A46 Coventry Junctions (Walsgrave) Scheme number: TR010066

6.3 Environmental Statement Appendices

Appendix 9.1 Hierarchy of Screening Criteria for Generic Quantitative Risk Assessment

APFP Regulations 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Volume 6

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Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

A46 Coventry Junctions (Walsgrave)
Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT APPENDICES
Appendix 9.1 Hierarchy of Screening Criteria or Generic Quantitative Risk Assessment

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Regulation Number	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010066
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1. Overview of generic soil screening guideline values

1.1. Introduction

1.1.1. In order to put the chemical analysis results for the site into context, the data has initially been assessed in relation to several sets of legislative guidelines and other criteria, commonly used for the assessment of land contamination. This is undertaken in consideration of the conceptual model for the site which establishes the pathways and receptors which are applicable.

1.1.2. This approach constitutes a Generic Quantitative Risk Assessment (GQRA). A GQRA may typically involve a site investigation to gather information on the type, levels and extent of contamination present, with comparison against generic assessment criteria (GAC) for various site use scenarios and environmental receptors. Assessment criteria may also take account of specific exposure pathways.

1.1.3. The background and hierarchy to the assessment criteria which have been used to undertake a GQRA in this report are described below. Assessment criteria are now available covering different levels of risk for both planning and Part 2A assessments.

1.1.4. In order to reflect the current site use, all available soil analysis results have been compared with GAC protective of a commercial/industrial end use and a Public Open Space (park) use. These are considered the most appropriate assessment criteria to assess risks to future workers and site occupiers during the construction phase and subsequent future land use.

1.2. Land Quality Management GAC 2009

1.2.1. In July 2009 Land Quality Management (LQM) published GAC for approximately 80 chemicals or groups of chemicals. These were generated using the updated CLEA framework and the CLEA software (v1.04). GAC were generated for the standard CLEA land uses using a soil organic matter (SOM) content of 1%, 2.5% and 6%. Transparent explanation of the GAC generation process including all chemical input parameters is provided within the LQM Report.

1.3. The EIC/AGS/CL:AIRE GAC 2010

1.3.1. In January 2010 Contaminated Land: Applications in Real Environments (CL:AIRE) in association with The Environmental Industries Commission (EIC) and The Association of Geotechnical and Geoenvironmental Specialists (AGS) published GAC for 35 contaminants.

1.3.2. GACs for the 35 contaminants were generated using CLEA v1.06 for the three standard CLEA land uses (residential with consumption of homegrown produce, commercial and allotments) as well as residential without consumption of homegrown produce. The GACs have been generated using an SOM content of 1%, 2.5% and 6%.

1.3.3. The methodology and supporting information for the EIC/AGS GACs is fully documented in the report published by CL:AIRE.

1.4. Category 4 Screening Levels 2014

1.4.1. In March 2014 CL:AIRE published Category 4 Screening Levels (C4SLs) for six contaminants in a project backed by DEFRA. These C4SLs describe low levels of harm which is in contrast to the minimal risk levels described by soil guideline values (SGV)s.

1.4.2. The underlying assumptions describing the exposure scenarios have been updated from those detailed in the SGV reports such as those describing inhalation rates in line with new research. In addition, the toxicological data for the six contaminants was reviewed and updated where deemed appropriate.

1.4.3. C4SL have been primarily derived to provide screening criteria for Part 2A assessments. Soils with concentrations below the C4SL cannot be determined under Part 2A as contaminated land.

1.4.4. C4SLs were derived for: arsenic, benzene, benzo(a)pyrene, cadmium, chromium and lead at an SOM of 6%. They are published for the following land use scenarios:

- Residential (with and without homegrown produce)
- Allotments
- Commercial

1.4.5. They also include two new land use scenarios both based on public open space (POS).

1.4.6. Scheme C4SL (SC4SL) have been produced for the six contaminants at SOMs of 1% and 2.5%.

1.5. LQM Suitable For Use Levels 2015

1.5.1. In January 2015 LQM published Suitable for Use Levels (S4ULs) for a total of 89 chemicals or groups of chemicals which represent a minimal level of risk (equivalent to risk levels used in the derivation of SGVs). These were generated using the updated scenarios found in the C4SL framework, revisions to chemical

data and updated toxicological data where available and generated using the CLEA software (v1.06). Transparent explanation of the S4UL generation process including all chemical input parameters is provided within the LQM Report.

1.5.2. The new S4ULs have been published for five types of land use as follows:

- Residential (with and without consumption of homegrown produce)
- Allotments
- Commercial
- Public Open Space – Parks
- Public Open Space – Residential

1.5.3. All S4ULs are generated based on a standard soil type defined as a sandy loam with a SOM content of 1%, 2.5% and 6%.

1.6. Scheme Suitable For Use Criteria (SS4UL)

1.6.1. A series of generic assessment criteria have been generated using CLEA (v1.07) for the standard land uses as defined by the CLEA framework for all contaminants for which SGV and associated toxicology reports have been published.

1.6.2. The SOM parameter is used to predict the level of sorption that will occur between the contaminant and soil particles. It affects the potential mobility of contaminants and therefore influences the predicted exposure by humans to a particular contaminant. Amending the SOM is therefore reflected in either an increase or decrease of the generic screening criteria.

1.6.3. The use of generic assessment criteria generated using SOM concentrations of 1% and 2.5% should be considered where site specific assessment (i.e. analytical results for fraction / total organic carbon) has identified soil conditions that are better characterised by an organic content which is below the 6% assumed in the published SGVs.

1.7. Hierarchy of Generic Assessment Criteria

1.7.1. In all cases, a GAC is only used where the conceptual model for the site indicates that it would be appropriate to use criteria derived for the five standard land uses.

1.7.2. The C4SL for benzo(a)pyrene uses a surrogate for all polycyclic aromatic hydrocarbons (PAH) and similarly the S4UL also have benzo(a)pyrene as a surrogate for coal tar which can be used as an alternative approach to screening

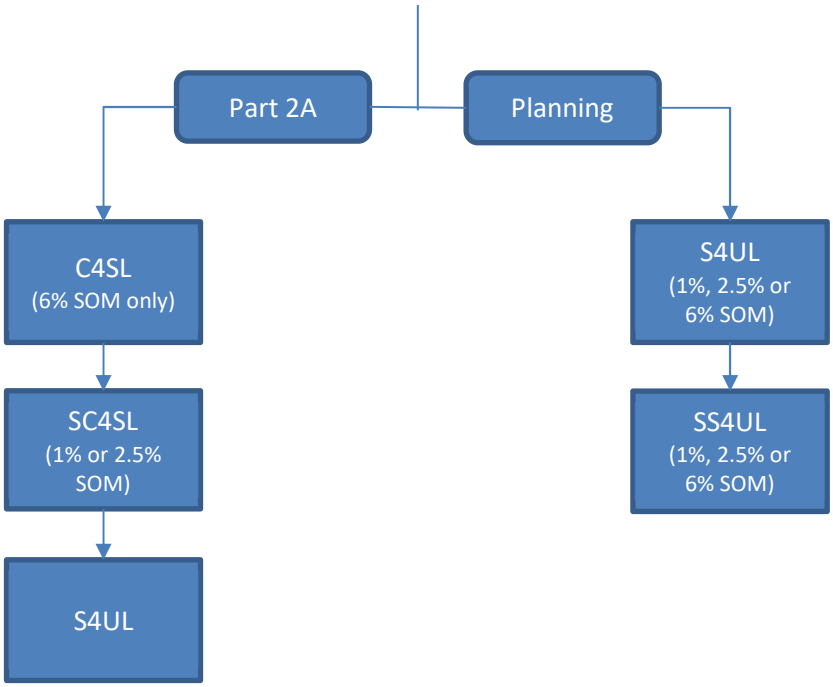
against individual PAHs. The S4ULs also have assessment criteria for individual PAHs and Sweco have adopted the approach of screening against the individual PAHs for completeness.

1.7.3. When deriving the assessment criteria some criteria are derived at a concentration greater than the chemicals' theoretical solubility limit. The S4ULs are presented in the LQM 2015 report with both the solubility limited value and the human health risk criteria. These solubility limited criteria are indicative of the presence of free product and do not present a concentration where human health risk may necessarily occur. In these cases, the human health derived criteria were taken as the assessment criteria with the exception of where free product is present.

1.7.4. Similarly, when the vapour saturation limit has been exceeded the human health derived value was taken as the assessment criteria rather than the vapour saturation limited criteria.

1.7.5. The selection of the appropriate criteria for the assessment is made based on both the end use and the regime (planning or Part 2A) under which the assessment is designed to perform. The choice of criteria is shown in Plate 1.1.

Plate 1.1: GQRA assessment criteria choice flowchart



Notes:

- Category 4 Screening Levels (C4SLs)

- The lead C4SL is currently used for both Part 2A and Planning scenarios. The remaining five C4SLs are used for a Part 2A assessment approach. C4SLs have been produced for 6% SOM only.

- Scheme Category 4 Screening Levels (SC4SLs)
  - Calculated C4SL for the six contaminants at 1% and 2.5% SOM to be used where the use of the C4SL for 6% SOM would not be appropriate.
- Suitable for Use Levels (S4ULs)
  - These are used where S4ULs have been published. Based on recorded site conditions the most appropriate S4ULs based on an SOM of 1%, 2.5% or 6% are selected.
- Scheme Generic Assessment Criteria (SS4ULs)
  - For contaminants not included in the S4ULs or C4SLs the SS4ULS will be utilised.

1.7.6. Based on recorded site conditions the most appropriate Sweco SS4UL based on an SOM of 1%, 2.5% or 6% are selected.

Total Mercury

1.7.7. No assessment screening criteria is currently available for concentrations of total mercury measured in soil, with S4UL available for elemental mercury, methyl mercury and inorganic mercury.

1.7.8. The concentrations of total mercury in soils reported by the laboratory have been screened against assessment criteria for elemental mercury as the most conservative criteria.

Cyanide

1.7.9. The assessment criteria for free and complex cyanide has been derived for an acute exposure scenario based on a single dose of soil ingested by a three year old female child. The criteria have been derived outside of the CLEA model utilising data and methodology produced by Environment Agency reporting and CLEA regime.

1.7.10. The TDI has been sourced from the DEFRA and Environment Agency R &D TOX 5 report (DEFRA/EA, 2002) on inorganic cyanide.

1.7.11. The three year old child has been chosen as the receptor as this is taken to be the youngest age a child will be able to be independent from their parents i.e. mobile enough to leave their protection and therefore access and consume a source of cyanide. The body weight used is sourced from Technical Review, Environment Agency, 2009 and is the mean body weight for a three year old female child.

1.7.12. A single 5g dose has been used which approximates to a teaspoon of soil.

2. Soil leachability and groundwater

2.1.1. Leachability analysis provides an indication of the potential for contaminants to be mobilised from soil through leaching and impact groundwater quality beneath the site. Two types of assessment have been undertaken on the groundwater and leachability analysis results, firstly relating to the potential impact on groundwater quality and secondly the potential impact on surface water quality.

2.1.2. The impact on groundwater quality has been assessed through the use of UK Drinking Water Standards (DWS) which are documented in The Water Supply (Water Quality) Regulations 2016. Where an appropriate UK DWS is not available, the World Health Organisation (WHO) guidelines for drinking water quality (2022) have been used.

2.1.3. Potential impacts on surface water quality which may occur through a linkage between groundwater on the site and a nearby surface water course are assessed through comparison to the environmental quality standards (EQS) presented in parts 1, 2 and 3 of Schedule 3 of The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. In the absence of these numbers, the 2004 EQS criteria have been used.

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