

Environmental geochemistry: an aid to the development and regeneration of the urban environment

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Within the UK 90% of the population are based in urban areas. Over the next 25 years the Government has estimated there will be a need for a further 4 million homes. The pressure on greenbelt has seen Government set a target of 60% for new homes to be built on recycled land. Many urban areas within the UK are run-down and suffer from poor design, traffic and industrial pollution. The Government has commissioned an Urban Task Force to address the sustainability and regeneration issues within the built environment and a final report from the Group, with recommendations, was published in June 1999.

The regeneration of urban areas, particularly those with a legacy of heavy industry, will require extensive work related to the identification, assessment and remediation of contaminated sites. Impending legislation in the UK will require local authorities to take responsibility for the assessment, management and the remediation of contaminated land. The pollutant linkage concept of source-pathway-target is being used to categorise land as being contaminated.

Geoscientists are able to make a major contribution to this multi-disciplinary task interpreting potential physical and chemical problems associated with contaminated sites and, with the aid of GIS, establish both data management and decision support systems. This includes the collection of data to determine the potential health effects on residents or workers or the potential for contamination of surface and groundwater.

Within the built environment systematic sampling of soils has been undertaken to establish an 'urban baseline' (i.e. the concentration of lead in topsoils). Preliminary studies have been undertaken to map and associate the presence of hazards with factors controlling the mobility of pollutants that constitute a hazard (e.g. soil acidity, soil organic carbon content). Potential pathways, by which pollutants may travel, or by which exposure may occur and potential receptors, which pollutants may affect (i.e. ground water, surface water, human beings, buildings and ecosystems), have also been examined. Geochemical data can be interrogated within a GIS environment with other relevant datasets, including former land-use, geological and hydrogeological information, to assess potential pathways.

This approach allows a better understanding of how geochemical variability within an urban environment effects risk assessment for a variety of given receptors, and provides valuable baseline data for site specific risk assessment and management.

Examples of systematic geochemical mapping within urban areas and the application of GIS to aid the interpretation of a variety of related datasets will be demonstrated for specific areas within the UK.