



OUR REF: A4320/24 15<sup>th</sup> February 2024  
YOUR REF:

15<sup>th</sup> February 2024

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**By Email ([info@maiconstruction.co.uk](mailto:info@maiconstruction.co.uk))**

Dear Ibraheem,

**Moss Lane East, Manchester**  
**Validation Letter Report**

**Background and Terms of Reference**

This report provides a summary of the validation of imported soil material used as a cover system in gardens at the new residential property development at Moss Lane East, Manchester.

This validation report should be read in conjunction with an Earth Environmental & Geotechnical remediation strategy (A4320/21/RMS) dated November 2022.

**Scope of Work**

A site visit was conducted on the 3<sup>rd</sup> of January 2024 to recover samples of the emplaced soil material for laboratory chemical analysis.

Sample testing frequency involved one sample from the rear and front gardens of each plot.

Chemical testing has been performed by DETS, a UKAS and MCERTS accredited laboratory. Appendix B provides a copy of the testing results.

The results have been compared to a residential end use (with plant uptake) criteria for the long-term protection of human health.

The sampling locations are shown in Figure 1 overleaf.

**Soil Horizons**

The soil material emplaced in the garden areas on site at Moss Lane East, Manchester has been measured and sampled.

The topsoil material has been described as a brown, silty, gravelly sandy TOPSOIL, measured from ground level to a maximum depth of 500mm.

This was underlain by a clayey sandy GRAVEL, locally a gravelly CLAY (HP1).

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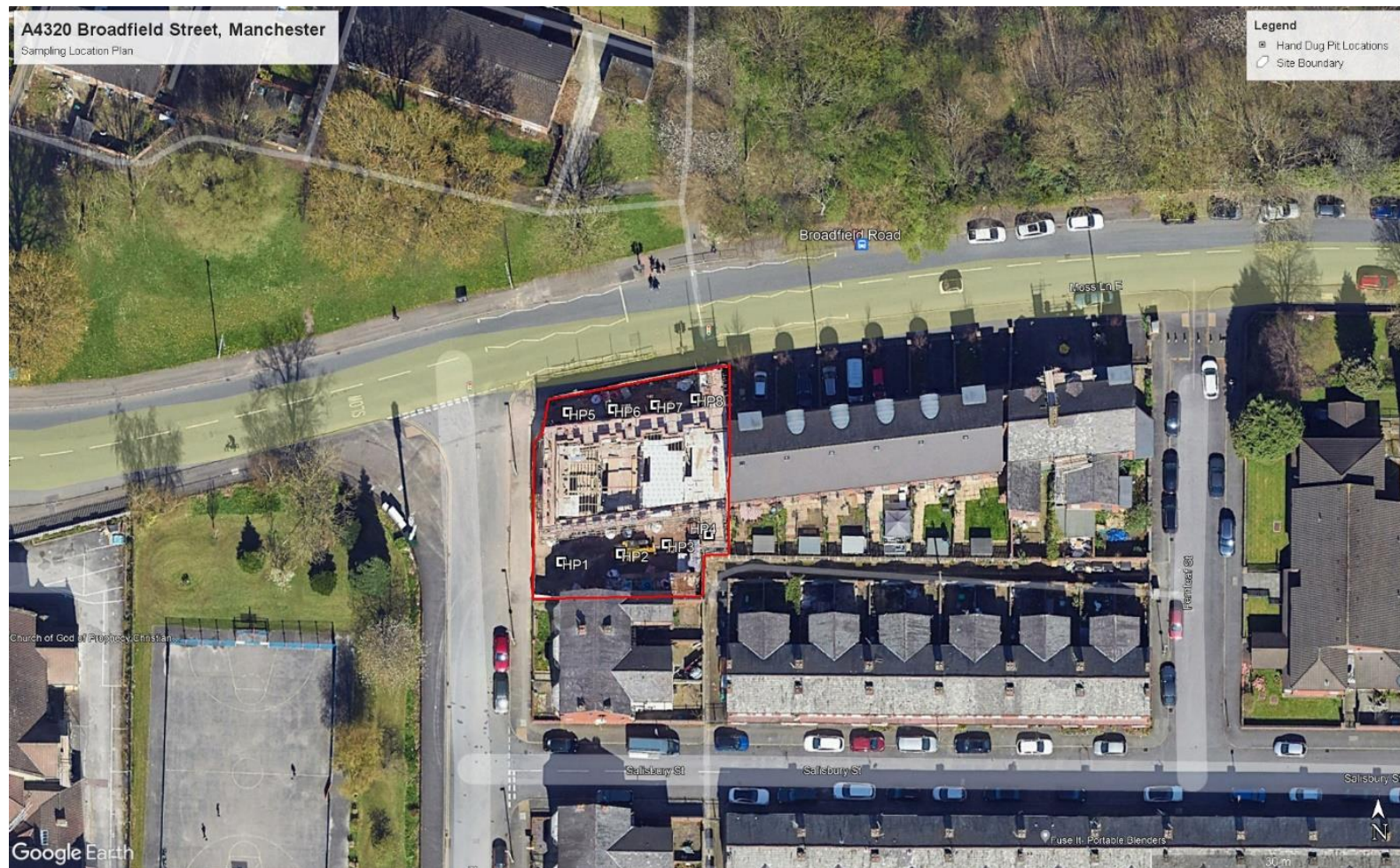
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There was no visual or olfactory evidence of contamination observed during the site sampling process.

Appendix A provides the hand dug pit logs.

**Figure 1: Sampling Location Plan**



## **Chemical Testing**

8no. samples were obtained from the topsoil material.

Chemical testing has been performed for a wide range of analytes including asbestos screen, pH, total organic carbon, total sulphate, sulphide, total cyanide, arsenic, chromium, hexavalent chromium, copper, lead, selenium, zinc, cadmium, mercury, nickel, vanadium, barium, beryllium, water soluble boron, mono phenol, speciated hydrocarbons and speciated PAH's.

At a Tier I stage the long term (chronic) human health toxicity of the soil has been assessed with reference to DEFRA/Environment Agency Contaminated Land Exposure Assessment (CLEA) Soil Guideline Values (SGV) for generic site land uses, soils, and exposure.

Where Environment Agency generic guidance is absent, reference has been made to the Chartered Institute of Environmental Health (CIEH) S4ULs for human health risk assessment.

In the case of arsenic, cadmium, hexavalent chromium, lead, benzene, naphthalene, and benzo(a)pyrene DEFRA Category 4 Screening Levels have been adopted.

**Table 1 Assessment of Soil Chemical Data**

| Determinand                   | C4SL/S4UL<br>Levels<br>Residential<br>(mg/kg) | HP1<br>0.50m | HP2<br>0.30m | HP3<br>0.20m | HP4<br>0.35m | HP5<br>0.40m | HP6<br>0.10m | HP7<br>0.30m | HP8<br>0.50m | No of<br>Exceedances |
|-------------------------------|-----------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------------|
| <b>Metals</b>                 |                                               |              |              |              |              |              |              |              |              |                      |
| Arsenic                       | 37                                            | 10           | 10           | 9            | 11           | 11           | 8            | 11           | 12           | 0                    |
| Beryllium                     | 1.7                                           | 0.9          | < 0.5        | < 0.5        | 0.5          | 0.5          | < 0.5        | 0.5          | 0.6          | 0                    |
| Boron                         | 290                                           | < 1          | < 1          | < 1          | < 1          | < 1          | < 1          | < 1          | < 1          | 0                    |
| Cadmium                       | 22                                            | < 0.2        | 0.2          | 0.2          | 0.3          | 0.3          | < 0.2        | 0.3          | 0.3          | 0                    |
| Chromium                      | 910                                           | 16           | 12           | 12           | 14           | 14           | 10           | 13           | 15           | 0                    |
| Chromium VI                   | 21                                            | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | 0                    |
| Copper                        | 2400                                          | 26           | 30           | 32           | 34           | 35           | 26           | 33           | 36           | 0                    |
| Lead                          | 200                                           | 65           | 66           | 66           | 78           | 74           | 54           | 73           | 81           | 0                    |
| Inorganic<br>Mercury          | 40                                            | < 1          | < 1          | < 1          | < 1          | < 1          | < 1          | < 1          | < 1          | 0                    |
| Nickel                        | 180                                           | 16           | 9            | 9            | 10           | 10           | 8            | 10           | 11           | 0                    |
| Selenium                      | 250                                           | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | 0                    |
| Vanadium                      | 410                                           | 22           | 15           | 15           | 17           | 17           | 12           | 16           | 18           | 0                    |
| Zinc                          | 3700                                          | 48           | 54           | 62           | 64           | 66           | 42           | 65           | 74           | 0                    |
| <b>Petroleum Hydrocarbons</b> |                                               |              |              |              |              |              |              |              |              |                      |
| Benzene                       | 0.87                                          | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | 0                    |
| Toluene                       | 660                                           | <0.005       | <0.005       | <0.005       | <0.005       | <0.005       | <0.005       | <0.005       | <0.005       | 0                    |
| Ethylbenzene                  | 260                                           | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | 0                    |
| o-xylenes                     | 310                                           | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | 0                    |
| m-xylenes                     | 310                                           | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | 0                    |
| p-xylenes                     | 310                                           | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | <0.002       | 0                    |
| Aliphatic EC<br>>5-6          | 160                                           | < 0.01       | < 0.01       | < 0.01       | < 0.01       | < 0.01       | < 0.01       | < 0.01       | < 0.01       | 0                    |
| Aliphatic EC<br>>6-8          | 530                                           | < 0.05       | < 0.05       | < 0.05       | < 0.05       | < 0.05       | < 0.05       | < 0.05       | < 0.05       | 0                    |
| Aliphatic EC<br>>8-10         | 150                                           | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | 0                    |
| Aliphatic EC<br>>10-12        | 760                                           | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | 0                    |
| Aliphatic EC<br>>12-16        | 4300                                          | < 3          | < 3          | < 3          | < 3          | < 3          | < 3          | < 3          | < 3          | 0                    |
| Aliphatic EC<br>>16-21        | 110000                                        | < 3          | < 3          | < 3          | < 3          | < 3          | < 3          | < 3          | < 3          | 0                    |
| Aliphatic EC<br>>21-35        | 110000                                        | < 10         | < 10         | < 10         | < 10         | < 10         | < 10         | < 10         | < 10         | 0                    |

| Determinand                             | C4SL/S4UL<br>Levels<br>Residential<br>(mg/kg) | HP1<br>0.50m | HP2<br>0.30m | HP3<br>0.20m | HP4<br>0.35m | HP5<br>0.40m | HP6<br>0.10m | HP7<br>0.30m | HP8<br>0.50m | No of<br>Exceedances |
|-----------------------------------------|-----------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------------|
| Aromatic EC >5-6                        | 300                                           | < 0.01       | < 0.01       | < 0.01       | < 0.01       | < 0.01       | < 0.01       | < 0.01       | < 0.01       | 0                    |
| Aromatic EC >6-8                        | 660                                           | < 0.05       | < 0.05       | < 0.05       | < 0.05       | < 0.05       | < 0.05       | < 0.05       | < 0.05       | 0                    |
| Aromatic EC >8-10                       | 190                                           | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | 0                    |
| Aromatic EC >10-12                      | 380                                           | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | 2            | 0                    |
| Aromatic EC >12-16                      | 660                                           | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | 0                    |
| Aromatic EC >16-21                      | 930                                           | < 3          | < 3          | < 3          | < 3          | < 3          | < 3          | < 3          | 4            | 0                    |
| Aromatic EC >21-35                      | 1700                                          | < 10         | < 10         | < 10         | < 10         | < 10         | < 10         | < 10         | < 10         | 0                    |
| <b>Polycyclic Aromatic Hydrocarbons</b> |                                               |              |              |              |              |              |              |              |              |                      |
| Naphthalene                             | 2.3                                           | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0                    |
| Acenaphthylene                          | 210                                           | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0                    |
| Acenaphthene                            | 170                                           | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0                    |
| Fluorene                                | 170                                           | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0                    |
| Phenanthrene                            | 95                                            | 0.21         | 0.15         | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0.37         | 0                    |
| Anthracene                              | 2400                                          | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0                    |
| Fluoranthene                            | 280                                           | 0.3          | 0.28         | 0.13         | 0.19         | 0.16         | 0.13         | 0.19         | 0.65         | 0                    |
| Pyrene                                  | 620                                           | 0.29         | 0.27         | 0.13         | 0.19         | 0.15         | 0.13         | 0.19         | 0.66         | 0                    |
| Benzo(a)anthracene                      | 7.2                                           | 0.12         | 0.13         | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0.34         | 0                    |
| Chrysene                                | 15                                            | 0.13         | 0.13         | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0.31         | 0                    |
| Benzo(a)pyrene                          | 5                                             | 0.14         | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0.34         | 0                    |
| Benzo(b)fluoranthene                    | 2.6                                           | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0.29         | 0                    |
| Benzo(k)fluoranthene                    | 77                                            | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0                    |
| Indeno(1,2,3-cd)<br>pyrene              | 27                                            | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0.14         | 0                    |
| Dibenz (a, h)<br>anthracene             | 0.24                                          | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0                    |
| Benzo(ghi)perylene                      | 320                                           | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | < 0.1        | 0                    |
| <b>Phenols</b>                          |                                               |              |              |              |              |              |              |              |              |                      |
| Phenol                                  | 280                                           | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | < 2          | 0                    |

#### **Notes for Table 1**

All units in mg/kg.

Concentrations in **red** above assessment criteria for residential end use.

Based on the above table, all topsoil samples tested contain concentrations of contaminants below the screening criteria relevant to residential end use (with plant uptake).

**Asbestos** was identified in two of the samples tested. The asbestos was identified as chrysotile from suspected loose insulation in samples HP2 (0.30m) and HP3 (0.20m), taken from the back garden plots. A summary is provided in table 2, below.

**Table 2: Summary of Asbestos Encountered**

| Location | Depth (m) | Sample Matrix               | Asbestos Type | Asbestos Quantification |
|----------|-----------|-----------------------------|---------------|-------------------------|
| HP2      | 0.30      | Chrysotile Loose Insulation | Chrysotile    | 0.005%                  |
| HP3      | 0.20      | Chrysotile Loose Insulation | Chrysotile    | 0.003%                  |

Table 3 provides a summary of the ground conditions at each location.

**Table 3 Summary of Cover System Thickness**

| Location | Cover System Thickness (mm) |
|----------|-----------------------------|
| HP1      | 600                         |
| HP2      | 600                         |
| HP3      | 600                         |
| HP4      | 600                         |
| HP5      | 600                         |
| HP6      | 600                         |
| HP7      | 600                         |
| HP8      | 600                         |

### **Conclusions & Recommendations**

The topsoil material in the garden areas of the land off Moss Lane East, has been validated by Earth Environmental & Geotechnical Ltd.

There are no contaminant exceedances of screening guideline values relevant to residential end use.

Asbestos fibres were identified in two of the samples tested.

***The asbestos, identified as chrysotile loose insulation, was found in samples HP2 (0.30m) and HP3 (0.20m).***

It is recommended that the material in this area is excavated, and clean topsoil material is emplaced.

Yours Sincerely,

*Adam Czarnecki*

**Adam Czarnecki**

**Director**

**For and on behalf of Earth Environmental & Geotechnical Ltd**

Appendix A    Hand Dug Pit Logs  
Appendix B    Soil Chemical Testing Results  
Appendix C    Soil Assessment Criteria

**APPENDIX A**

**SOIL CHEMICAL TESTING RESULTS**

## **APPENDIX B**

### **SOIL ASSESSMENT CRITERIA**

**Appendix B**  
**Tier I Values for Residential Land Use (with plant uptake)**  
**Based on Sandy Loamy Soil**

|                         |       |       |                                               |
|-------------------------|-------|-------|-----------------------------------------------|
| Arsenic                 | mg/kg | 37    | Category 4 Screening level based on 6% SOM    |
| Boron                   | mg/kg | 290   | CIEH S4UL based on 6% SOM                     |
| Beryllium               | mg/kg | 1.7   | CIEH S4UL based on 6% SOM                     |
| Cadmium                 | mg/kg | 22    | Category 4 Screening level based on 6% SOM    |
| Chromium (III)          | mg/kg | 910   | CIEH S4UL based on 6% SOM                     |
| Chromium (VI)           | mg/kg | 21    | Category 4 Screening level based on 6% SOM    |
| Lead                    | mg/kg | 200   | Category 4 Screening level based on 6% SOM    |
| Mercury (Inorganic)     | mg/kg | 40    | CIEH S4UL based on 6% SOM                     |
| Selenium                | mg/kg | 250   | CIEH S4UL based on 6% SOM                     |
| Nickel                  | mg/kg | 130   | CIEH S4UL based on 6% SOM (Revised, Aug 2015) |
| Copper                  | mg/kg | 2400  | CIEH S4UL based on 6% SOM                     |
| Toluene                 | mg/kg | 130   | CIEH S4UL based on 1% SOM                     |
| Benzene                 | mg/kg | 0.87  | Category 4 Screening level based on 6% SOM    |
| Ethylbenzene            | mg/kg | 47    | CIEH S4UL based on 1% SOM                     |
| P – Xylene              | mg/kg | 56    | CIEH S4UL based on 1% SOM                     |
| Trichlorethene (TCE)    | mg/kg | 0.016 | CIEH S4UL based on 1% SOM                     |
| Tetrachloroethene (PCE) | mg/kg | 0.18  | CIEH S4UL based on 1% SOM                     |
| Zinc                    | mg/kg | 3700  | CIEH S4UL based on 6% SOM                     |
| Cyanide - Free          | mg/kg | 41    | Based on acute risk to 0-6yr old child, HPA   |
| Phenols                 | mg/kg | 280   | CIEH S4UL based on 1% SOM                     |
| PCB                     | mg/kg | 1.4   | CLEA 1.06 modelling with 1% SOM               |
| Naphthalene             | mg/kg | 2.3   | Category 4 Screening level based on 6% SOM    |
| Acenaphthylene          | mg/kg | 170   | CIEH S4UL based on 1% SOM                     |
| Acenaphthene            | mg/kg | 210   | CIEH S4UL based on 1% SOM                     |
| Fluorene                | mg/kg | 170   | CIEH S4UL based on 1% SOM                     |

|                           |       |       |                                             |
|---------------------------|-------|-------|---------------------------------------------|
| Phenanthrene              | mg/kg | 95    | CIEH S4UL based on 1% SOM                   |
| Anthracene                | mg/kg | 2400  | CIEH S4UL based on 1% SOM                   |
| Fluoranthene              | mg/kg | 280   | CIEH S4UL based on 1% SOM                   |
| Pyrene                    | mg/kg | 620   | CIEH S4UL based on 1% SOM                   |
| Benzo(a)anthracene        | mg/kg | 7.2   | CIEH S4UL based on 1% SOM                   |
| Chrysene                  | mg/kg | 15    | CIEH S4UL based on 1% SOM                   |
| Benzo(b)fluoranthene      | mg/kg | 2.6   | CIEH S4UL based on 1% SOM                   |
| Benzo(k)fluoranthene      | mg/kg | 77    | CIEH S4UL based on 1% SOM                   |
| Benzo(a)pyrene            | mg/kg | 5.0   | Category 4 Screening Levels based on 6% SOM |
| Indeno(1,2,3-cd) pyrene   | mg/kg | 27    | CIEH S4UL based on 1% SOM                   |
| Di-benz (a, h) anthracene | mg/kg | 0.24  | CIEH S4UL based on 1% SOM                   |
| Benzo(ghi)perylene        | mg/kg | 320   | CIEH S4UL based on 1% SOM                   |
| Vanadium                  | mg/kg | 410   | CIEH S4UL based on 6% SOM                   |
| TPH Ali C5-C6             | mg/kg | 42    | CIEH S4UL based on 1% SOM                   |
| TPH Ali C6-C8             | mg/kg | 100   | CIEH S4UL based on 1% SOM                   |
| TPH Ali C8-C10            | mg/kg | 27    | CIEH S4UL based on 1% SOM                   |
| TPH Ali C10-C12           | mg/kg | 130   | CIEH S4UL based on 1% SOM                   |
| TPH Ali C12-C16           | mg/kg | 1100  | CIEH S4UL based on 1% SOM                   |
| TPH Ali C16-C35           | mg/kg | 65000 | CIEH S4UL based on 1% SOM                   |
| TPH Ali C35-C44           | mg/kg | 65000 | CIEH S4UL based on 1% SOM                   |
| TPH Aro C5-C7             | mg/kg | 70    | CIEH S4UL based on 1% SOM                   |
| TPH Aro C7-C8             | mg/kg | 130   | CIEH S4UL based on 1% SOM                   |
| TPH Aro C8-C10            | mg/kg | 34    | CIEH S4UL based on 1% SOM                   |
| TPH Aro C10-C12           | mg/kg | 74    | CIEH S4UL based on 1% SOM                   |
| TPH Aro C12-C16           | mg/kg | 140   | CIEH S4UL based on 1% SOM                   |
| TPH Aro C16-C21           | mg/kg | 260   | CIEH S4UL based on 1% SOM                   |
| TPH Aro C21-C35           | mg/kg | 1100  | CIEH S4UL based on 1% SOM                   |
| TPH Aro C35-C44           | mg/kg | 1100  | CIEH S4UL based on 1% SOM                   |