly upset local residents and/or businesses/workers. These schemes include noise as well as many other elements such as dust suppression, deliveries, working hours, behaviour on site, approved delivery routes, etc.

6.2.5 Vibration

Significant vibration within the Borough, with the exception of temporary construction works, is only likely to be generated by passenger or freight trains travelling along railway lines. Ideally, track form and wheel/rail interface would be in the optimum condition to minimise vibration generation. However, wear and tear will over time change the condition of the track surfaces. Road traffic is unlikely to generate any significant vibration, providing the road wearing surface is in reasonable repair. The exception to this is where there is a significant proportion of Heavy Goods Vehicle traffic present, as this can create vibration issues regardless of road surface condition.

A vibration assessment may be required where railway lines are within 75m of a proposed development site. Building services, plant and equipment, including air conditioning and air handling plant, may generate vibration and in turn, re-radiate noise within buildings. All building services plant and equipment should be supported on proprietary anti-vibration mounts. As such, planning permission granted for the installation of services, plant and equipment may include a condition to assess or control plant vibration.

6.3 Technical Guidance for Consultants/Specialists

The following reference documents and guidance constitute some of the more important and relevant legislation and standards relating to noise and the planning process.

6.3.1 BS8233:1999 Sound Insulation And Noise Reduction For Buildings

BS8233 provides a range of factors to be considered through the planning process. It identifies key stages in the design and development of a proposal and considers different types of activities and uses, providing advice and guidance on how to achieve ambient noise levels. This standard suggests design criteria for noise to achieve within a range of differing activities including the work environment, leisure environment and the home environment. It identifies 'Good' and 'Reasonable' noise levels to achieve for the specific proposals/situations. Wherever possible it is expected that the 'Good' level should be aimed for in any new design.

Criterion	Typical Situations	Design Range L_{Aeq},T dB	
		Good	Reasonable
Reasonable industrial working conditions	Heavy Engineering	70	80
	Light Engineering	65	75
	Garages, Warehouses	65	75
Reasonable speech or telephone communications	Department Store	50	55
	Cafeteria, Canteen, Kitchen	50	55
	Wash-room, Toilet	45	55
	Corridor	45	55
Reasonable conditions for study and work requiring concentration	Library, Cellular Office, Museum,	40	50
	Staff Room	35	45
	Meeting Room, Executive Office	35	40
Reasonable listening conditions	Classroom	35	40
	Church, Lecture Theatre, Cinema	30	35
	Concert Hall, Theatre	25	30
	Recording Studio	20	25
Reasonable resting / sleeping conditions	Living Rooms	30	40
	Bedrooms*	30	35
Note - For a reasonable standard in bedrooms at night, individual noise events (measured with F time-weighting) should not normally exceed 45 dB LAmax.			

Table 6.1 Indoor ambient noise levels in spaces when they are unoccupied.

For residential buildings/dwellings, the main criteria are reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms. Occupants will usually tolerate higher levels of anonymous noise, such as that from road traffic. More obvious sources, such as that noise from neighbours may trigger complex emotional reactions that are ultimately disproportionate to the noise level. As well as noise protection for the residential buildings, barriers or bunds should be considered to protect the gardens or outdoor areas. For gardens and balconies it is desirable that the steady noise level does not exceed 50 LAeq,T dB and 55 LAeq,T dB should be regarded as the upper limit.

6.3.2 BS4142:1997 Method For Rating Industrial Noise Affecting Mixed Residential And Industrial Areas

BS4142 considers industrial or commercial development proposals; it assesses noise in a local area and compares noise from a particular activity or from equipment against the ambient background noise level. Different noises may attract a rating, which is applied where a noise is distinct, tonal or intermittent. The rated noise level is then compared to the background noise level and the difference between the two levels is used to assess the likelihood of complaints.

This standard also introduces the concept of 'Statutory Nuisance'. If a Statutory Nuisance is proven, then the Council has no option but to take appropriate actions to abate the Nuisance. There are arguments both for and against the use of this standard in the planning process, but what must not be forgotten, is that should planning permission be granted for a development which subsequently receives complaints about noise, then it is quite possible that this standard will be used to assess the noise and determine whether or not the noise constitutes a Statutory Nuisance. As such, it is recommended that this guidance is given due consideration through the planning process and that noise from plant, equipment or activities is assessed and considered under this standard as part of the planning consultation.

6.3.3 Approved Document E – Building Regulations

Building Regulations Approved Document E is the main reference document which relates to the insulation of buildings against airborne and structure borne noise. These regulations do not cover environmental noise, meaning that reference to other technical documents is required if environmental noise is a significant consideration.

Approved Document E covers general building situations and common issues, which could arise if appropriate attention is not paid to the construction elements of a building. It identifies minimum standards for airborne and impact noise within a building. It reviews both new build and conversion of existing buildings (i.e. a change of use). It identifies common structural designs and comments upon the level of acoustic protection that these may offer, allowing review of these factors against guideline values, which should generally protect residential amenity. The document also covers impact noise arising from 'foot fall' on floors and details construction techniques designed to mitigate against such noise. The document either requires testing to be carried out to demonstrate compliance with the required standards or alternatively, construction to a 'robust detail' standard.

6.4 Measures to Deal With Noise Reduction

The prevention of noise pollution is key to ensuring future noise problems are unlikely to be experienced by local residents and businesses/workers and to ensure that any additional noise has a limited effect on the health and well-being of individuals. Therefore, when preparing a development proposal the following matters must be considered:

6.4.1 Building Orientation

A building should be orientated in such a way as to minimise noise exposure. For example, buildings can be arranged so that they form a natural acoustic barrier against any noise sources. This is particularly effective where one side of the development has a dominant noise source, such as a busy road/factory. The façade facing a noise source should be constructed with high performance acoustic mitigation measures built in with all windows and doors having high performance acoustic glazing. Windows should also have proper acoustic edge seals, acoustic trickle vents and the provision of fixed windows should also be considered. Acoustically-treated forced ventilation may also be necessary to minimise the need to open windows. These techniques can be used to great advantage, particularly if designed in conjunction with the layout of the rooms, allowing bedrooms or living rooms to face away from a noise source(s).

6.4.2 Screening of the Site

Barriers or acoustic screens can be used to reduce noise levels. Whether they are an existing feature, such as a railway cutting or embankment; a purpose-designed acoustic barrier, such as a solid boundary fence or earth mound; a purpose-designed feature of the building, such as a courtyard; or the building itself, which attempts to arrange sensitive internal spaces away from any noise source, barriers can prove extremely effective in mitigating or attenuating noise. The main points to consider when designing barriers are:

- They are most effective when located close to either the source of noise or the receiver;
- They protect low-rise buildings better than high rise buildings;

- Generally the taller the barrier the better, but there are physical limits above which the barrier will not realistically offer any additional protection;
- They should usually extend well beyond the site boundary to ensure adequate protection is offered.

Acoustic barriers are usually constructed from timber, although any solid material with a sizeable mass per unit area will provide acoustic shielding. Barriers can even be made from transparent/opaque materials such as plastic, for areas where visual amenity may be of importance. It is vital that an acoustic barrier does not have any gaps within it, as even a small gap or hole in the barrier at ground level is sufficient to render it ineffective.

6.4.3 Building Layout / Design

When considering the layout of a proposed building, it may be better to locate non-habitable rooms, such as kitchens, bathrooms and stairwells on the noisier aspects of the building. This allows these non-sensitive rooms to act as an acoustic barrier to the more sensitive, habitable rooms, which are located at the quieter side of the building.

For semi-detached/terraced houses and flats/apartments, the positioning of rooms relative to those in the adjacent residences is important to ensure that noisier areas such as kitchens, living rooms and bathrooms do not share party walls, ceilings or floors with bedrooms residing in separate occupancy. Such incompatible adjacent room types are highly likely to give rise to noise complaints in the future. If the layout of a building is such that these incompatible room types are adjacent to each other, either vertically or horizontally, then it is likely that uprated acoustic measures will be required in the walls and/or floors to mitigate against noise transfer.

Building Regulations Approved Document E considers impact noise through floors and provides appropriate mitigation measures to counter the effects of footfalls, but it does not consider impact noise through walls that would be commonplace in kitchen areas through the closing/slamming of kitchen doors and drawers. This can be a significant source of noise if a kitchen in one property is adjacent to a bedroom in an adjoining property.

6.4.4 Windows and Doors

The windows and external doors of a building should be to a specification that ensures they provide sufficient insulation against external noise. To achieve a good standard of insulation external doors should be close-sealed with no gaps in or around them, and have sufficient mass to resist external noise.

Where necessary, higher standards may be achieved by providing entrance porches with double doors. Providing they are properly fitted, standard thermal double glazed window units will generally reduce external noise levels by approximately 30 decibels. The amount of noise that is reduced by a feature such as a window is known as the Sound Reduction Index (Rw).

Traffic noise can often result in reverberant noise being passed through glass into a building. This is usually due to the glazing panels being constructed of the same thickness of glass meaning that when the outer pane vibrates, it causes the inner pane to vibrate as well. Acoustic glazing often has different thicknesses of glass incorporated into the glazing unit, meaning each pane has a different reverberant frequency and therefore noise is not transmitted through it as easily. Increasing the thickness of the panes of glass (for example from 4mm to 6mm) provides an improvement in noise attenuation, as does increasing the air gap between the panes. For example panes of 10mm and 6mm with a 12mm gap between them will reduce noise levels by about 34 decibels.

Where external noise levels are very high, thermal double-glazing may fail to provide sufficient acoustic attenuation. If this is the case, then higher performance acoustic glazing, which utilises secondary glazing can be considered. This is usually characterised by an air gap between the panes of at least 100mm and can be constructed with secondary sashes. Again, it is advisable for the two panes to be of different thickness and performance can be further improved if the sides of the air space between

panes are lined with sound absorbent material. Under some circumstances, triple glazing will be sought by the LPA as a means of noise attenuation, but these measures are only usually required in proximity to sites exhibiting a significant noise impact.

Acoustic glazing is only of benefit when the windows are kept closed; this is obviously not always practical. Partially opening the window will typically reduce the acoustic performance by between 10-15dB. This is of great concern where the uprated acoustic performance is to protect occupiers of a bedroom, where opening the window to increase ventilation and comfort will instead introduce unacceptable levels of noise which may make sleep difficult. Windows may also be fitted with acoustic trickle vents, but these are primarily for background ventilation as opposed to rapid ventilation or summer cooling. It may therefore be necessary to introduce alternative acoustically-treated mechanical ventilation to bedrooms and some lounge areas, the aim being to increase ventilation rates in a room without physically opening the window.

6.4.5 Acoustic Ventilation

Where ambient noise levels are high and opening of windows is not desirable, acoustic ventilation may be considered. Whilst it does not usually replace opening windows, it aims to minimise the need to use opening windows, providing a more comfortable internal noise level. The use of acoustic trickle vents can be used to permit adequate background ventilation as required by the Building Regulations. These acoustic trickle vents usually have an acoustic performance in excess of that of uprated glazing, whilst still allowing background ventilation to occur.

Where noise is more extreme and the opening of windows is likely to be required to increase ventilation rates, then it may be necessary to consider forced acoustically-treated mechanical ventilation. This utilises acoustically-treated fans (quiet running) to provide additional fresh ‘make up’ air into a room. If combined with a boost facility, then this may reduce the need to open windows for summer cooling or rapid ventilation purposes. Mechanical systems may include fans within individual rooms or may be incorporated as part of a larger scheme, which provides ‘whole house’ ventilation. This may operate in conjunction with kitchen and bathroom extraction systems to provide both input and output air to the building, sometimes with heat recovery to pre-heat the incoming air with during colder periods. These systems usually filter and acoustically shield the incoming air to prevent external noise entering a building and are usually mounted inside the roof space. Sometimes 'make up' air is brought in from the quieter side of the building to utilise the natural acoustic shielding that the building itself provides.

Mechanical ventilation is often utilised in Air Quality Management Areas where there is the need to shield both transportation noise and polluted air from the occupiers of the buildings. Proofing against noise will usually satisfy many air quality issues; reconfiguration of the system to provide make up air from the furthest point away from a transport source or emission will typically satisfy many air quality issues.

6.4.6 Plant and Equipment

Noise from plant and equipment is an area commonly assessed by the LPA when determining planning applications. It is becoming more frequent in developments of all types. Typical equipment in both commercial and residential developments includes items such as air conditioning plant, retail refrigeration plant or lift motors. Industrial developments are much more varied with the types of plant and equipment being entirely related to the industry in question.

Regardless of the type of equipment the Applicant/Developer should ensure that any noise from external plant or equipment does not exceed the existing ambient background noise level by more than -10dB(A) at the boundary or façade of the closest noise sensitive land use. This should ensure that any noise from plant or equipment does not dominate the noise level in the area; it may be audible at a noise sensitive land use but will be a faint noise when compared to the background noise levels.

Consideration should be given to selecting quieter models of plant and equipment. If this is not feasible, then it may be advisable to consider relocating noisy plant and equipment to a less noise sensitive area of the site. It may also be possible to erect acoustic shielding around any necessary plant and

equipment to contain noise and prevent it causing problems off-site. Some equipment may require additional acoustic mitigation measures to control the impacts from tonal noise or intermittent operation. The use of any plant and equipment overnight usually causes an increase in noise sensitivity, so it may be advisable to limit use during night time periods if possible. Consideration of the above measures at an early stage of the planning process is likely to progress an application more smoothly.

6.4.7 Quick Reference Guide to Residential Development

If a residential development is proposed near to or alongside road or rail networks, the following table and subsequent descriptions may provide an indication as to whether acoustic protection may be necessary to protect residential amenity according to a noise level:

Category	Times (hrs)	LAeq,T (dB) Road	LAeq,T (dB) Rail	Advice
A	07:00 – 23:00 23:00 – 07:00	< 55 < 45	< 55 < 45	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
B	07:00 – 23:00 23:00 – 07:00	55 – 63 45 – 57	55 – 66 45 – 59	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise to meet the Council's recommended outdoor and indoor noise levels.
C	07:00 – 23:00 23:00 – 07:00	63 – 72 57 – 66	66 – 74 59 – 66	Planning permission should not normally be granted. Where it is considered that permission should be given, conditions should be imposed to ensure a commensurate level of protection against noise to meet the Council's recommended outdoor and indoor noise levels.
D	07:00 – 23:00 23:00 – 07:00	> 72 > 66	> 74 > 66	Planning permission should normally be refused on the basis of elevated noise levels.

Category A will utilise standard glazing and standard trickle vents; no special acoustic mitigation measures will usually be required.

Category B would benefit from the use of acoustic trickle vents and slightly uprated acoustic glazing. If it is feasible changes to the layout of the property to put bedrooms away from the road or rail noise source would assist to achieve a quieter internal noise level.

Category C will require passive type wall mounted vents and/or acoustic trickle vents. Consideration of acoustically treated mechanical ventilation should be considered for all habitable rooms facing the noise source. Glazing will need to be uprated, use of different thickness glass on inner and outer panes will be necessary. A high level of acoustic protection will be necessary along the facades facing the

noise source. Building orientation should be considered to minimise bedrooms facing the road or rail noise source, any bedrooms which have to face the road or railway will need acoustically treated mechanical ventilation to be installed.

Category D will not normally be granted planning permission. If residential development is inevitable on a site, then extremely high specification glazing and ventilation will be necessary. Glazing will need to be significantly up-rated, use of different thickness glass on inner and outer panes will be necessary as may secondary glazing with a larger air gap. Ventilation must be forced acoustically treated mechanical ventilation as the opening of windows is not practical at many times. It may be recommended that certain windows are non-openable due to the external noise levels. Particular consideration of room orientation within the building will be necessary with non-habitable rooms to the facades facing the road or rail noise source.

6.5 Applications with Potential Noise Implications

The following development proposals may require some element of acoustic review when included within any planning application:

6.5.1 Renewable Energy – Wind Turbines & Heat Pumps

Applications involving renewable energy are becoming more popular as energy costs increase. Some technologies are silent, while others have a potential to create noise during their operation. The main technologies include: 'Solar Panel Arrays', which involves producing electricity from light or hot water from the sun; 'Ground Source Heat Pumps' or 'Air Source Heat Pumps', which produce heat from the ground or air; and Wind Turbines, which convert electricity from wind power.

Wind turbines and the ground or air source heat pumps are of particular relevance to noise. Wind turbines can emit noise as the turbine blades slice through the air. Depending on the location of the turbine and its design, an unacceptable impact may occur on nearby noise sensitive land uses or properties. Most current designs are not really suited for use in dense urban areas due to potential noise problems and the lack of undisturbed wind to power them. Any application for a wind turbine is likely to require a full noise assessment to be submitted with the application to enable the LPA to determine whether it will be suitable for its proposed location.

Ground and Air Source Heat Pump equipment may utilise pumps to assist in the transfer of heat. Obviously equipment utilising pumps and other motorised equipment has the potential to emit noise. As such, some assessment may be necessary to determine whether the heat pumps will have any adverse impacts on amenity beyond the site boundary and if mitigation measures may be required.

6.5.2 Other Potentially Noisy Activities

The following types of development proposals or applications may have additional specific guidance published to review noise impacts or may otherwise be a potential source of noise. It is recommended that pre-application discussions are held with LPA if any of the following application types are to be submitted:

- Clay Pigeon Shooting / Gun Clubs / Rifle Ranges
- Flying of Model Aircraft
- Airstrip
- Motor Vehicle Testing / Proving Grounds
- Off Road Motorbike Tracks
- BMX or Skateboard Ramps
- Electricity Substations/Transformers/Switchgear
- Sports Stadia
- B2 Use Class developments
- Waste Handling Facilities
- Wind Turbines / Wind Farms

The above list is far from exhaustive however it highlights some of the applications that have been considered with particular attention to noise in the past. If there is any doubt over whether noise issues may need to be addressed prior to submitting a planning application, please contact the Public Protection Service for further advice.

6.6 References

1. British Standards [online] Available at: www.standardsuk.com/
2. BS 4142: (1997) Method for rating industrial noise affecting mixed residential and industrial areas.
3. Noise: Environmental: World Health Organisation [online]
4. BS8233 (1999) Sound Insulation and Noise Reduction for Buildings. Noise: Environmental: World Health Organisation [online]
5. Noise Act 1996 [online] Available at: www.legislation.gov.uk/
6. Institute of Acoustics – Good Practice Guide on the control of noise from Pubs and Clubs – Draft Annex 2 (Institute of Acoustics, 2002). [online] Available at: www.cieh.org
7. The Building Regulations (2010) Resistance to the passage of sound, approved E document [online] Available at: www.planningportal.gov.uk/
8. World Health Organisation. (2012) Noise (European Region) [online] Available at: www.who.int/topic/noise
9. Institute of Acoustics: www.ioa.org.uk
10. Association of Noise Consultants: www.association-of-noise-consultants.co.uk

6.7 Glossary

Aerodrome: Any area of land, water, or space on the roof of a building, which is commonly used to provide facilities for the landing and departure of aircraft - including types capable of descending or climbing vertically. The term is generic and embraces other terms such as airport, airfield and heliport. For a formal definition see the Civil Aviation Act 1982.

Background Noise: LA90,T the A weighted noise level exceeded for 90% of the specified measurement period (T). In BS4142:1990 it is used to define the background noise level.

Decibel (dB): A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 Pa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.

dB(A): Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).

Hertz (Hz): Unit of frequency, equal to one cycle per second. Frequency is related to the pitch of a sound.

LA10,T: The A weighted level of noise exceeded for 10% of the specified measurement period (T). It gives an indication of the upper limit of fluctuating noise such as that from road traffic. LA10,18h is the arithmetic average of the 18 hourly LA10,1h values from 06.00 to 24.00.

LA90,T: The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 1990 it is used to define background noise level.

LAeq,T: The equivalent continuous sound level -the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). LAeq,T is used to describe many types of noise and can be measured directly with an integrating sound level meter. It is written as Leq in connection with aircraft noise.

LAmax: The highest A-weighted noise level recorded during a noise event. The time weighting used (F or S) should be stated.

Make Up Air: Air brought in by often mechanical means to provide fresh air into a room or building. This air is to compensate for circumstances where it is either not possible or not desirable to open windows (e.g. along busy highways where opening windows would introduce unacceptable levels of noise).

Noise Creep: Noise creep occurs over a period of time where several noise sources are introduced gradually - each one causing an insignificant increase in noise. The cumulative effect of these noise sources can be significant. This effect is called 'Noise Creep'. To avoid or minimise this, noise sources should be less than 10dB below the existing ambient background noise level (La90,t) where logarithmic addition of sources will not exceed the existing background level.

Noise and Number Index (NNI): A composite measure of exposure to aircraft noise that takes into account the average peak noise level and the number of aircraft in a specific period. Now generally superseded by Leq.

Noise index: A measure of noise over a period of time which correlates well with average subjective response.

6 Noise

Noise Management Scheme: A comprehensive assessment of the noise impacts from a proposal or development which can include operational noise as well as construction noise during the development. Schemes may have an ongoing monitoring element to ensure that regular review and adjustments occur as the development progresses and evolves over time.

Rating level: The noise level of an industrial noise source which includes an adjustment for the character of the noise. Used in BS4142:1990.

Rw: Single number rating used to describe the sound insulation of building elements (sound reduction index). It is defined in BS5821:1984.

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