

M5 Junction 10 Improvement Scheme

Appendix 6/15

Limiting Values for Harm to Human Health and the Environment

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P01	S3	18/08/25	AS	AM	AG	MB	First Issue

Appendix 6/15

Limiting Values for Harm to Human Health and the Environment

1. This Appendix pertains to site won made ground or imported materials to be re-used on site only. This appendix does not apply to virgin materials such as quarry aggregates. Which will be considered chemically suitable for re-use in accordance with geotechnical requirements without further chemical testing. For information regarding topsoil reference shall be made to Appendix 6/8.
2. This Appendix provides limiting values for determinands in materials for the protection of human health, reference should be made to Appendix 6/14 for the protection of controlled waters.
3. Testing frequencies shall be as scheduled in contract-specific Appendix 1/5 including frequencies, certifications and any other scheme-specific requirements. If material is observed to have visual/olfactory evidence of contamination, then additional testing will be required. Samples will be collected under chain of custody and testing in a suitable laboratory which is UKAS accredited and MCERTS compliant.
4. Imported materials must be suitable for use and therefore require assessment. Where adequate prior testing and assessment are not available additional testing is required for comparison with the limiting values in table 6/15-1 or 6/15-2 prior to importation to site.
5. If determinand concentrations in the soil are above the limiting values presented in Table 6/15-1 or 6/15-2 then the material under consideration might pose an unacceptable risk to identified human health receptors, and shall be classified as Class U1B. Alternatively, further site-specific risk assessment can be undertaken to determine suitability for re-use (such as detailed quantitative risk assessment to derive site-specific limiting values). This may also require further consultation with the Environment Agency or Local Contaminated Land Officer.
6. All materials classified as Hazardous Wastes in accordance with Technical Guidance WM3 and materials containing Asbestos Containing Materials (ACMs), or free phase oil shall automatically be classified as unacceptable material Class U2, irrespective of the limiting values presented in Appendix 6/15.
7. The following limiting values have been selected taking into account potential receptor and exposure pathways. The primary human health receptors are members of the public using the footpath/cycleway or future maintenance workers in roadway areas. The assessment of the risk to human health will therefore be based on the Generic Assessment Criteria (GAC) for:
 - Allotment for areas being returned to agriculture – Table 6/15-1
 - Public open Space (POS) (parkland) for all other areas– Table 6/15-2
8. The limits are primarily based on the LQM/CIED Suitable for Use Levels (S4ULs) for human health risk assessment and Category 4 Screening Level (C4SL) has been adopted, based on a soil organic matter (SOM) content of 1% as a conservative approach. Consideration of the site based data set has also be used to derive acceptability values (see accompanying notes below the tables).

Table 6/15-1: Acceptance Criteria for Limiting Values for Harm to Human Health and the Environment for site won soils

Determinand	Soil Concentration (mg/kg)		
	Site won (no contamination)	Site won (contamination noted)	Imported
Metals	Allotment GAC	Allotment GAC	Acceptability Value
Arsenic	49	49	27*
Cadmium	3.9	3.9	3.3*
Inorganic Mercury	21 (elemental)	21	7*
Nickel	53	53	53 [§]
Chromium (III)	170	170	107*
Chromium (VI)	1.8	1.8	1.8
Copper	520	520	90*
Zinc	620	620	429*
pH	2-11.5 pH units	2-11.5 pH units	2-11.5 pH units
Total Petroleum Hydrocarbons (TPH)			
Total TPH	<1000	-	-
Aliphatic Hydrocarbons >C ₅ -C ₆	-	730	100**
Aliphatic Hydrocarbons >C ₆ -C ₈	-	2300	100**
Aliphatic Hydrocarbons >C ₈ -C ₁₀	-	320	100**
Aliphatic Hydrocarbons >C ₁₀ -C ₁₂	-	2200	36*
Aliphatic Hydrocarbons >C ₁₂ -C ₁₆	-	5000 ⁺	52*
Aliphatic Hydrocarbons >C ₁₆ -C ₂₁	-	5000 ⁺	132*
Aliphatic Hydrocarbons >C ₂₁ -C ₃₅	-	5000 ⁺	605*
Aromatic Hydrocarbons >C ₅ -C ₇	-	13	13
Aromatic Hydrocarbons >C ₇ -C ₈	-	22	22 [§]
Aromatic Hydrocarbons >C ₈ -C ₁₀	-	8.6	8.6
Aromatic Hydrocarbons >C ₁₀ -C ₁₂	-	13	13 [§]
Aromatic Hydrocarbons >C ₁₂ -C ₁₆	-	23	23 [§]
Aromatic Hydrocarbons >C ₁₆ -C ₂₁	-	46	46 [§]
Aromatic Hydrocarbons >C ₂₁ -C ₃₅	-	370	370 [§]

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Determinand	Soil Concentration (mg/kg)		
Polycyclic Aromatic Hydrocarbons (PAH)			
Total PAH	<1000		
Acenaphthene	-	4.1	4.1 [§]
Acenaphthylene	-	28	4.4*
Anthracene	-	380	52*
Benzo(a)anthracene	-	2.9	2.9 [§]
Benzo(a)pyrene	-	5.7	5.7 [§]
Benzo(b)fluoranthene	-	0.99	0.99 [§]
Benzo(ghi)perylene	-	290	24*
Benzo(k)fluoranthene	-	37	30*
Chrysene	-	4.1	4.1 [§]
Dibenzo(a,h)anthracene	-	0.14	0.14 [§]
Fluoranthene	-	52	52 [§]
Fluorene	-	27	27 [§]
Indeno(1,2,3-c,d)pyrene	-	9.5	9.5 [§]
Naphthalene	-	4.1	4.1 [§]
Phenanthrene	-	15	14 [§]
Pyrene	-	110	110*
Organics			
Coal Tar (using BaP as surrogate marker)	-	<2.2	<2.2
Asbestos	No detectable asbestos [^]	No detectable asbestos [^]	No detectable asbestos

Notes

GAC values are based on the LQM / CIEH Allotment Suitable 4 Use Limits (S4UL) values and the Category 4 Screening Level (C4SL). Suitability values have been based on site based dataset and professional judgement.

*suitability value based on highest concentration from site based dataset +10%

*suitability value proposed as site based data is <detection limits

§GAC used as site based data is > GAC

*suitability value proposed. Materials which appear to be visibly impacted by hydrocarbon contamination (presence of odours and oily sheens) will not be considered for re-use.

%Hazard threshold

[^]if fibres are detected, further assessment including quantification. Potential for re-use under a cover system with geotextile separation layer.

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Table 6/15-2: Acceptance Criteria for Limiting Values for Harm to Human Health and the Environment for imported soils

Determinand	Soil Concentration (mg/kg)		Imported
	Site won (no contamination)	Site won (contamination noted)	
Metals	POS Parkland GAC	POS Parkland GAC	Acceptability Value
Arsenic	170	170	27*
Cadmium	532	532	3.3*
Inorganic Mercury	21 (elemental)	21	7*
Nickel	800	800	53 [§]
Chromium (III)	220	220	107*
Chromium (VI)	220	220	1.8
Copper	44,000	44,000	2,500%
Zinc	170,000	170,000	2,500%
pH	2-11.5 pH units	2-11.5 pH units	2-11.5 pH units
Total Petroleum Hydrocarbons (TPH)			
Total TPH	<1,000%	-	-
Aliphatic Hydrocarbons >C ₅ -C ₆	-	5,000 ⁺	100**
Aliphatic Hydrocarbons >C ₆ -C ₈	-	5,000 ⁺	100**
Aliphatic Hydrocarbons >C ₈ -C ₁₀	-	5,000 ⁺	100**
Aliphatic Hydrocarbons >C ₁₀ -C ₁₂	-	5,000 ⁺	36*
Aliphatic Hydrocarbons >C ₁₂ -C ₁₆	-	5,000 ⁺	52*
Aliphatic Hydrocarbons >C ₁₆ -C ₂₁	-	5,000 ⁺	132*
Aliphatic Hydrocarbons >C ₂₁ -C ₃₅	-	5,000 ⁺	605*
Aromatic Hydrocarbons >C ₅ -C ₇	-	1,000 ⁺	13
Aromatic Hydrocarbons >C ₇ -C ₈	-	1,000 ⁺	22 [§]
Aromatic Hydrocarbons >C ₈ -C ₁₀	-	1,000 ⁺	8.6
Aromatic Hydrocarbons >C ₁₀ -C ₁₂	-	1,000 ⁺	13 [§]
Aromatic Hydrocarbons >C ₁₂ -C ₁₆	-	1,000 ⁺	23 [§]
Aromatic Hydrocarbons >C ₁₆ -C ₂₁	-	1,000 ⁺	46 [§]
Aromatic Hydrocarbons >C ₂₁ -C ₃₅	-	1,000 ⁺	370 [§]

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Determinand	Soil Concentration (mg/kg)		
Polycyclic Aromatic Hydrocarbons (PAH)			
Total PAH	<1,000		
Acenaphthene	-	1,000 ⁺	33 [*]
Acenaphthylene	-	1,000 ⁺	4.4 [*]
Anthracene	-	1,000 ⁺	52 [*]
Benzo(a)anthracene	-	1,000 ⁺	59 [§]
Benzo(a)pyrene	-	1,000 ⁺	42 [*]
Benzo(b)fluoranthene	-	1,000 ⁺	13 [§]
Benzo(ghi)perylene	-	1,000 ⁺	24 [*]
Benzo(k)fluoranthene	-	1,000 ⁺	30 [*]
Chrysene	-	93	52 [*]
Dibenzo(a,h)anthracene	-	1.1	1.1 [§]
Fluoranthene	-	1,000 ⁺	154 [*]
Fluorene	-	1,000 ⁺	35 [§]
Indeno(1,2,3-c,d)pyrene	-	150	21 [*]
Naphthalene	-	1,000 ⁺	26 [*]
Phenanthrene	-	1,000 ⁺	176 [*]
Pyrene	-	1,000 ⁺	110 [*]
Organics			
Coal Tar (using BaP as surrogate marker)	-	<2.2	<2.2
Asbestos	No detectable asbestos [^]	No detectable asbestos [^]	No detectable asbestos

Notes

GAC values are based on the LQM / CIEH Allotment Suitable 4 Use Limits (S4UL) values and the Category 4 Screening Level (C4SL). Suitability values have been based on site based dataset and professional judgement.

*suitability value based on highest concentration from site based dataset +10%

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^Hazard threshold