



RPS Consultants Ltd  
Park House  
Greyfriars Road  
Cardiff  
South Glamorgan  
CF10 3AF

**Attention:** Adam Parker

## CERTIFICATE OF ANALYSIS

**Date:** 11 June 2016  
**Customer:** H\_RPS\_CDF  
**Sample Delivery Group (SDG):** 160528-13  
**Your Reference:** JCD0170  
**Location:** Neal Soils  
**Report No:** 364543

**This report has been revised and directly supersedes 364078 in its entirety.**

We received 1 sample on Saturday May 28, 2016 and 1 of these samples were scheduled for analysis which was completed on Wednesday June 08, 2016. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

**Sonia McWhan**

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

|                   |             |            |                     |                    |          |
|-------------------|-------------|------------|---------------------|--------------------|----------|
| SDG:              | 160528-13   | Location:  | Neal Soils          | Order Number:      | PO16-441 |
| Job:              | H_RPS_CDF-4 | Customer:  | RPS Consultants Ltd | Report Number:     | 364543   |
| Client Reference: | JCD0170     | Attention: | Adam Parker         | Superseded Report: | 364078   |

Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|------------------|----------------------|----------|-----------|--------------|
| 13509015         | WS5                  |          |           | 27/05/2016   |

Only received samples which have had analysis scheduled will be shown on the following pages.



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| <b>LIQUID</b><br><b>Results Legend</b><br><div> <div>X</div> Test         </div> <div> <div>N</div> No Determination Possible         </div> | Lab Sample No(s)          |                     | 13509015                                                                                                                                                                                   |   |  |  |   |  |   |  |   |   |
|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--|--|---|--|---|--|---|---|
|                                                                                                                                              | Customer Sample Reference |                     | WS5                                                                                                                                                                                        |   |  |  |   |  |   |  |   |   |
|                                                                                                                                              | AGS Reference             |                     |                                                                                                                                                                                            |   |  |  |   |  |   |  |   |   |
|                                                                                                                                              | Depth (m)                 |                     |                                                                                                                                                                                            |   |  |  |   |  |   |  |   |   |
|                                                                                                                                              | Container                 |                     | Vial (AL E297)<br>Total Metals Preserve<br>NaOH (AL E245)<br>HNO3 Unfiltered<br>H2SO4 (AL E244)<br>DO KIT + DO 250 ml<br>250ml BOD (AL E212)<br>11plastic (AL E221)<br>1000ml glass bottle |   |  |  |   |  |   |  |   |   |
| Ammonium Low                                                                                                                                 | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  |   |  | X |  |   |   |
| Anions by Kone (w)                                                                                                                           | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            | X |  |  |   |  |   |  |   |   |
| BOD True Total                                                                                                                               | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  | X |  |   |  |   |   |
| Conductivity (at 20 deg.C)                                                                                                                   | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  | X |  |   |  |   |   |
| Dissolved Metals by ICP-MS                                                                                                                   | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  | X |  |   |  |   |   |
| Dissolved Oxygen by Titration                                                                                                                | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  |   |  | X |  |   |   |
| EPH (DRO) (C10-C40) Aqueous (W)                                                                                                              | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            | X |  |  |   |  |   |  |   |   |
| GRO by GC-FID (W)                                                                                                                            | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  |   |  |   |  |   | X |
| Mercury Unfiltered                                                                                                                           | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  |   |  |   |  |   | X |
| Metals by iCap-OES Dissolved (W)                                                                                                             | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            | X |  |  |   |  |   |  |   |   |
| Metals by iCap-OES Unfiltered (W)                                                                                                            | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  |   |  | X |  |   |   |
| Nitrite by Kone (w)                                                                                                                          | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  |   |  |   |  | X |   |
| PAH Spec MS - Aqueous (W)                                                                                                                    | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            | X |  |  |   |  |   |  |   |   |
| pH Value                                                                                                                                     | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  | X |  |   |  |   |   |
| Suspended Solids                                                                                                                             | All                       | NDPs: 0<br>Tests: 1 |                                                                                                                                                                                            |   |  |  | X |  |   |  |   |   |



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**Order Number:** PO16-441  
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**Superseded Report:** 364078

|                                                                                                                           |                           |                     |                     |                     |                     |                    |                 |                 |                |                       |                |   |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------|---------------------|---------------------|---------------------|--------------------|-----------------|-----------------|----------------|-----------------------|----------------|---|
| <b>LIQUID</b><br><br>Results Legend<br><br><div><div>X</div> Test</div> <div><div>N</div> No Determination Possible</div> | Lab Sample No(s)          |                     | 13509015            |                     |                     |                    |                 |                 |                |                       |                |   |
|                                                                                                                           | Customer Sample Reference |                     | WS5                 |                     |                     |                    |                 |                 |                |                       |                |   |
|                                                                                                                           | AGS Reference             |                     |                     |                     |                     |                    |                 |                 |                |                       |                |   |
|                                                                                                                           | Depth (m)                 |                     |                     |                     |                     |                    |                 |                 |                |                       |                |   |
|                                                                                                                           | Container                 |                     | 1000ml glass bottle | 11plastic (AL E221) | 250ml BOD (AL E212) | DO KIT + DO 250 ml | H2SO4 (AL E244) | HNO3 Unfiltered | NaOH (AL E245) | Total Metals Preserve | Vial (AL E297) |   |
| Total Metals by ICP-MS                                                                                                    | All                       | NDPs: 0<br>Tests: 1 |                     |                     |                     |                    |                 |                 |                |                       |                | X |

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## Table of Results - Appendix

| Method No | Reference                                                                                                                                                   | Description                                                                                                      | Wet/Dry Sample <sup>1</sup> | Surrogate Corrected |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------|
| TM022     | Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872                                                                                   | Determination of total suspended solids in waters                                                                |                             |                     |
| TM045     | MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130                                                                    | Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids                                                  |                             |                     |
| TM061     | Method for the Determination of EPH,Massachusetts Dept.of EP, 1998                                                                                          | Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)                                          |                             |                     |
| TM099     | BS 2690: Part 7:1968 / BS 6068: Part2.11:1984                                                                                                               | Determination of Ammonium in Water Samples using the Kone Analyser                                               |                             |                     |
| TM120     | Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970                                                                                              | Determination of Electrical Conductivity using a Conductivity Meter                                              |                             |                     |
| TM152     | Method 3125B, AWWA/APHA, 20th Ed., 1999                                                                                                                     | Analysis of Aqueous Samples by ICP-MS                                                                            |                             |                     |
| TM172     | Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria                                                            | EPH in Waters                                                                                                    |                             |                     |
| TM178     | Modified: US EPA Method 8100                                                                                                                                | Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters                                      |                             |                     |
| TM183     | BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3                                                                                                    | Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry |                             |                     |
| TM184     | EPA Methods 325.1 & 325.2,                                                                                                                                  | The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers                      |                             |                     |
| TM187     | Winkler, L.W, Ber Deutsch. Chem. Ges, 21,2843,1888."                                                                                                        | Dissolved Oxygen in Natural and Waste Waters HMSO 1979 ISBN 011 751442                                           |                             |                     |
| TM191     | Standard Methods for the examination of waters and wastewaters 16th Edition, ALPHA, Washington DC, USA. ISBN 0-87553-131-8.                                 | Determination of Unfiltered Metals in Water Matrices by ICP-MS                                                   |                             |                     |
| TM228     | US EPA Method 6010B                                                                                                                                         | Determination of Major Cations in Water by iCap 6500 Duo ICP-OES                                                 |                             |                     |
| TM245     | By GC-FID                                                                                                                                                   | Determination of GRO by Headspace in waters                                                                      |                             |                     |
| TM256     | The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4. | Determination of pH in Water and Leachate using the GLpH pH Meter                                                |                             |                     |

<sup>1</sup> Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.





|                          |             |                   |                     |                           |          |
|--------------------------|-------------|-------------------|---------------------|---------------------------|----------|
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Test Completion Dates

|                                   |             |
|-----------------------------------|-------------|
| <b>Lab Sample No(s)</b>           | 13509015    |
| <b>Customer Sample Ref.</b>       | WS5         |
| <b>AGS Ref.</b>                   |             |
| <b>Depth</b>                      |             |
| <b>Type</b>                       | LIQUID      |
| Ammonium Low                      | 28-May-2016 |
| Anions by Kone (w)                | 31-May-2016 |
| BOD True Total                    | 02-Jun-2016 |
| Conductivity (at 20 deg.C)        | 03-Jun-2016 |
| Dissolved Metals by ICP-MS        | 03-Jun-2016 |
| Dissolved Oxygen by Titration     | 01-Jun-2016 |
| EPH (DRO) (C10-C40) Aqueous (W)   | 07-Jun-2016 |
| GRO by GC-FID (W)                 | 02-Jun-2016 |
| Mercury Unfiltered                | 01-Jun-2016 |
| Metals by iCap-OES Dissolved (W)  | 01-Jun-2016 |
| Metals by iCap-OES Unfiltered (W) | 03-Jun-2016 |
| Nitrite by Kone (w)               | 28-May-2016 |
| PAH Spec MS - Aqueous (W)         | 08-Jun-2016 |
| pH Value                          | 02-Jun-2016 |
| Suspended Solids                  | 03-Jun-2016 |
| Total Metals by ICP-MS            | 01-Jun-2016 |



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## Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH<sub>4</sub> by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

## General

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

## Sample Deviations

|    |                                                                 |
|----|-----------------------------------------------------------------|
| 1  | Container with Headspace provided for volatiles analysis        |
| 2  | Incorrect container received                                    |
| 3  | Deviation from method                                           |
| 4  | Holding time exceeded before sample received                    |
| 5  | Samples exceeded holding time before preservation was performed |
| \$ | Sampled on date not provided                                    |
| ♦  | Sample holding time exceeded in laboratory                      |
| @  | Sample holding time exceeded due to sampled on date             |
| &  | Sample Holding Time exceeded - Late arrival of instructions.    |

## Asbestos

### Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

| Asbestos Type         | Common Name    |
|-----------------------|----------------|
| Chrysotile            | White Asbestos |
| Amosite               | Brown Asbestos |
| Crocidolite           | Blue Asbestos  |
| Fibrous Actinolite    | -              |
| Fibrous Anthophyllite | -              |
| Fibrous Tremolite     | -              |

### Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

**Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.**

**The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.**