

**Gareth Ffoulkes**  
Cardiff City Council  
Waste Management  
Lamby Way  
Rumney  
Cardiff  
CF3 2HP

Decus Research Limited  
ExCAL House  
Capel Hendre Industrial Estate  
Ammanford  
Carmarthenshire  
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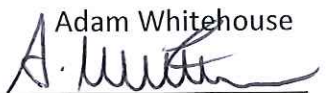
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### Certificate of Analysis Number: 2194

|                    |                                                  |                    |            |
|--------------------|--------------------------------------------------|--------------------|------------|
| Project/Site name: | Lamby Way                                        | Samples Taken:     | 19-01-2018 |
| Job Number:        | -                                                | Samples Received:  | 19-01-2018 |
| Order Number:      | -                                                | Date Instructed:   | 19-01-2018 |
| Quotation Number:  | DS 170612                                        | Analysis Complete: | 08-02-2018 |
| Sample Matrix:     | Groundwater,<br>Surface Water,<br>Leachate Water | Report Issued:     | 15-02-2018 |
|                    |                                                  | Sampled By:        | Client     |

#### Disposal Times:

All water samples will be retained for a period of two weeks and all soil samples retained for a period of one month following the date of the issued certificate.

Approved by: Adam Whitehouse  
Signature:   
Title: Quality Manager



Client: Cardiff City Council  
FAO: Gareth Ffoulkes

**CERTIFICATE OF ANALYSIS 2194**  
Results of analysis of 30 samples received  
on the 19/01/18

Report Date  
15<sup>th</sup> February 2018

| Code                             | Determinand | Units                                 | *   | Sample Identification |                  |                  |                  |
|----------------------------------|-------------|---------------------------------------|-----|-----------------------|------------------|------------------|------------------|
| <b>Laboratory Sample Number:</b> |             |                                       |     | <b>190118039</b>      | <b>190118040</b> | <b>190118041</b> | <b>190118042</b> |
| <b>Client Sample Reference:</b>  |             |                                       |     | L2                    | L4               | SL4              | SL5              |
| <b>Sample Date:</b>              |             |                                       |     | 19/01/18              | 19/01/18         | 19/01/18         | 19/01/18         |
| <b>Sample Matrix:</b>            |             |                                       |     | Leachate Water        | Leachate Water   | Leachate Water   | Leachate Water   |
| INORG-L12                        | Ammonia     | mg.l <sup>-1</sup> as NH <sub>4</sub> | A   | 1,790                 | 1,720            | 468              | 117              |
| INORG-L13                        | Chloride    | mg.l <sup>-1</sup>                    | A   | 20.9                  | 18.9             | 15.3             | 19.8             |
| METALS-L                         | Nickel      | µg.l <sup>-1</sup>                    | A   | 124                   | 177              | 9.9              | 3.6              |
| 1450                             | Cadmium     | µg.l <sup>-1</sup>                    | S-N | <0.080                | <0.080           | <0.080           | <0.080           |
| ORL-L17                          | Mecoprop    | µg.l <sup>-1</sup>                    | A   | <1.0                  | <1.0             | <0.1             | <0.1             |
| ORG-L05                          | Xylene      | µg.l <sup>-1</sup>                    | N   | 19.7                  | 12.9             | <1.0             | <1.0             |

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|----------------------------------|-------------|---------------------------------------|-----|-----------------------|-----------------|------------------|---|
| <b>Laboratory Sample Number:</b> |             |                                       |     | <b>190118043</b>      | <b>19018044</b> | <b>190118045</b> | - |
| <b>Client Sample Reference:</b>  |             |                                       |     | SL6                   | SL7             | SL8              | - |
| <b>Sample Date:</b>              |             |                                       |     | 19/01/18              | 19/01/18        | 19/01/18         | - |
| <b>Sample Matrix:</b>            |             |                                       |     | Leachate Water        | Leachate Water  | Leachate Water   | - |
| INORG-L12                        | Ammonia     | mg.l <sup>-1</sup> as NH <sub>4</sub> | A   | 52                    | 1,070           | 1,290            | - |
| INORG-L13                        | Chloride    | mg.l <sup>-1</sup>                    | A   | 25.1                  | 7.6             | 18.3             | - |
| METALS-L                         | Nickel      | µg.l <sup>-1</sup>                    | A   | 1.5                   | 17.3            | 71.3             | - |
| 1450                             | Cadmium     | µg.l <sup>-1</sup>                    | S-N | <0.080                | <0.080          | 0.18             | - |
| ORL-L17                          | Mecoprop    | µg.l <sup>-1</sup>                    | A   | <0.1                  | <0.1            | <0.1             | - |
| ORG-L05                          | Xylene      | µg.l <sup>-1</sup>                    | N   | <1.                   | 2.7             | 1.3              | - |

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|---------------------------|-------------|---------------------------------------|---|-----------------------|-------------|-------------|-------------|
| Laboratory Sample Number: |             |                                       |   | 190118046             | 190118047   | 190118048   | 190118049   |
| Client Sample Reference:  |             |                                       |   | C18                   | C19         | C20         | C21         |
| Sample Date:              |             |                                       |   | 19/01/18              | 19/01/18    | 19/01/18    | 19/01/18    |
| Sample Matrix:            |             |                                       |   | Groundwater           | Groundwater | Groundwater | Groundwater |
| INORG-L12                 | Ammonia     | mg.l <sup>-1</sup> as NH <sub>4</sub> | A | 0.18                  | 0.03        | 0.52        | 0.26        |
| INORG-L13                 | Chloride    | mg.l <sup>-1</sup>                    | A | 17.3                  | 23.5        | 5.3         | 13.1        |
| INORG-L01                 | pH          | pH units                              | A | 7.2                   | 7.2         | 7.0         | 7.1         |

| Code                      | Determinand | Units                                 | * | Sample Identification |               |               |               |
|---------------------------|-------------|---------------------------------------|---|-----------------------|---------------|---------------|---------------|
| Laboratory Sample Number: |             |                                       |   | 190118050             | 190118051     | 190118052     | 190118053     |
| Client Sample Reference:  |             |                                       |   | C22                   | SW2           | SW3           | SW4           |
| Sample Date:              |             |                                       |   | 19/01/18              | 19/01/18      | 19/01/18      | 19/01/18      |
| Sample Matrix:            |             |                                       |   | Groundwater           | Surface Water | Surface Water | Surface Water |
| INORG-L12                 | Ammonia     | mg.l <sup>-1</sup> as NH <sub>4</sub> | A | 5.2                   | 0.01          | 0.01          | 0.40          |
| INORG-L13                 | Chloride    | mg.l <sup>-1</sup>                    | A | 5.1                   | 31.2          | 20.5          | 33.1          |
| INORG-L06.1               | BOD         | mg.l <sup>-1</sup> as O <sub>2</sub>  | A | -                     | 1.9           | 1.0           | 1.1           |
| INORG-L01                 | pH          | pH units                              | A | 6.9                   | 7.5           | 7.6           | 7.3           |

| Code                      | Determinand | Units                                 | * | Sample Identification |               |   |   |
|---------------------------|-------------|---------------------------------------|---|-----------------------|---------------|---|---|
| Laboratory Sample Number: |             |                                       |   | 190118054             | 190118055     | - | - |
| Client Sample Reference:  |             |                                       |   | SW5                   | SW6           | - | - |
| Sample Date:              |             |                                       |   | 19/01/18              | 19/01/18      | - | - |
| Sample Matrix:            |             |                                       |   | Surface Water         | Surface Water | - | - |
| INORG-L12                 | Ammonia     | mg.l <sup>-1</sup> as NH <sub>4</sub> | A | 4.0                   | 0.53          | - | - |
| INORG-L13                 | Chloride    | mg.l <sup>-1</sup>                    | A | 32.6                  | 24.5          | - | - |
| INORG-L06.1               | BOD         | mg.l <sup>-1</sup> as O <sub>2</sub>  | A | 8.3                   | 1.1           | - | - |
| INORG-L01                 | pH          | pH units                              | A | 7.3                   | 7.8           | - | - |

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| Code                             | Determinand       | Units                                 | *   | Sample Identification |                  |                  |   |
|----------------------------------|-------------------|---------------------------------------|-----|-----------------------|------------------|------------------|---|
| <b>Laboratory Sample Number:</b> |                   |                                       |     | <b>190118056</b>      | <b>190118057</b> | <b>190118058</b> | - |
| <b>Client Sample Reference:</b>  |                   |                                       |     | C25                   | LTP1             | LTP Sample       | - |
| <b>Sample Date:</b>              |                   |                                       |     | 19/01/18              | 19/01/18         | 19/01/18         | - |
| <b>Sample Matrix:</b>            |                   |                                       |     | Leachate Water        | Leachate Water   | Leachate Water   | - |
| INORG-L12                        | Ammonia           | mg.l <sup>-1</sup> as NH <sub>4</sub> | A   | 1.0                   | 182              | 910              | - |
| INORG-L01                        | pH                | pH Units                              | A   | -                     | -                | -                | - |
| INORG-L13                        | Chloride          | mg.l <sup>-1</sup>                    | A   | 30.2                  | 16.5             | 22.1             | - |
| INORG-L31                        | Cyanide           | mg.l <sup>-1</sup>                    | N   | <0.1                  | <0.1             | <0.1             | - |
| INORG-L20                        | Mono Phenols      | mg.l <sup>-1</sup>                    | A   | <0.02                 | 1.1              | 3.6              | - |
| INORG-L21                        | Ortho-Phosphate   | mg.l <sup>-1</sup> P                  | A   | 0.03                  | 1.3              | 5.4              | - |
| METALS-L                         | Sulphate          | mg.l <sup>-1</sup>                    | A   | 192                   | 140              | 70.2             | - |
| INORG-L10                        | Suspended Solids  | mg.l <sup>-1</sup>                    | A   | 13.2                  | 11.2             | 30               | - |
| INORG-L05                        | COD               | mg.l <sup>-1</sup> O <sub>2</sub>     | A   | 24                    | 350              | 1,826            | - |
| 1450                             | Arsenic           | µg.l <sup>-1</sup>                    | S-N | 3.6                   | 32               | 30               | - |
| METALS-L                         | Chromium          | µg.l <sup>-1</sup>                    | A   | 3.5                   | 33.8             | 123              | - |
| METALS-L                         | Copper            | µg.l <sup>-1</sup>                    | A   | 20.3                  | 6.5              | 88.1             | - |
| METALS-L                         | Nickel            | µg.l <sup>-1</sup>                    | A   | 1.7                   | 40.3             | 169              | - |
| METALS-L                         | Zinc              | µg.l <sup>-1</sup>                    | A   | <1.1                  | <1.1             | 46.1             | - |
| METALS-L                         | Sulphur           | mg.l <sup>-1</sup>                    | A   | 64.2                  | 46.7             | 23.4             | - |
| 1630                             | Dissolved Methane | mg.l <sup>-1</sup>                    | S-N | <0.050                | <0.050           | <0.050           | - |

| Code                             | Determinand | Units                                 | * | Sample Identification |                  |                  |                  |
|----------------------------------|-------------|---------------------------------------|---|-----------------------|------------------|------------------|------------------|
| <b>Laboratory Sample Number:</b> |             |                                       |   | <b>190118059</b>      | <b>190118060</b> | <b>190118061</b> | <b>190118062</b> |
| <b>Client Sample Reference:</b>  |             |                                       |   | C1                    | C2               | C3               | C5               |
| <b>Sample Date:</b>              |             |                                       |   | 19/01/18              | 19/01/18         | 19/01/18         | 19/01/18         |
| <b>Sample Matrix:</b>            |             |                                       |   | Groundwater           | Groundwater      | Groundwater      | Groundwater      |
| INORG-L12                        | Ammonia     | mg.l <sup>-1</sup> as NH <sub>4</sub> | A | 0.10                  | 0.10             | 6.2              | 8.5              |
| INORG-L13                        | Chloride    | mg.l <sup>-1</sup>                    | A | 30.0                  | 27.6             | 18.1             | 7.4              |
| INORG-L01                        | pH          | pH units                              | A | 7.6                   | 7.6              | 7.7              | 7.4              |

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| Code                      | Determinand | Units                                 | * | Sample Identification |             |             |             |
|---------------------------|-------------|---------------------------------------|---|-----------------------|-------------|-------------|-------------|
| Laboratory Sample Number: |             |                                       |   | 190118063             | 190118064   | 190118065   | 190118066   |
| Client Sample Reference:  |             |                                       |   | C6                    | C8          | C12         | C13         |
| Sample Date:              |             |                                       |   | 19/01/18              | 19/01/18    | 19/01/18    | 19/01/18    |
| Sample Matrix:            |             |                                       |   | Groundwater           | Groundwater | Groundwater | Groundwater |
| INORG-L12                 | Ammonia     | mg.l <sup>-1</sup> as NH <sub>4</sub> | A | 0.55                  | 0.60        | 0.26        | 0.91        |
| INORG-L13                 | Chloride    | mg.l <sup>-1</sup>                    | A | 4.4                   | 23.6        | 6.0         | 8.5         |
| INORG-L01                 | pH          | pH units                              | A | 7.3                   | 7.9         | 7.2         | 7.4         |

| Code                      | Determinand | Units                                 | * | Sample Identification |             |   |   |
|---------------------------|-------------|---------------------------------------|---|-----------------------|-------------|---|---|
| Laboratory Sample Number: |             |                                       |   | 190118067             | 190118068   | - | - |
| Client Sample Reference:  |             |                                       |   | C14                   | C16         | - | - |
| Sample Date:              |             |                                       |   | 19/01/18              | 19/01/18    | - | - |
| Sample Matrix:            |             |                                       |   | Groundwater           | Groundwater | - | - |
| INORG-L12                 | Ammonia     | mg.l <sup>-1</sup> as NH <sub>4</sub> | A | 0.14                  | 3.6         | - | - |
| INORG-L13                 | Chloride    | mg.l <sup>-1</sup>                    | A | 4.9                   | 4.6         | - | - |
| INORG-L01                 | pH          | pH units                              | A | 7.3                   | 7.2         | - | - |

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| Analytical Method                                                                        | Method Code | Accreditation Status |
|------------------------------------------------------------------------------------------|-------------|----------------------|
| Determination of pH in waters by electrode probe meter (In-house method)                 | INORG-L01   | ISO 17025            |
| Determination of ammonia in waters by colorimetric photometer (In-house method)          | INORG-L12   | ISO 17025            |
| Determination of chloride by colorimetric photometer (In-house method)                   | INORG-L13   | ISO 17025            |
| Determination of BOD in waters by titration (In-house method)                            | INORG-L06.1 | ISO 17025            |
| Determination of metals (Cr, Ni, Cu, Zn, S) in waters by ICP-OES (In-house method)       | METALS-L    | ISO 17025            |
| Determination of metals (As, Cd) in waters by colorimetric analysis (In-house method)    | 1450        | None                 |
| Determination of Cyanide in water by colorimetric analysis (In-house method)             | INORG-L31   | None                 |
| Determination of COD in waters by colorimetric photometer (In-house method)              | INORG-L05   | ISO 17025            |
| Determination of Ortho-Phosphates in waters by colorimetric photometer (In-house method) | INORG-L21.1 | ISO 17025            |
| Determination of suspended solids in waters by gravimetric (In-house method)             | INORG-L10   | ISO 17025            |
| Determination of Dissolved Methane in waters by GC-MS (Sub-Contracted method)            | 1630        | None                 |

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All results only relate to the items tested.

This report supersedes any previous versions issued by the laboratory.

A full list of determinants relating to abbreviations such as PAHs, VOCs, SVOCs, PCBs etc. is available upon request.

Where results have been labelled as deviating for any reason, the data may not be representative of the sample at the point of sampling:

[I/S]: Insufficient Sample

[U/S]: Unsuitable Sample

[A]: Date of Sampling not supplied

[B]: Sample age exceeds recommended storage time

[C]: Samples not received in appropriate containers

[D]: Broken Container

< "Less Than"

> "Greater Than"

Where any sub-contracted results have been noted as deviating by the laboratory in question, their deviations codes will be applied and detailed.

Accreditation statements are correct at the time of issue.

This report shall not be reproduced in part without the approval of Decus Research Ltd, nor used in any way as to lead to misrepresentation of the results or their implications.

\*\*\*\*\*END OF REPORT\*\*\*\*\*

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