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APPROVED DOCUMENT C C1 -SITE PREPARATION / RESISTANCE TO CONTAMINANTS AND C2 - RESISTANCE TO MOISTURE.

C1 - Site Preparation and Resistance to Contaminants.

Site Preparation.

- **Site investigations are now required** as the method for determining how much material should be removed to prepare a site as well as determining the nature and extent of any contamination.
- You must ensure that any ground covered by the building is reasonably free from any material that might damage the building or affect its stability, including vegetable matter, topsoil and pre-existing foundations.
- Reasonable precautions must also be taken to avoid danger to health and safety caused by contaminants on or in the ground covered, or to be covered **by the building and ANY LAND ASSOCIATED WITH THE BUILDING**. (A major change to the regulations, which previously only applied to the ground covered by the building).
- Precautions must be taken against ground gases e.g. landfill gases, radon, vapours etc
- Remedial measures for dealing with land affected by contaminants have been expanded to include biological, chemical and physical treatment processes.
- Guidance on protection from radon is expanded to include **buildings other than dwellings**.
- Requirements to protect persons occupying premises from contaminants, are now included to **'Material Changes of Use'**, and apply to residential use or sleeping accommodation e.g. dwellings/ flats / hotels /institutions and changes of use of previous exempt structures.

Clearance or Treatment of Unsuitable Materials.

Without a proper site investigation, it is not possible to adequately assess ground conditions and therefore, full assurance cannot be obtained that all unsuitable materials under the building or under the land the building stands in, have been treated adequately.

In order to ensure compliance with the new regulations (and planning conditions - which are often placed on consents by our pollution control section), ***we will be requiring suitable ground investigation reports and where appropriate gas monitoring on all new build (commercial and domestic) / large commercial extensions and where ground conditions are suspect.***

This investigation is not to be limited to structural matters and must assess contamination including adjacent sites that could lead to contamination through migration, i.e. landfill gas, Geotechnical / ground water levels and flow, underlying geology and ground and hydro-geological properties all need to be considered.

The extent and level of investigation is to be tailored to the type of development and further guidance on undertaking site investigations is given in BS5930: 1999 and BS8103-1: 1995.

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Resistance to Contaminants.

Definition of contaminant - any substance that is or may become harmful to persons or building, including substances that are corrosive, explosive, flammable, radioactive or toxic.

Sites could potentially contain wide range of solid, liquid and gaseous contaminants. These can be natural i.e. radon / methane, or manmade due to previous use. This may not necessarily be on the site, but could migrate via water flows, landfill gas flow into the site being built upon.

Site investigations must clearly establish what is on the site or can affect the site and identify the potential for naturally derived contamination to cause an issue on the site. Where the site is potentially affected by contaminants, a combined geotechnical and geo-environmental investigation should also be considered.

Guidance on assessing and remediating sites affected by contaminants is given in the Approved Document Advice is given risk assessments and actions to remove risk to building occupants and land on which the building stands. These risk assessments must be carried out by suitably qualified persons and to an approved model and will then trigger various types of actions to remedy.

Contaminants, once nature/extent are determined, you can then either:

- a) treat the contaminants to eliminate or reduce the toxicity or harmful properties.
- b) block or have the pathways to humans removed by isolating the contaminant beneath protective layers or installing barriers to prevent migration.
- c) have the contamination removed and replaced with inert materials.
- d) or re-design the scheme to avoid the contamination.

Methane and Other Gases from the Ground.

Any sites within 250m of the boundary of a landfill site must have an appropriate risk assessment and investigations carried out, which will then allow suitable remedial measures to be designed in the proposals, i.e., installation of gas barriers and venting, etc. However depending on site conditions gas migration may range between 0-3+km.

Approved Document provides information on technical documents that provide technical guidance to prevent problems from landfill gases occurring.

Clearance or Treatment of Unsuitable Material.

- a) Vegetable matter e.g. turf, roots etc., must be removed to a depth to prevent re-growth.
- b) Where mature trees are present, heave and shrinkage precautions have to be taken to protect the building/services. New maps are provided showing shrinkable clays and volume change potential of the clays.
- c) Previously used sites - consider removal of existing foundations, services, tanks and other infrastructure that could endanger persons.
- d) Sites containing fill or made ground - full investigation required into its compressibility / potential for collapse on wetting and to the appropriate remedial measures to prevent differential settlement.

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IMPORTANT NOTES:

Failure to tackle landfill or contaminated land issues will result in problems occurring upon property sales - it is now common place for questions to be asked by purchasers' representatives regarding the adequacy of any land remediation and precautions taken against contamination.

You are advised to carefully check you planning conditions, as they may contain contaminated land conditions that you must comply with before development commences.

We work closely with our Environmental Health section, who are responsible for setting planning contaminated land conditions and assist Building Control in determining whether or not your proposal comply with Part C.

In order to ensure compliance with the new regulations and planning conditions, we will be requiring suitable ground investigation reports and where appropriate gas monitoring on all new build (commercial and domestic) / large commercial extensions and where ground conditions are suspect.

Sub-Soil Drainage.

Adequate sub-soil drainage shall be provided to avoid:

- a) passage of ground water to the building interior; and
- b) building damage, including damage through the transport of waterborne contaminants to the building foundations or into the building or its services.

C2 - Resistance to Moisture.

Floors, walls and roofs of a building should be designed to protect people using the building from harmful effects caused by ground moisture /rain and wind-driven spray /interstitial and surface condensation and spillage of water from or associated with sanitary fittings or fixed appliances.

Floors.

- a) All floors should not promote surface condensation or mould growth.
- b) Slabs with more than 600mm of fill under, **must be suspended or suspended reinforced**
- c) Insulation must resist any attack from aggressive soil or ground water conditions.

Note: Some insulation materials used under slabs require d.p.m protection under the board insulation **AND** over the top as well. **(CHECK MANUFACTURERS RECOMMENDATIONS!).**

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Timber Floors.

- a) In areas such as kitchens, utility rooms and bathrooms, where water may be spilled, any flooring board **MUST BE MOISTURE RESISTANT!** Particularly important for chipboard floors (must be moisture resistant grade in accordance with BS7331:1990). Identification marking must be laid upper most to allow easy identification.
- b) In areas such as kitchens, utility rooms and bathrooms, where water may be spilled, softwood boarding must be min. 20mm thick and of a durable species – alternatively all boards must be preservative treated.

Suspended Concrete Floors.

- a) Ventilation is required to sub floors on two opposing walls (1500mm²/m run or 500mm²/m² of floor area, whichever is the greater) and all vent pipes to be min 100mm diameter.
- b) In locations where flooding is likely, you must provide means of inspecting and clearing out the sub-floor voids beneath

WALLS.

Cavity Insulation.

- a) Reference is now made to BS8280 for assessing the suitability of cavity walls for filling. New diagram / tables are provided – '**UK zones for exposure to driving rain**' and '**Maximum recommended exposure zones for insulated masonry walls**'. Various forms of cavity insulation are indicated, together with different cavity widths and wall finishes/pointing are recommended, so that the wall construction does not allow water to penetrate.

Make sure you check exposure zone/conditions and ensure you design your external walls accordingly to suit the exposure to prevent any rain penetration through the construction.

You may find, as a result, full fill cavity insulation systems, particularly injection systems are restricted, as well as recessed mortar joints, also all cills and copings are required to have appropriate drip overhangs.

Obviously, the higher and more exposed the building the greater the risk. More accurate exposure zones maps are given in BS8104:1992.

- b) **225mm deep clear** wall cavity required below lowest horizontal dpc in walls. Alternatively, a proper cavity tray to protect the inner skin.
- c) **All cavity trays must have 150mm upstands** and suitable cavity weep holes provided (max. 900mm c/s). To openings, a minimum of 2 weepholes must be provided (subject to max. 900mm c/s).
- d) Residual wall cavities in all situations must **be not less than 50mm.**

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Joint Between Doors and Windows.

- a) Important detailing to prevent rain/water penetrating openings.
- b) Additional requirement in areas of the country in driving rain exposure, Zone 4 **MUST HAVE CHECKED REBATES**, i.e., the frame is set back behind the outer masonry leaf, with the leaf overlapping frames by a minimum 25mm or you must use insulated finned cavity closures.

Door Thresholds.

New Guidance is provided about ensuring proper detailing to the base of walls where level access or ramps are provided, to stop moisture entering into the building. Drained thresholds are required

Condensation/Mould Growth.

- a) External walls – must be resistant to damage from interstitial condensation and be resistant to surface condensation and mould growth.
- b) For uses of high internal temperatures and humidity's e.g. swimming pools / saunas where there is a higher risk of interstitial condensation, you are now required to seek specialist design advice on wall construction.
- c) Walls must be designed and constructed in accordance with Clause 3.3 of BS5250: 2002,
- d) Walls are not to have any cold bridges to wall areas / openings – max. 0.7 w/m²k 'u' value at any point. (Refer to ADL guide notes).

Roofs.

- a) Much of the rain penetration requirements for roofs stay the same i.e. they should resist rain penetration; not be damaged by rain, nor let water be carried to parts of the building that would be damaged by it.
- b) Ventilation guidance diagrams and details are dropped from F2 and roofs must be designed in accordance with Clause 8.4 BS5250: 2002 and B.R.E. Report 262.
- c) Cold roofs must be ventilated, all roof void gaps must be sealed, all pipe/cable penetrations must be sealed where entering roof voids, particularly in high humidity areas e.g. bathrooms / kitchens and all loft hatches must be draught sealed.
- d) For uses of high internal temperatures and humidity's e.g. swimming pools / saunas where there is a higher risk of interstitial condensation, you are now required to seek specialist design advice for roof construction and venting.