**Aberdeen Harbour Expansion Project**

**Chemical Analysis Summary**

This report describes the marine sediment sampling and analysis that has been carried out to date for the Aberdeen Harbour Expansion Project.

Sample locations and dates

In 2013, a marine site investigation was carried out by Fugro Seacore. A total of 68 boreholes, 12 grab samples and 12 trial pits were sampled, and 26 of those samples were analysed for chemical quality at an accredited laboratory. Samples were analysed in two batches: on 28 June 2013 and on 28 October 2013. The locations and coordinates of the samples are shown on Figure 1.

In 2015, a grab sampling survey was undertaken by CMACS as part of the subtidal benthic survey for the Environmental Statement (ES). A total of 30 samples were collected and 10 of those were analysed for chemical quality at an accredited laboratory. The locations of the samples are shown on Figure 2, and the coordinates are provided in Table 1.

All samples were tested for the full suite of contaminants listed in Appendix II of Marine Scotland's '*Guidance for the sampling and analysis of sediment and dredged material to be submitted in support of applications for sea disposal of dredged material'*.

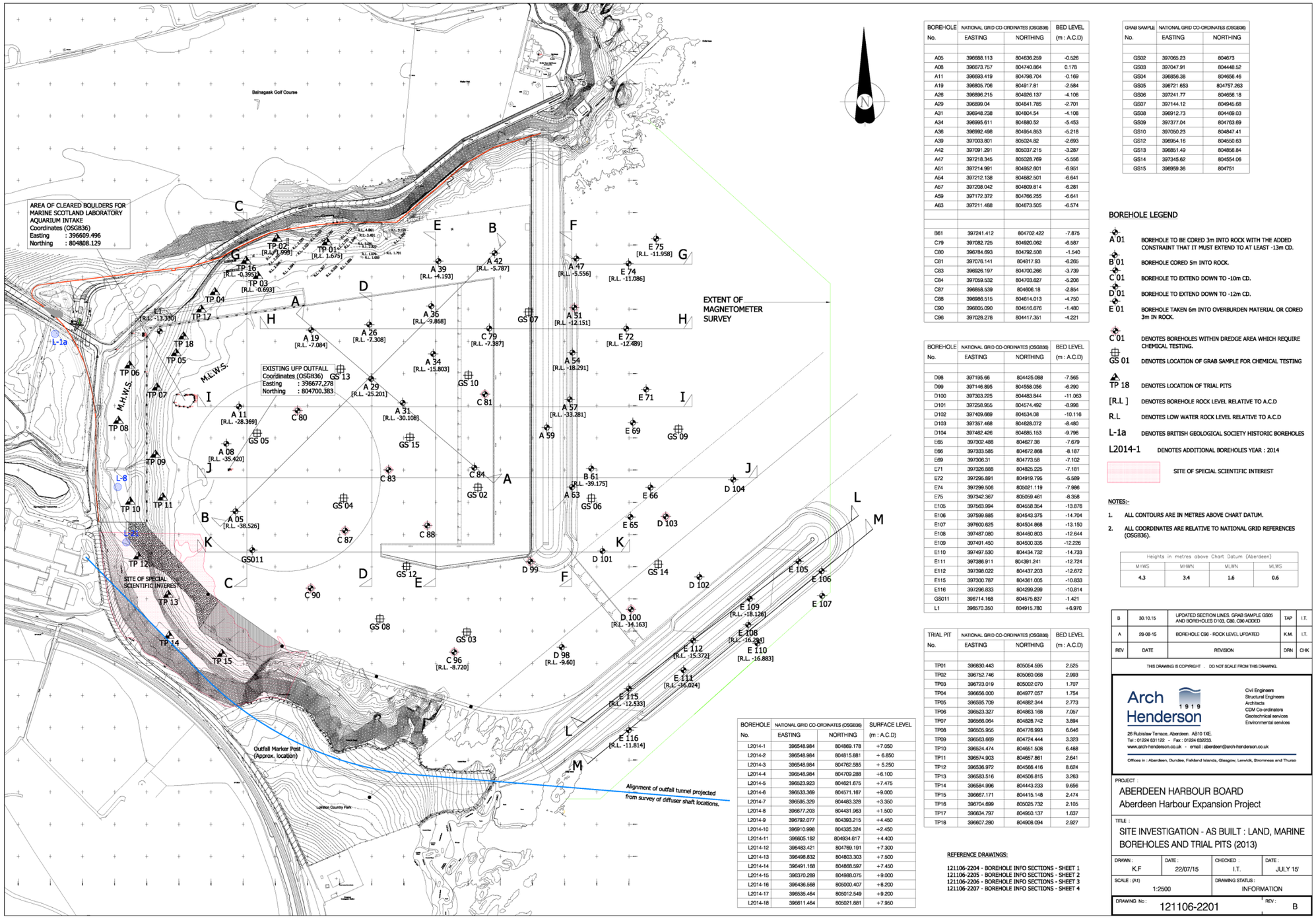
Sample results

A copy of the 2013 sediment quality results is provided in Appendix A. Levels of all contaminants were found to be below Marine Scotland's revised Action Level 1, with the exception of one sample in which the concentration of lead was found to be 74 mg/kg, which is above the revised Action Level 1 (50 mg/kg), but well below the revised Action Level 2 (400 mg/kg).

A copy of the 2015 sediment quality results is provided in Appendix B, and a copy of the full survey report is provided in ES Appendix 12-B: Subtidal Benthic Ecological Characterisation Survey. Levels of all contaminants were found to be below Marine Scotland's revised Action Level 1.

Additional sampling

At the time of writing, a marine site investigation is underway within Nigg Bay. Samples will be collected from boreholes at various depths, and these will be analysed for chemical quality. Once available, the results of the analysis will be provided to Marine Scotland as supporting information, to supplement the existing data described above. As the levels of contamination in the surface samples are low, and there have been no known historic pollution incidents within Nigg Bay that could affect the sediment quality at depth, it is considered likely that the levels of contamination will be similar to the existing data described above.




| BOREHOLE No. | NATIONAL GRID CO-ORDINATES (OSGB36) EASTING | NORTHING | BED LEVEL (m : A.C.D) |
|---|---|---|---|
| A05 | 396688.113 | 804636.259 | -0.526 |
| A08 | 396673.757 | 804740.864 | 0.178 |
| A11 | 396693.419 | 804798.704 | -0.169 |
| A19 | 396805.706 | 804917.81 | -2.584 |
| A26 | 396896.215 | 804926.137 | -4.108 |
| A29 | 396899.04 | 804841.785 | -2.701 |
| A31 | 396948.238 | 804804.54 | -4.108 |
| A34 | 396995.611 | 804880.52 | -5.453 |
| A36 | 396992.498 | 804954.853 | -5.218 |
| A39 | 397003.801 | 805024.82 | -2.693 |
| A42 | 397091.291 | 805037.215 | -3.287 |
| A47 | 397218.345 | 805028.769 | -5.556 |
| A51 | 397214.991 | 804952.601 | -6.951 |
| A54 | 397212.138 | 804882.501 | -6.641 |
| A57 | 397208.042 | 804809.814 | -6.281 |
| A59 | 397172.372 | 804766.255 | -6.641 |
| A63 | 397211.488 | 804673.505 | -6.574 |
| | | | |
| | | | |
| B61 | 397241.412 | 804702.422 | -7.875 |
| C79 | 397082.725 | 804920.062 | -6.587 |
| C80 | 396784.693 | 804792.508 | -1.540 |
| C81 | 397076.141 | 804817.93 | -6.265 |
| C83 | 396926.197 | 804700.266 | -3.739 |
| C84 | 397059.532 | 804703.627 | -5.206 |
| C87 | 396858.539 | 804606.18 | -2.854 |
| C88 | 396986.515 | 804614.013 | -4.750 |
| C90 | 396805.090 | 804516.676 | -1.480 |
| C96 | 397028.278 | 804417.351 | -4.221 |

| BOREHOLE No. | NATIONAL GRID CO-ORDINATES (OSGB36) EASTING | NORTHING | BED LEVEL (m : A.C.D) |
|---|---|---|---|
| D98 | 397195.66 | 804425.088 | -7.565 |
| D99 | 397146.895 | 804558.056 | -6.290 |
| D100 | 397303.225 | 804483.844 | -11.063 |
| D101 | 397258.955 | 804574.492 | -8.998 |
| D102 | 397409.669 | 804534.08 | -10.116 |
| D103 | 397357.468 | 804628.072 | -8.480 |
| D104 | 397462.426 | 804685.153 | -9.796 |
| E65 | 397302.488 | 804627.38 | -7.679 |
| E66 | 397333.585 | 804672.868 | -8.187 |
| E69 | 397306.31 | 804773.58 | -7.102 |
| E71 | 397326.888 | 804825.225 | -7.181 |
| E72 | 397295.891 | 804919.795 | -5.589 |
| E74 | 397299.506 | 805021.119 | -7.986 |
| E75 | 397342.367 | 805059.461 | -8.358 |
| E105 | 397563.994 | 804558.354 | -13.876 |
| E106 | 397599.885 | 804543.375 | -14.704 |
| E107 | 397600.625 | 804504.868 | -13.150 |
| E108 | 397487.080 | 804460.803 | -12.644 |
| E109 | 397491.450 | 804500.335 | -12.226 |
| E110 | 397497.530 | 804434.732 | -14.733 |
| E111 | 397386.911 | 804391.241 | -12.724 |
| E112 | 397398.022 | 804437.203 | -12.672 |
| E115 | 397300.787 | 804361.005 | -10.833 |
| E116 | 397296.833 | 804299.299 | -10.814 |
| GS011 | 396714.168 | 804575.837 | -1.421 |
| L1 | 396570.350 | 804915.780 | +6.970 |

| TRIAL PIT No. | NATIONAL GRID CO-ORDINATES (OSGB36) EASTING | NORTHING | BED LEVEL (m : A.C.D) |
|---|---|---|---|
| | | | |
| TP01 | 396830.443 | 805054.595 | 2.525 |
| TP02 | 396752.746 | 805060.068 | 2.993 |
| TP03 | 396723.019 | 805002.070 | 1.707 |
| TP04 | 396656.000 | 804977.057 | 1.754 |
| TP05 | 396595.709 | 804882.344 | 2.773 |
| TP06 | 396523.327 | 804863.168 | 7.057 |
| TP07 | 396566.064 | 804828.742 | 3.894 |
| TP08 | 396505.955 | 804776.993 | 6.646 |
| TP09 | 396563.669 | 804724.444 | 3.323 |
| TP10 | 396524.474 | 804651.508 | 6.488 |
| TP11 | 396574.903 | 804657.861 | 2.641 |
| TP12 | 396536.972 | 804566.416 | 8.624 |
| TP13 | 396583.516 | 804506.815 | 3.263 |
| TP14 | 396584.996 | 804443.233 | 9.656 |
| TP15 | 396667.171 | 804415.148 | 2.474 |
| TP16 | 396704.699 | 805025.732 | 2.105 |
| TP17 | 396634.797 | 804950.137 | 1.637 |
| TP18 | 396607.280 | 804908.094 | 2.927 |

| BOREHOLE No. | NATIONAL GRID CO-ORDINATES (OSGB36) EASTING | NORTHING | SURFACE LEVEL (m : A.C.D) |
|---|---|---|---|
| L2014-1 | 396548.984 | 804869.178 | +7.050 |
| L2014-2 | 396548.984 | 804815.881 | + 6.850 |
| L2014-3 | 396548.984 | 804762.585 | + 5.250 |
| L2014-4 | 396548.984 | 804709.288 | +6.100 |
| L2014-5 | 396523.923 | 804621.675 | +7.475 |
| L2014-6 | 396533.369 | 804571.167 | +9.000 |
| L2014-7 | 396595.329 | 804483.328 | +3.350 |
| L2014-8 | 396677.203 | 804431.963 | +1.500 |
| L2014-9 | 396792.077 | 804393.215 | +4.450 |
| L2014-10 | 396910.998 | 804335.324 | +2.450 |
| L2014-11 | 396605.182 | 804934.617 | +4.400 |
| L2014-12 | 396483.421 | 804769.191 | +7.300 |
| L2014-13 | 396498.832 | 804803.303 | +7.500 |
| L2014-14 | 396491.168 | 804868.597 | +7.450 |
| L2014-15 | 396370.289 | 804988.075 | +9.000 |
| L2014-16 | 396436.568 | 805000.407 | +8.200 |
| L2014-17 | 396535.464 | 805012.549 | +9.200 |
| L2014-18 | 396611.464 | 805021.881 | +7.950 |

REFERENCE DRAWINGS:

121106-2204 - BOREHOLE INFO SECTIONS - SHEET 1
121106-2205 - BOREHOLE INFO SECTIONS - SHEET 2
121106-2206 - BOREHOLE INFO SECTIONS - SHEET 3
121106-2207 - BOREHOLE INFO SECTIONS - SHEET 4

| GRAB SAMPLE No. | NATIONAL GRID CO-ORDINATES (OSGB36) EASTING | NORTHING |
|---|---|---|
| | | |
| GS02 | 397065.23 | 804673 |
| GS03 | 397047.91 | 804448.52 |
| GS04 | 396856.38 | 804656.46 |
| GS05 | 396721.653 | 804757.263 |
| GS06 | 397241.77 | 804656.18 |
| GS07 | 397144.12 | 804945.68 |
| GS08 | 396912.73 | 804469.03 |
| GS09 | 397377.04 | 804783.69 |
| GS10 | 397050.23 | 804847.41 |
| GS12 | 396954.16 | 804550.63 |
| GS13 | 396851.49 | 804856.84 |
| GS14 | 397345.62 | 804554.06 |
| GS15 | 396959.36 | 804751 |

BOREHOLE LEGEND

- A 01 — BOREHOLE TO BE CORED 3m INTO ROCK WITH THE ADDED CONSTRAINT THAT IT MUST EXTEND TO AT LEAST -13m CD.
- B 01 — BOREHOLE CORED 5m INTO ROCK.
- C 01 — BOREHOLE TO EXTEND DOWN TO -10m CD.
- D 01 — BOREHOLE TO EXTEND DOWN TO -12m CD.
- E 01 — BOREHOLE TAKEN 6m INTO OVERBURDEN MATERIAL OR CORED 3m IN ROCK.
- C 01 — DENOTES BOREHOLES WITHIN DREDGE AREA WHICH REQUIRE CHEMICAL TESTING.
- GS 01 — DENOTES LOCATION OF GRAB SAMPLE FOR CHEMICAL TESTING
- TP 18 — DENOTES LOCATION OF TRIAL PITS
- [R.L ] — DENOTES BOREHOLE ROCK LEVEL RELATIVE TO A.C.D
- R.L — DENOTES LOW WATER ROCK LEVEL RELATIVE TO A.C.D
- L-1a — DENOTES BRITISH GEOLOGICAL SOCIETY HISTORIC BOREHOLES
- L2014-1 — DENOTES ADDITIONAL BOREHOLES YEAR : 2014
- SITE OF SPECIAL SCIENTIFIC INTEREST

NOTES:-

1. ALL CONTOURS ARE IN METRES ABOVE CHART DATUM.
2. ALL COORDINATES ARE RELATIVE TO NATIONAL GRID REFERENCES (OSGB36).

| Heights in metres above Chart Datum (Aberdeen) | | | |
|---|---|---|---|
| MHWS | MHWN | MLWN | MLWS |
| 4.3 | 3.4 | 1.6 | 0.6 |

| REV | DATE | REVISION | DRN | CHK |
|---|---|---|---|---|
| B | 30.10.15 | UPDATED SECTION LINES. GRAB SAMPLE GS05 AND BOREHOLES D103, C80, C90 ADDED | TAP | I.T. |
| A | 28-08-15 | BOREHOLE C96 - ROCK LEVEL UPDATED | K.M. | I.T. |

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Arch Henderson 1919
Civil Engineers
Structural Engineers
Architects
CDM Co-ordinators
Geotechnical services
Environmental services
26 Rubislaw Terrace, Aberdeen. AB10 1XE.
Tel : 01224 631122 - Fax : 01224 632233.
www.arch-henderson.co.uk - email : aberdeen@arch-henderson.co.uk
Offices in : Aberdeen, Dundee, Falkland Islands, Glasgow, Lerwick, Stromness and Thurso

PROJECT :
ABERDEEN HARBOUR BOARD
Aberdeen Harbour Expansion Project

TITLE :
SITE INVESTIGATION - AS BUILT : LAND, MARINE BOREHOLES AND TRIAL PITS (2013)

| DRAWN : | DATE : | CHECKED : | DATE : |
|---|---|---|---|
| K.F | 22/07/15 | I.T. | JULY 15' |

SCALE : (A1) 1:2500
DRAWING STATUS : INFORMATION
DRAWING No : 121106-2201 REV : B

**Figure 1 Sample locations from 2013 site investigation by Fugro Seacore**

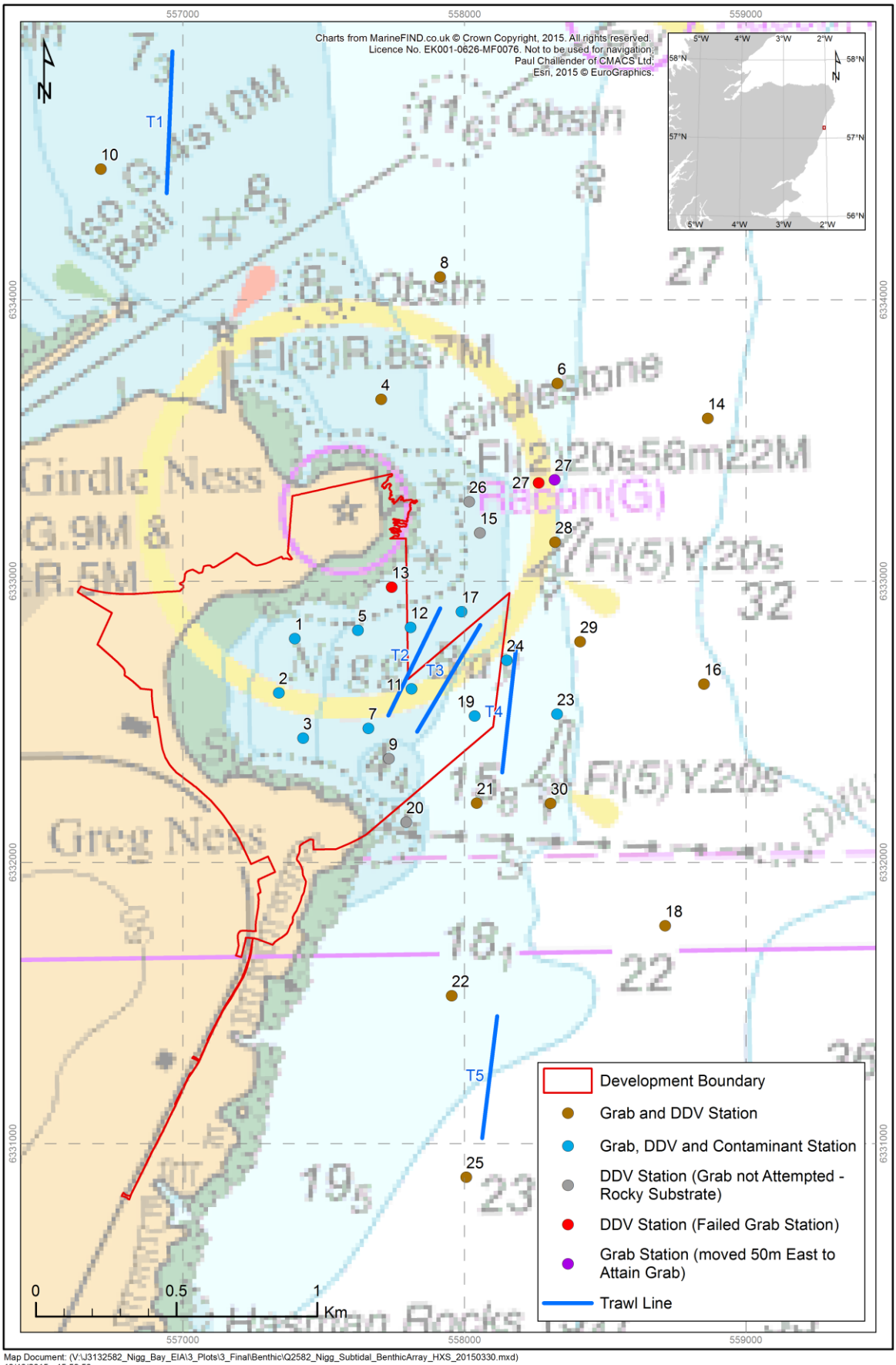


**Figure 2 Sample locations from the 2015 survey by CMACS**

**Table 1 Coordinates of sample locations from the 2015 survey by CMACS**

| Station | Easting | Northing |
|---|---|---|
| 1 | 557397 | 6332795 |
| 2 | 557340.5 | 6332602 |
| 3 | 557426.8 | 6332441 |
| 5 | 557621.8 | 6332825 |
| 7 | 557658.7 | 6332476 |
| 11 | 557812 | 6332617 |
| 17 | 557989.1 | 6332891 |
| 19 | 558036 | 6332520 |
| 23 | 558329 | 6332527 |
| 24 | 558149.9 | 6332719 |

# Appendix A:

# 2013 sediment sampling results

SOIL ENGINEERING

# SUPPORTING FACTUAL DATA

## SECTION B
Laboratory Testing

## ENVIRONMENTAL AND CHEMICAL RESULTS

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## Certificate of Analysis

3 Crittall Drive
Springwood Industrial
Estate
Braintree
Essex
CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

**Report Number:** 359771-1

**Date of Report:** 19-Nov-2013

**Customer:** Soil Engineering Geoservices Limited
Parkside Lane
Dewsbury Road
Leeds
West Yorkshire.
LS11 5SX

**Customer Contact:** Mr Stuart Kirk

**Customer Job Reference:** TA7148
**Customer Site Reference:** Bay of Nigg Harbour Development Ground Investigation
**Date Job Received at SAL:** 07-Nov-2013
**Date Analysis Started:** 08-Nov-2013
**Date Analysis Completed:** 18-Nov-2013

The results reported relate to samples received in the laboratory
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Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with QP22

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1650

Report checked
and authorised by :
Sarah Watt-Roy
Project Manager

Issued by :
Sarah Watt-Roy
Project Manager

[redacted]

**SAL Reference:** 359771
**Project Site:** Bay of Nigg Harbour Development Ground Investigation
**Customer Reference:** TA7148

**Soil** Analysed as Soil
**Miscellaneous**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | **SAL Reference** | **359771 001** | **359771 003** | **359771 004** | **359771 005** | **359771 006** |
| | | | | **Customer Sample Reference** | **TP01 D004 @ 0.600m** | **TP08 D002 @ 0.500m** | **TP12 D005 @ 2.200m** | **TP16 D002 @ 0.200m** | **A54 C @ 8.000-8.500m** |
| | | | | **Date Sampled** | **06-NOV-2013** | **06-NOV-2013** | **06-NOV-2013** | **06-NOV-2013** | **06-NOV-2013** |
| **Determinand** | **Method** | **Test Sample** | **LOD** | **Units** | | | | | |
| Chloride | T686 | A40 | 2 | mg/kg | **1500** | **93** | **81** | **1700** | **1200** |
| (Water soluble) Mg | T251 | A40 | 0.1 | g/l | **23** | **5.3** | **3.2** | **26** | **10** |
| Nitrate | T686 | A40 | 1 | mg/kg | - | **5** | **10** | - | - |
| (Water Soluble) SO4 expressed as SO4 | T242 | A40 | 0.01 | g/l | **0.19** | **0.06** | **0.04** | **0.18** | **0.08** |
| pH | T7 | A40 | | | **8.6** | **8.6** | **8.5** | **7.9** | **8.7** |
| Retained on 2mm | T2 | A40 | 0.1 | % | <0.1 | <0.1 | **7.1** | **4.2** | <0.1 |

**SAL Reference:** 359771
**Project Site:** Bay of Nigg Harbour Development Ground Investigation
**Customer Reference:** TA7148

**Soil** Analysed as Soil
**Miscellaneous**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | **SAL Reference** | **359771 007** | **359771 008** |
| | | | | **Customer Sample Reference** | **A11 C @ 7.630-8.100m** | **E71 C @ 10.300-10.720m** |
| | | | | **Date Sampled** | **06-NOV-2013** | **06-NOV-2013** |
| **Determinand** | **Method** | **Test Sample** | **LOD** | **Units** | | |
| Chloride | T686 | A40 | 2 | mg/kg | **280** | - |
| (Water soluble) Mg | T251 | A40 | 0.1 | g/l | **5.8** | - |
| (Water Soluble) SO4 expressed as SO4 | T242 | A40 | 0.01 | g/l | **0.03** | **0.10** |
| pH | T7 | A40 | | | **8.8** | **8.1** |
| Retained on 2mm | T2 | A40 | 0.1 | % | <0.1 | **8.7** |

## Index to symbols used in 359771-1

| Value | Description |
|---|---|
| A40 | Assisted dried < 40C |
| U | Analysis is UKAS accredited |
| N | Analysis is not UKAS accredited |

## Method Index

| Value | Description |
|---|---|
| T7 | Probe |
| T2 | Grav |
| T686 | Discrete Analyser |
| T251 | 2:1 Extraction/ICP/OES |
| T242 | 2:1 Extraction/ICP/OES (TRL 447 T1) |

## Accreditation Summary

| Determinand | Method | Test Sample | LOD | Units | Symbol | SAL References |
|---|---|---|---|---|---|---|
| Chloride | T686 | A40 | 2 | mg/kg | N | 001,003-007 |
| (Water soluble) Mg | T251 | A40 | 0.1 | g/l | N | 001,003-007 |
| Nitrate | T686 | A40 | 1 | mg/kg | N | 003-004 |
| (Water Soluble) SO4 expressed as SO4 | T242 | A40 | 0.01 | g/l | U | 001,003-008 |
| pH | T7 | A40 | | | U | 001,003-008 |
| Retained on 2mm | T2 | A40 | 0.1 | % | N | 001,003-008 |

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## Certificate of Analysis

3 Crittall Drive
Springwood Industrial
Estate
Braintree
Essex
CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

**Report Number:** 359295-1

**Date of Report:** 19-Nov-2013

**Customer:** Soil Engineering Geoservices Limited
Parkside Lane
Dewsbury Road
Leeds
West Yorkshire.
LS11 5SX

**Customer Contact:** Mr Stuart Kirk

**Customer Job Reference:** TA7148
**Customer Site Reference:** Bay of Nigg Harbour Development Ground Investigation
**Date Job Received at SAL:** 05-Nov-2013
**Date Analysis Started:** 06-Nov-2013
**Date Analysis Completed:** 19-Nov-2013

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All results have been reviewed in accordance with QP22

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Report checked
and authorised by :
Sarah Watt-Roy
Project Manager

Issued by :
Sarah Watt-Roy
Project Manager

[redacted]

**SAL Reference:** 359295
**Project Site:** Bay of Nigg Harbour Development Ground Investigation
**Customer Reference:** TA7148

**Soil** Analysed as Soil
**Miscellaneous**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | **SAL Reference** | **359295 001** | **359295 003** | **359295 004** | **359295 005** | **359295 007** |
| | | | | **Customer Sample Reference** | **A05 C @ 5.980-6.320m** | **A57 D017 @ 6.000m** | **A63 D023 @ 7.000m** | **E65 D007 @ 2.000m** | **E108 D003 @ 1.000m** |
| | | | | **Date Sampled** | **01-NOV-2013** | **01-NOV-2013** | **01-NOV-2013** | **01-NOV-2013** | **01-NOV-2013** |
| **Determinand** | **Method** | **Test Sample** | **LOD** | **Units** | | | | | |
| Chloride | T686 | A40 | 2 | mg/kg | **270** | - | **2800** | **4100** | - |
| (Water soluble) Mg | T251 | A40 | 0.1 | g/l | **5.0** | - | **39** | <0.1 | - |
| (Water Soluble) SO4 expressed as SO4 | T242 | A40 | 0.01 | g/l | **0.04** | **0.20** | **0.26** | **0.39** | **0.57** |
| pH | T7 | A40 | | | **8.8** | **8.7** | **8.7** | **9.0** | **8.9** |
| Retained on 2mm | T2 | A40 | 0.1 | % | **5.5** | **5.4** | **4.9** | <0.1 | (32) <0.1 |

**SAL Reference:** 359295
**Project Site:** Bay of Nigg Harbour Development Ground Investigation
**Customer Reference:** TA7148

**Soil** Analysed as Soil
**Miscellaneous**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | **SAL Reference** | **359295 008** |
| | | | | | **Customer Sample Reference** | **TP05 B005 @ 1.500m** |
| | | | | | **Date Sampled** | **01-NOV-2013** |
| **Determinand** | **Method** | **Test Sample** | **LOD** | **Units** | | |
| Chloride | T686 | A40 | 2 | mg/kg | **3000** | |
| (Water soluble) Mg | T251 | A40 | 0.1 | g/l | **48** | |
| (Water Soluble) SO4 expressed as SO4 | T242 | A40 | 0.01 | g/l | **0.25** | |
| pH | T7 | A40 | | | **8.4** | |
| Retained on 2mm | T2 | A40 | 0.1 | % | **2.8** | |

## Index to symbols used in 359295-1

| Value | Description |
|---|---|
| A40 | Assisted dried < 40C |
| 32 | Whole sample was crushed |
| U | Analysis is UKAS accredited |
| N | Analysis is not UKAS accredited |

## Method Index

| Value | Description |
|---|---|
| T2 | Grav |
| T251 | 2:1 Extraction/ICP/OES |
| T7 | Probe |
| T686 | Discrete Analyser |
| T242 | 2:1 Extraction/ICP/OES (TRL 447 T1) |

## Accreditation Summary

| Determinand | Method | Test Sample | LOD | Units | Symbol | SAL References |
|---|---|---|---|---|---|---|
| Chloride | T686 | A40 | 2 | mg/kg | N | 001,004-005,008 |
| (Water soluble) Mg | T251 | A40 | 0.1 | g/l | N | 001,004-005,008 |
| (Water Soluble) SO4 expressed as SO4 | T242 | A40 | 0.01 | g/l | U | 001,003-005,007-008 |
| pH | T7 | A40 | | | U | 001,003-005,007-008 |
| Retained on 2mm | T2 | A40 | 0.1 | % | N | 001,003-005,007-008 |

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3 Crittall Drive
Springwood Industrial
Estate
Braintree
Essex
CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

**Report Number:** 360047-1

**Date of Report:** 21-Nov-2013

**Customer:** Soil Engineering Geoservices Limited
Parkside Lane
Dewsbury Road
Leeds
West Yorkshire.
LS11 5SX

**Customer Contact:** Mr Stuart Kirk

**Customer Job Reference:** TA7148
**Customer Site Reference:** Bay of Nigg Harbour Development Ground Investigation
**Date Job Received at SAL:** 08-Nov-2013
**Date Analysis Started:** 11-Nov-2013
**Date Analysis Completed:** 19-Nov-2013

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All results have been reviewed in accordance with QP22

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Report checked
and authorised by :
Sarah Watt-Roy
Project Manager

Issued by :
Sarah Watt-Roy
Project Manager

[redacted]

**SAL Reference:** 360047
**Project Site:** Bay of Nigg Harbour Development Ground Investigation
**Customer Reference:** TA7148

**Soil** Analysed as Soil
**Miscellaneous**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | **SAL Reference** | **360047 001** | **360047 002** |
| | | | | **Customer Sample Reference** | **A29 C011 @ 10.800m** | **E112 D004 @ 1.500m** |
| | | | | **Date Sampled** | **07-NOV-2013** | **07-NOV-2013** |
| **Determinand** | **Method** | **Test Sample** | **LOD** | **Units** | | |
| (Water Soluble) SO4 expressed as SO4 | T242 | A40 | 0.01 | g/l | **0.06** | **0.30** |
| pH | T7 | A40 | | | **8.3** | **8.8** |
| Retained on 2mm | T2 | A40 | 0.1 | % | **7.2** | **4.0** |

## Index to symbols used in 360047-1

| Value | Description |
|---|---|
| A40 | Assisted dried < 40C |
| U | Analysis is UKAS accredited |
| N | Analysis is not UKAS accredited |

## Method Index

| Value | Description |
|---|---|
| T2 | Grav |
| T242 | 2:1 Extraction/ICP/OES (TRL 447 T1) |
| T7 | Probe |

## Accreditation Summary

| Determinand | Method | Test Sample | LOD | Units | Symbol | SAL References |
|---|---|---|---|---|---|---|
| (Water Soluble) SO4 expressed as SO4 | T242 | A40 | 0.01 | g/l | U | 001-002 |
| pH | T7 | A40 | | | U | 001-002 |
| Retained on 2mm | T2 | A40 | 0.1 | % | N | 001-002 |

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# Scientific Analysis Laboratories Ltd

## Certificate of Analysis

3 Crittall Drive
Springwood Industrial
Estate
Braintree
Essex
CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

**Report Number:** 361939-1

**Date of Report:** 22-Nov-2013

**Customer:** Soil Engineering Geoservices Limited
Parkside Lane
Dewsbury Road
Leeds
West Yorkshire.
LS11 5SX

**Customer Contact:** Mr Stuart Kirk

**Customer Job Reference:** TA7148
**Customer Site Reference:** Bay of Nigg Harbour Development Ground Investigation
**Date Job Received at SAL:** 20-Nov-2013
**Date Analysis Started:** 20-Nov-2013
**Date Analysis Completed:** 22-Nov-2013

The results reported relate to samples received in the laboratory
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Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with QP22

UKAS TESTING
1650

Report checked
and authorised by :
Sarah Watt-Roy
Project Manager

Issued by :
Sarah Watt-Roy
Project Manager

[redacted]

**SAL Reference:** 361939
**Project Site:** Bay of Nigg Harbour Development Ground Investigation
**Customer Reference:** TA7148

**Soil** Analysed as Soil
**Miscellaneous**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | **SAL Reference** | **361939 001** | **361939 002** |
| | | | | **Customer Sample Reference** | **A34 C @ 6.250m** | **E72 D005 @ 2.000m** |
| | | | | **Date Sampled** | **01-NOV-2013** | **01-NOV-2013** |
| **Determinand** | **Method** | **Test Sample** | **LOD** | **Units** | | |
| Chloride | T686 | A40 | 2 | mg/kg | **2900** | **710** |
| (Water soluble) Mg | T251 | A40 | 0.1 | g/l | **6.6** | **77** |
| (Water Soluble) SO4 expressed as SO4 | T242 | A40 | 0.01 | g/l | **0.04** | **0.30** |
| pH | T7 | A40 | | | **8.4** | **8.8** |
| Retained on 2mm | T2 | A40 | 0.1 | % | <0.1 | <0.1 |

## Index to symbols used in 361939-1

| Value | Description |
|---|---|
| A40 | Assisted dried < 40C |
| U | Analysis is UKAS accredited |
| N | Analysis is not UKAS accredited |

## Method Index

| Value | Description |
|---|---|
| T7 | Probe |
| T242 | 2:1 Extraction/ICP/OES (TRL 447 T1) |
| T686 | Discrete Analyser |
| T251 | 2:1 Extraction/ICP/OES |
| T2 | Grav |

## Accreditation Summary

| Determinand | Method | Test Sample | LOD | Units | Symbol | SAL References |
|---|---|---|---|---|---|---|
| Chloride | T686 | A40 | 2 | mg/kg | N | 001-002 |
| (Water soluble) Mg | T251 | A40 | 0.1 | g/l | N | 001-002 |
| (Water Soluble) SO4 expressed as SO4 | T242 | A40 | 0.01 | g/l | U | 001-002 |
| pH | T7 | A40 | | | U | 001-002 |
| Retained on 2mm | T2 | A40 | 0.1 | % | N | 001-002 |

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## Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

**Report Number:** 355566-1

**Date of Report:** 28-Oct-2013

**Customer:** Soil Engineering Geoservices Limited
Parkside Lane
Dewsbury Road
Leeds
West Yorkshire.
LS11 5SX

**Customer Contact:** Mr Tom Walton

**Customer Job Reference:** TA7148
**Customer Site Reference:** Bay of Nigg Harbour Development
**Date Job Received at SAL:** 15-Oct-2013
**Date Analysis Started:** 16-Oct-2013
**Date Analysis Completed:** 28-Oct-2013

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Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with QP22

UKAS TESTING
1549

Report checked
and authorised by :
Mr Ross Walker
Customer Services Manager
(Land)

Issued by :
Mr Ross Walker
Customer Services Manager
(Land)

[redacted]

**SAL Reference:** 355566
**Project Site:** Bay of Nigg Harbour Development
**Customer Reference:** TA7148

**Marine Sediment** Analysed as Marine Sediment
**Marine Scotland Suite**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **SAL Reference** | **355566 001** | **355566 002** | **355566 003** | **355566 004** | **355566 005** | **355566 006** | **355566 007** |
| | | | | **Customer Sample Reference** | **D99G ES 001 0.00** | **A05G ES 001 0.00** | **C88G ES 001 0.00** | **D100G ES 001 0.00** | **C87G ES 001 0.00** | **D103G ES 001 0.00** | **A51G ES 001 0.00** |
| | | | | **Date Sampled** | **07-OCT-2013** | **07-OCT-2013** | **07-OCT-2013** | **07-OCT-2013** | **07-OCT-2013** | **07-OCT-2013** | **07-OCT-2013** |
| **Determinand** | **Method** | **Test Sample** | **LOD** | **Units** | | | | | | | |
| Naphthalene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Acenaphthylene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Acenaphthene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Fluorene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **2.3** | <2.0 | <2.0 | <2.0 | <2.0 |
| Phenanthrene | T1 | AR | 2.0 | µg/kg | <2.0 | **2.0** | **8.4** | <2.0 | <2.0 | <2.0 | <2.0 |
| Anthracene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Fluoranthene | T1 | AR | 2.0 | µg/kg | <2.0 | **2.4** | **5.8** | <2.0 | <2.0 | <2.0 | <2.0 |
| Pyrene | T1 | AR | 2.0 | µg/kg | <2.0 | **2.4** | **7.8** | <2.0 | <2.0 | <2.0 | <2.0 |
| Benzo(a)Anthracene | T1 | AR | 2.0 | µg/kg | <2.0 | **2.9** | **5.0** | **2.1** | <2.0 | <2.0 | <2.0 |
| Chrysene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **2.6** | <2.0 | <2.0 | <2.0 | <2.0 |
| Benzo(b/k)Fluoranthene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **3.1** | <2.0 | <2.0 | <2.0 | <2.0 |
| Benzo(a)Pyrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **2.5** | <2.0 | <2.0 | <2.0 | <2.0 |
| Indeno(123-cd)Pyrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **2.3** | <2.0 | <2.0 | <2.0 | <2.0 |
| Dibenzo(ah)Anthracene | T1 | AR | 0.5 | µg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(ghi)Perylene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **2.1** | <2.0 | <2.0 | <2.0 | <2.0 |
| PCB BZ#101 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#118 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#138 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#153 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#180 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#28 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#52 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB EC7 (Sum) | T85 | AR | 0.7 | µg/kg | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 |
| PCB (Total Tri-Hepta) | T1 | AR | 1.4 | µg/kg | <1.4 | <1.4 | <1.4 | <1.4 | <1.4 | <1.4 | <1.4 |
| Tributyl tin | T16 | AR | 10 | µg/kg | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| As (Total) | T301 | AR | 1.0 | mg/kg | **5.6** | **6.2** | **5.0** | **6.6** | **5.7** | **6.1** | **6.2** |
| Cd (Total) | T301 | AR | 0.05 | mg/kg | <0.05 | **0.07** | <0.05 | <0.05 | <0.05 | <0.05 | **0.07** |
| Cr (Total) | T301 | AR | 0.2 | mg/kg | **10** | **17** | **14** | **13** | **7.0** | **8.7** | **7.7** |
| Cu (Total) | T301 | AR | 0.1 | mg/kg | **2.7** | **5.3** | **4.4** | **4.3** | **2.1** | **4.5** | **2.1** |
| Pb (Total) | T301 | AR | 0.2 | mg/kg | **17** | **17** | **15** | **17** | **19** | **17** | **16** |
| Mercury | T355 | AR | 0.05 | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ni (Total) | T301 | AR | 0.2 | mg/kg | **6.2** | **11** | **9.1** | **8.7** | **5.9** | **6.4** | **7.2** |
| Zn (Total) | T303 | AR | 2.0 | mg/kg | **16** | **29** | **23** | **25** | **10** | **15** | **12** |
| Moisture @ 105 C | T162 | AR | 0.1 | % | **29** | **24** | **35** | **7.6** | **19** | **25** | **21** |

**SAL Reference:** 355566
**Project Site:** Bay of Nigg Harbour Development
**Customer Reference:** TA7148

**Marine Sediment** Analysed as Marine Sediment
**Marine Scotland Suite**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **SAL Reference** | **355566 008** | **355566 010** | **355566 011** | **355566 012** | **355566 013** | **355566 014** | **355566 015** |
| | | | | **Customer Sample Reference** | **C90G ES 001 0.00** | **C81G ES 001 0.00** | **C83G ES 001 0.00** | **C80G ES 001 0.00** | **GS11 ES 001 0.00** | **C96G ES 001 0.00** | **GS05 ES 001 0.00** |
| | | | | **Date Sampled** | **07-OCT-2013** | **07-OCT-2013** | **07-OCT-2013** | **07-OCT-2013** | **07-OCT-2013** | **07-OCT-2013** | **07-OCT-2013** |
| **Determinand** | **Method** | **Test Sample** | **LOD** | **Units** | | | | | | | |
| Naphthalene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **4.5** | <2.0 | <2.0 | <2.0 | <2.0 |
| Acenaphthylene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Acenaphthene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **13** | <2.0 | <2.0 | <2.0 | <2.0 |
| Fluorene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **14** | <2.0 | <2.0 | <2.0 | <2.0 |
| Phenanthrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **110** | **3.3** | <2.0 | <2.0 | <2.0 |
| Anthracene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **34** | <2.0 | <2.0 | <2.0 | <2.0 |
| Fluoranthene | T1 | AR | 2.0 | µg/kg | **2.7** | <2.0 | **110** | **6.4** | <2.0 | **2.2** | <2.0 |
| Pyrene | T1 | AR | 2.0 | µg/kg | **2.9** | <2.0 | **110** | **5.4** | <2.0 | **2.1** | <2.0 |
| Benzo(a)Anthracene | T1 | AR | 2.0 | µg/kg | **3.3** | <2.0 | **61** | **5.1** | **2.0** | **3.1** | **2.1** |
| Chrysene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **31** | **2.3** | <2.0 | <2.0 | <2.0 |
| Benzo(b/k)Fluoranthene | T1 | AR | 2.0 | µg/kg | **2.5** | <2.0 | **30** | **2.3** | <2.0 | <2.0 | <2.0 |
| Benzo(a)Pyrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **30** | <2.0 | <2.0 | <2.0 | <2.0 |
| Indeno(123-cd)Pyrene | T1 | AR | 2.0 | µg/kg | **2.6** | <2.0 | **20** | **2.1** | **2.0** | <2.0 | <2.0 |
| Dibenzo(ah)Anthracene | T1 | AR | 0.5 | µg/kg | <0.5 | <0.5 | **3.7** | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(ghi)Perylene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | **18** | <2.0 | <2.0 | <2.0 | <2.0 |
| PCB BZ#101 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#118 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#138 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#153 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#180 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#28 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#52 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB EC7 (Sum) | T85 | AR | 0.7 | µg/kg | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 |
| PCB (Total Tri-Hepta) | T1 | AR | 1.4 | µg/kg | <1.4 | <1.4 | <1.4 | <1.4 | <1.4 | <1.4 | <1.4 |
| Tributyl tin | T16 | AR | 10 | µg/kg | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| As (Total) | T301 | AR | 1.0 | mg/kg | **6.2** | **6.2** | **6.4** | **6.3** | **5.9** | **6.3** | **6.7** |
| Cd (Total) | T301 | AR | 0.05 | mg/kg | <0.05 | **0.07** | **0.07** | <0.05 | <0.05 | <0.05 | <0.05 |
| Cr (Total) | T301 | AR | 0.2 | mg/kg | **8.5** | **13** | **15** | **6.8** | **7.2** | **7.6** | **7.4** |
| Cu (Total) | T301 | AR | 0.1 | mg/kg | **2.5** | **5.6** | **5.1** | **3.0** | **3.0** | **2.5** | **2.0** |
| Pb (Total) | T301 | AR | 0.2 | mg/kg | **16** | **15** | **15** | **15** | **16** | **14** | **15** |
| Mercury | T355 | AR | 0.05 | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ni (Total) | T301 | AR | 0.2 | mg/kg | **7.2** | **10** | **12** | **7.2** | **9.0** | **9.4** | **8.3** |
| Zn (Total) | T303 | AR | 2.0 | mg/kg | **15** | **21** | **23** | **12** | **15** | **12** | **11** |
| Moisture @ 105 C | T162 | AR | 0.1 | % | **23** | **33** | **26** | **20** | **24** | **27** | **23** |

## Index to symbols used in 355566-1

| Value | Description |
|---|---|
| AR | As Received |
| U | Analysis is UKAS accredited |
| N | Analysis is not UKAS accredited |

## Method Index

| Value | Description |
|---|---|
| T355 | CVAFS |
| T301 | ICP/MS (Total) |
| T16 | GC/MS |
| T303 | ICP-OES (Total) |
| T85 | Calc |
| T1 | GC/MS (HR) |
| T162 | Grav (1 Dec) (105 C) |

# Accreditation Summary

| Determinand | Method | Test Sample | LOD | Units | Symbol | SAL References |
|---|---|---|---|---|---|---|
| Naphthalene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Acenaphthylene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Acenaphthene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Fluorene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Phenanthrene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Anthracene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Fluoranthene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Pyrene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Benzo(a)Anthracene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Chrysene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Benzo(b/k)Fluoranthene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Benzo(a)Pyrene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Indeno(123-cd)Pyrene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| Dibenzo(ah)Anthracene | T1 | AR | 0.5 | µg/kg | N | 001-008,010-015 |
| Benzo(ghi)Perylene | T1 | AR | 2.0 | µg/kg | N | 001-008,010-015 |
| PCB BZ#101 | T1 | AR | 0.1 | µg/kg | U | 001-008,010-015 |
| PCB BZ#118 | T1 | AR | 0.1 | µg/kg | U | 001-008,010-015 |
| PCB BZ#138 | T1 | AR | 0.1 | µg/kg | U | 001-008,010-015 |
| PCB BZ#153 | T1 | AR | 0.1 | µg/kg | U | 001-008,010-015 |
| PCB BZ#180 | T1 | AR | 0.1 | µg/kg | U | 001-008,010-015 |
| PCB BZ#28 | T1 | AR | 0.1 | µg/kg | U | 001-008,010-015 |
| PCB BZ#52 | T1 | AR | 0.1 | µg/kg | U | 001-008,010-015 |
| PCB EC7 (Sum) | T85 | AR | 0.7 | µg/kg | N | 001-008,010-015 |
| PCB (Total Tri-Hepta) | T1 | AR | 1.4 | µg/kg | U | 001-008,010-015 |
| Tributyl tin | T16 | AR | 10 | µg/kg | N | 001-008,010-015 |
| As (Total) | T301 | AR | 1.0 | mg/kg | N | 001-008,010-015 |
| Cd (Total) | T301 | AR | 0.05 | mg/kg | N | 001-008,010-015 |
| Cr (Total) | T301 | AR | 0.2 | mg/kg | N | 001-008,010-015 |
| Cu (Total) | T301 | AR | 0.1 | mg/kg | N | 001-008,010-015 |
| Pb (Total) | T301 | AR | 0.2 | mg/kg | N | 001-008,010-015 |
| Mercury | T355 | AR | 0.05 | mg/kg | N | 001-008,010-015 |
| Ni (Total) | T301 | AR | 0.2 | mg/kg | N | 001-008,010-015 |
| Zn (Total) | T303 | AR | 2.0 | mg/kg | N | 001-008,010-015 |
| Moisture @ 105 C | T162 | AR | 0.1 | % | N | 001-008,010-015 |

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Hadfield House, Hadfield Street, Manchester M16 9FE

# Scientific Analysis Laboratories Ltd

## Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

**Report Number:** 338167-1

**Date of Report:** 16-Jul-2013

**Customer:** Soil Engineering Geoservices Limited
Parkside Lane
Dewsbury Road
Leeds
West Yorkshire.
LS11 5SX

**Customer Contact:** Mr Tom Walton

**Customer Job Reference:** TA7148
**Customer Site Reference:** Bay of Nigg Harbour Development
**Date Job Received at SAL:** 01-Jul-2013
**Date Analysis Started:** 05-Jul-2013
**Date Analysis Completed:** 16-Jul-2013

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Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with QP22

UKAS TESTING
1549

Report checked
and authorised by :
Mr Ross Walker
Customer Services Manager
(Land)

Issued by :
Mr Ross Walker
Customer Services Manage
(Land)

[redacted]

**SAL Reference:** 338167
**Project Site:** Bay of Nigg Harbour Development
**Customer Reference:** TA7148

**Marine Sediment** Analysed as Marine Sediment
**Marine Scotland Suite**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **SAL Reference** | **338167 001** | **338167 002** | **338167 003** | **338167 004** | **338167 005** | **338167 006** |
| | | | | **Customer Sample Reference** | **GS02 0.00 ES 001** | **GS03 0.00 ES 001** | **GS04 0.00 ES 001** | **GS06 0.00 ES 001** | **GS07 0.00 ES 001** | **GS08 0.00 ES 001** |
| | | | | **Date Sampled** | **28-JUN-2013** | **28-JUN-2013** | **28-JUN-2013** | **28-JUN-2013** | **28-JUN-2013** | **28-JUN-2013** |
| **Determinand** | **Method** | **Test Sample** | **LOD** | **Units** | | | | | | |
| Naphthalene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Acenaphthylene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **7.0** | <2.0 |
| Acenaphthene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Fluorene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Phenanthrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Anthracene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Fluoranthene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Pyrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Benzo(a)Anthracene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Chrysene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Benzo(b/k)Fluoranthene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **22** | <2.0 |
| Benzo(a)Pyrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **13** | <2.0 |
| Indeno(123-cd)Pyrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **7.0** | <2.0 |
| Dibenzo(ah)Anthracene | T1 | AR | 0.5 | µg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(ghi)Perylene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **8.0** | <2.0 |
| PCB BZ#101 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#118 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#138 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#153 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#180 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#28 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#52 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB EC7 (Sum) | T85 | AR | 0.7 | µg/kg | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 |
| PCB (Total Tri-Hepta) | T1 | AR | 1.4 | µg/kg | <1.4 | <1.4 | <1.4 | <1.4 | <1.4 | <1.4 |
| Tributyl tin | T16 | AR | 10 | µg/kg | <10 | <10 | <10 | <10 | <10 | <10 |
| As (Total) | T301 | AR | 1.0 | mg/kg | **6.4** | **6.4** | **5.4** | **4.9** | **6.0** | **5.9** |
| Cd (Total) | T301 | AR | 0.05 | mg/kg | **0.24** | **0.27** | **0.23** | **0.26** | **0.21** | **0.19** |
| Cr (Total) | T301 | AR | 0.2 | mg/kg | **19** | **32** | **17** | **19** | **14** | **13** |
| Cu (Total) | T301 | AR | 0.1 | mg/kg | **3.4** | **5.0** | **2.6** | **3.3** | **2.4** | **2.5** |
| Pb (Total) | T301 | AR | 0.2 | mg/kg | **25** | **44** | **29** | **28** | **28** | **28** |
| Mercury | T355 | AR | 0.05 | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ni (Total) | T301 | AR | 0.2 | mg/kg | **6.1** | **7.8** | **5.4** | **6.4** | **4.6** | **4.2** |
| Zn (Total) | T303 | AR | 2.0 | mg/kg | **24** | **30** | **20** | **23** | **19** | **19** |
| Moisture @ 105 C | T162 | AR | 0.1 | % | **21** | **20** | **19** | **22** | **20** | **20** |

**SAL Reference:** 338167
**Project Site:** Bay of Nigg Harbour Development
**Customer Reference:** TA7148

**Marine Sediment** Analysed as Marine Sediment
**Marine Scotland Suite**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **SAL Reference** | **338167 007** | **338167 008** | **338167 009** | **338167 010** | **338167 011** | **338167 012** |
| | | | | **Customer Sample Reference** | **GS09 0.00 ES 001** | **GS10 0.00 ES 001** | **GS12 0.00 ES 001** | **GS13 0.00 ES 001** | **GS14 0.00 ES 001** | **GS15 0.00 ES 001** |
| | | | | **Date Sampled** | **28-JUN-2013** | **28-JUN-2013** | **28-JUN-2013** | **28-JUN-2013** | **28-JUN-2013** | **28-JUN-2013** |
| **Determinand** | **Method** | **Test Sample** | **LOD** | **Units** | | | | | | |
| Naphthalene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Acenaphthylene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 | <2.0 |
| Acenaphthene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **5.0** | **4.0** |
| Fluorene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **5.0** | **4.0** |
| Phenanthrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **25** | **25** |
| Anthracene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **6.0** | **8.0** |
| Fluoranthene | T1 | AR | 2.0 | µg/kg | **2.0** | <2.0 | <2.0 | <2.0 | **25** | **33** |
| Pyrene | T1 | AR | 2.0 | µg/kg | **2.0** | <2.0 | **3.0** | <2.0 | **27** | **31** |
| Benzo(a)Anthracene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **12** | **15** |
| Chrysene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **11** | **13** |
| Benzo(b/k)Fluoranthene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **22** | **31** |
| Benzo(a)Pyrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **12** | **17** |
| Indeno(123-cd)Pyrene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **4.0** | **6.0** |
| Dibenzo(ah)Anthracene | T1 | AR | 0.5 | µg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(ghi)Perylene | T1 | AR | 2.0 | µg/kg | <2.0 | <2.0 | <2.0 | <2.0 | **6.0** | **11** |
| PCB BZ#101 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#118 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#138 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#153 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#180 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#28 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB BZ#52 | T1 | AR | 0.1 | µg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| PCB EC7 (Sum) | T85 | AR | 0.7 | µg/kg | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 | <0.7 |
| PCB (Total Tri-Hepta) | T1 | AR | 1.4 | µg/kg | <1.4 | <1.4 | <1.4 | <1.4 | <1.4 | <1.4 |
| Tributyl tin | T16 | AR | 10 | µg/kg | <10 | <10 | <10 | <10 | <10 | <10 |
| As (Total) | T301 | AR | 1.0 | mg/kg | **5.5** | **5.4** | **6.1** | **5.6** | **5.9** | **6.5** |
| Cd (Total) | T301 | AR | 0.05 | mg/kg | **0.36** | **0.22** | **0.34** | **0.23** | **0.22** | **0.29** |
| Cr (Total) | T301 | AR | 0.2 | mg/kg | **30** | **11** | **22** | **13** | **12** | **35** |
| Cu (Total) | T301 | AR | 0.1 | mg/kg | **5.0** | **2.1** | **4.5** | **2.3** | **2.2** | **5.2** |
| Pb (Total) | T301 | AR | 0.2 | mg/kg | **32** | **29** | **34** | **30** | **32** | **74** |
| Mercury | T355 | AR | 0.05 | mg/kg | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Ni (Total) | T301 | AR | 0.2 | mg/kg | **9.8** | **3.9** | **8.1** | **4.2** | **4.3** | **11** |
| Zn (Total) | T303 | AR | 2.0 | mg/kg | **32** | **17** | **28** | **18** | **17** | **32** |
| Moisture @ 105 C | T162 | AR | 0.1 | % | **27** | **20** | **31** | **21** | **22** | **19** |

## Index to symbols used in 338167-1

| Value | Description |
|---|---|
| AR | As Received |
| U | Analysis is UKAS accredited |
| N | Analysis is not UKAS accredited |

## Method Index

| Value | Description |
|---|---|
| T162 | Grav (1 Dec) (105 C) |
| T303 | ICP-OES (Total) |
| T16 | GC/MS |
| T301 | ICP/MS (Total) |
| T355 | CVAFS |
| T85 | Calc |
| T1 | GC/MS (HR) |

# Accreditation Summary

| Determinand | Method | Test Sample | LOD | Units | Symbol | SAL References |
|---|---|---|---|---|---|---|
| Naphthalene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Acenaphthylene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Acenaphthene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Fluorene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Phenanthrene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Anthracene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Fluoranthene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Pyrene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Benzo(a)Anthracene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Chrysene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Benzo(b/k)Fluoranthene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Benzo(a)Pyrene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Indeno(123-cd)Pyrene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| Dibenzo(ah)Anthracene | T1 | AR | 0.5 | µg/kg | N | 001-012 |
| Benzo(ghi)Perylene | T1 | AR | 2.0 | µg/kg | N | 001-012 |
| PCB BZ#101 | T1 | AR | 0.1 | µg/kg | U | 001-012 |
| PCB BZ#118 | T1 | AR | 0.1 | µg/kg | U | 001-012 |
| PCB BZ#138 | T1 | AR | 0.1 | µg/kg | U | 001-012 |
| PCB BZ#153 | T1 | AR | 0.1 | µg/kg | U | 001-012 |
| PCB BZ#180 | T1 | AR | 0.1 | µg/kg | U | 001-012 |
| PCB BZ#28 | T1 | AR | 0.1 | µg/kg | U | 001-012 |
| PCB BZ#52 | T1 | AR | 0.1 | µg/kg | U | 001-012 |
| PCB EC7 (Sum) | T85 | AR | 0.7 | µg/kg | N | 001-012 |
| PCB (Total Tri-Hepta) | T1 | AR | 1.4 | µg/kg | U | 001-012 |
| Tributyl tin | T16 | AR | 10 | µg/kg | N | 001-012 |
| As (Total) | T301 | AR | 1.0 | mg/kg | N | 001-012 |
| Cd (Total) | T301 | AR | 0.05 | mg/kg | N | 001-012 |
| Cr (Total) | T301 | AR | 0.2 | mg/kg | N | 001-012 |
| Cu (Total) | T301 | AR | 0.1 | mg/kg | N | 001-012 |
| Pb (Total) | T301 | AR | 0.2 | mg/kg | N | 001-012 |
| Mercury | T355 | AR | 0.05 | mg/kg | N | 001-012 |
| Ni (Total) | T301 | AR | 0.2 | mg/kg | N | 001-012 |
| Zn (Total) | T303 | AR | 2.0 | mg/kg | N | 001-012 |
| Moisture @ 105 C | T162 | AR | 0.1 | % | N | 001-012 |

# Appendix B:

# 2015 sediment sampling results

(extract from ES Appendix 12-B: Subtidal Benthic Ecological Characterisation Survey)

# Appendix 8: Sediment contaminants full results

## Table 1. Dry Weights, Total Organic Carbon and Organotins.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Customer Sample No** | | | | | **Certified Reference Material** | | **NIGG 1** | **NIGG 2** | **NIGG 3** | **NIGG 5** | **NIGG 7** | **NIGG 11** | **NIGG 17** | **NIGG 19** | **NIGG 23** | **NIGG 24** |
| Customer Sample ID | | | | | | | | | | | | | | | | |
| RPS Sample No | | | | | | | 266086 | 266087 | 266088 | 266089 | 266090 | 266091 | 266092 | 266093 | 266094 | 266095 |
| **Sample Type** | | | | | **SEDIMENT** | | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** |
| Sample Location | | | | | **CRM-646** | | | | | | | | | | | |
| Sample Depth (m) | | | | | | | | | | | | | | | | |
| Sampling Date | | | | | | | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 |
| Sampling Time | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| **Determinand** | **CAS No** | **Codes** | **SOP** | **Units** | **Result** | **Recovery %** | | | | | | | | | | |
| dry solids (at 105°C) | | | In house | % | n/a | n/a | 75.3 | 74.2 | 75.3 | 74.8 | 75.6 | 64.5 | 75.5 | 74.0 | 74.2 | 73.9 |
| total organic carbon* | | S | | % | n/a | n/a | 0.06 | 0.10 | 0.19 | 0.10 | 0.08 | 0.10 | 0.07 | 0.06 | 0.06 | 0.06 |
| tributyltin (TBT) | 56573-85-4 | | In house | mg/kg | 0.42 | 89.4 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |

Tributyltin results have been dry weight corrected

## Table 2. Metals.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Customer Sample No** | **Standard Reference Material** | **NIGG 1** | **NIGG 2** | **NIGG 3** | **NIGG 5** | **NIGG 7** | **NIGG 11** | **NIGG 17** | **NIGG 19** | **NIGG 23** | **NIGG 24** |
| | | | | | | | Customer Sample ID | | | | | | | | | | | |
| | | | | | | | RPS Sample No | | 266086 | 266087 | 266088 | 266089 | 266090 | 266091 | 266092 | 266093 | 266094 | 266095 |
| | | | | | | | **Sample Type** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** |
| | | | | | | | Sample Location | **SRM-2702** | | | | | | | | | | |
| | | | | | | | Sample Depth (m) | | | | | | | | | | | |
| | | | | | | | Sampling Date | | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 |
| | | | | | | | Sampling Time | | | | | | | | | | | |
| **Determinand** | **CAS No** | **Codes** | **SOP** | **Mass** | **Units** | **Result** | **Recovery %** | | | | | | | | | | | |
| arsenic* | 7440-38-2 | SI | ICP-MS | 75 | mg/kg | 42.4 | 93.6 | 6.19 | 5.98 | 6.12 | 5.92 | 6.00 | 6.65 | 7.34 | 7.68 | 8.79 | 6.99 |
| cadmium* | 7440-43-9 | SI | ICP-MS | 111 | mg/kg | 0.93 | 113.8 | < 0.10 | < 0.10 | 0.11 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | 0.16 |
| chromium* | 7440-47-3 | SI | ICP-MS | 52 | mg/kg | 307.9 | 87.5 | 19.0 | 24.2 | 22.1 | 19.9 | 22.3 | 27.3 | 25.3 | 22.4 | 17.8 | 18.3 |
| copper* | 7440-50-8 | SI | ICP-MS | 65 | mg/kg | Not certified | n/a | 3.03 | 3.66 | 2.96 | 2.53 | 2.60 | 2.48 | 2.20 | 2.16 | 1.70 | 1.83 |
| lead* | 7439-92-1 | SI | ICP-MS | 208 | mg/kg | 134 | 100.9 | 17.9 | 19.5 | 19.9 | 17.2 | 19.5 | 18.0 | 17.5 | 17.9 | 21.0 | 18.3 |
| mercury* | 7439-97-6 | SI | AFS | 202 | mg/kg | 0.42 | 93.9 | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.03 | < 0.01 | < 0.01 | < 0.01 |
| nickel* | 7440-02-0 | SI | ICP-MS | 60 | mg/kg | 61.1 | 81 | 5.88 | 8.11 | 6.15 | 5.99 | 5.79 | 7.09 | 5.99 | 5.66 | 4.76 | 4.56 |
| zinc* | 7440-66-6 | SI | ICP-MS | 65 | mg/kg | 462.5 | 95.3 | 25.0 | 29.7 | 25.1 | 21.8 | 23.5 | 24.3 | 24.8 | 22.8 | 18.8 | 20.3 |

Metals results have been dry weight corrected

## Table 3. Polycyclic Aromatic Hydrocarbons (EPA 16 PAHs).

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Customer Sample No** | **Certified Reference Material** | **NIGG 1** | **NIGG 2** | **NIGG 3** | **NIGG 5** | **NIGG 7** | **NIGG 11** | **NIGG 17** | **NIGG 19** | **NIGG 23** | **NIGG 24** |
| | | | | | | Customer Sample ID | | | | | | | | | | | |
| | | | | | | RPS Sample No | | 266086 | 266087 | 266088 | 266089 | 266090 | 266091 | 266092 | 266093 | 266094 | 266095 |
| | | | | | | **Sample Type** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** |
| | | | | | | Sample Location | **NIST-1944** | | | | | | | | | | |
| | | | | | | Sample Depth (m) | | | | | | | | | | | |
| | | | | | | Sampling Date | | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 |
| | | | | | | Sampling Time | | | | | | | | | | | |
| **Determinand** | **CAS No** | **Codes** | **SOP** | **Mass** | **Units** | **Result** | **Recovery %** | | | | | | | | | | |
| naphthalene | 91-20-3 | | 304 | 128 | ug/kg | Not certified | n/a | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 |
| acenaphthylene | 208-96-8 | | 304 | 152 | ug/kg | Not certified | n/a | 0.133 | 0.135 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 |
| acenaphthene | 83-32-9 | | 304 | 154 | ug/kg | Not certified | n/a | 0.266 | 1.75 | 0.531 | < 0.100 | < 0.100 | 0.620 | 0.132 | < 0.100 | < 0.100 | 0.541 |
| fluorene | 86-73-7 | | 304 | 166 | ug/kg | Not certified | n/a | 4.25 | 1.89 | 0.531 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | 0.541 |
| phenanthrene | 85-01-8 | | 304 | 178 | ug/kg | 4471.2 | 84.8 | 3.05 | 11.3 | 3.85 | 0.802 | 0.794 | 0.620 | 0.132 | 0.270 | < 0.100 | 3.25 |
| anthracene | 120-12-7 | | 304 | 178 | ug/kg | Not certified | n/a | 1.33 | 3.23 | 1.46 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | 0.812 |
| fluoranthene | 206-44-0 | | 304 | 202 | ug/kg | 7223.4 | 81.0 | 0.797 | 9.56 | 4.52 | < 0.100 | < 0.100 | 0.155 | 0.397 | < 0.100 | < 0.100 | 3.11 |
| pyrene | 129-00-0 | | 304 | 202 | ug/kg | 7310 | 75.4 | 3.85 | 11.2 | 4.91 | 0.267 | 0.132 | < 0.100 | 0.530 | < 0.100 | 0.674 | 3.38 |
| benzo(a)anthracene | 56-55-3 | | 304 | 228 | ug/kg | 3290.6 | 69.7 | 1.99 | 4.58 | 2.13 | < 0.100 | 0.132 | 0.155 | < 0.100 | 0.135 | < 0.100 | 1.22 |
| chrysene | 218-01-9 | | 304 | 228 | ug/kg | 3932.4 | 80.9 | 1.20 | 4.85 | 1.20 | < 0.100 | < 0.100 | < 0.100 | 3.31 | < 0.100 | < 0.100 | 0.677 |
| benzo(b)fluoranthene | 205-99-2 | | 304 | 252 | ug/kg | 5211.4 | 87.1 | 2.39 | 5.25 | 2.79 | 0.134 | 0.529 | 0.155 | 0.397 | < 0.100 | < 0.100 | 1.08 |
| benzo(k)fluoranthene | 207-08-9 | | 304 | 252 | ug/kg | 1598.2 | 69.5 | 0.797 | 1.75 | 0.930 | 0.134 | 0.265 | 0.155 | 0.265 | < 0.100 | < 0.100 | 0.406 |
| benzo(a)pyrene | 50-32-8 | | 304 | 252 | ug/kg | 2997.8 | 69.7 | 2.13 | 4.85 | 2.66 | 0.267 | 0.661 | 0.310 | 0.662 | 0.135 | < 0.100 | 1.35 |
| indeno(1,2,3-c,d)pyrene | 193-39-5 | | 304 | 276 | ug/kg | 850.2 | 112.0 | 1.20 | 2.29 | 1.46 | 0.134 | 0.397 | 0.155 | 0.265 | < 0.100 | < 0.100 | 0.406 |
| dibenzo(a,h)anthracene | 53-70-3 | | 304 | 278 | ug/kg | 2138.2 | 76.9 | 0.398 | 0.808 | 0.398 | < 0.100 | 0.132 | < 0.100 | < 0.100 | < 0.100 | < 0.100 | 0.135 |
| benzo(g,h,i)perylene | 191-24-2 | | 304 | 276 | ug/kg | 2544.8 | 89.6 | 1.33 | 3.23 | 1.73 | 0.134 | 0.529 | 0.155 | 0.397 | < 0.100 | < 0.100 | 0.677 |

PAH results have been dry weight corrected

## Table 4. Polychlorinated Biphenyls (ICES 7).

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Customer Sample No** | | | | | **Certified Reference Material** | | **NIGG 1** | **NIGG 2** | **NIGG 3** | **NIGG 5** | **NIGG 7** | **NIGG 11** | **NIGG 17** | **NIGG 19** | **NIGG 23** | **NIGG 24** |
| Customer Sample ID | | | | | | | | | | | | | | | | |
| RPS Sample No | | | | | | | 266086 | 266087 | 266088 | 266089 | 266090 | 266091 | 266092 | 266093 | 266094 | 266095 |
| **Sample Type** | | | | | **SEDIMENT** | | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** | **SEDIMENT** |
| Sample Location | | | | | **NIST-1944** | | | | | | | | | | | |
| Sample Depth (m) | | | | | | | | | | | | | | | | |
| Sampling Date | | | | | | | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 | 20/03/15 |
| Sampling Time | | | | | | | | | | | | | | | | |
| **Determinand** | **CAS No** | **Codes** | **SOP** | **Units** | **Result** | **Recovery %** | | | | | | | | | | |
| 2,4,4'-trichlorobiphenyl (PCB congener 28) | 7012-37-5 | | 319 | ug/kg | 91.0 | 112.6 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| 2,2',5,5'-tetrachlorobiphenyl (PCB congener 52) | 35693-99-3 | | 319 | ug/kg | 101.3 | 127.6 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| 2,2',4,5,5'-pentachlorobiphenyl (PCB congener 101) | 37680-73-2 | | 319 | ug/kg | 81.7 | 111.3 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| 2,3',4,4',5-pentachlorobiphenyl (PCB congener 118) | 31508-00-6 | | 319 | ug/kg | 65.6 | 113.0 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| 2,2',3,4,4',5-hexachlorobiphenyl (PCB 138) | 35065-28-2 | | 319 | ug/kg | 97.4 | 156.8 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| 2,2',4,4',5,5'-hexachlorobiphenyl (PCB 153) | 35065-27-1 | | 319 | ug/kg | 83.8 | 113.2 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| 2,2',3,4,4',5,5'-heptachlorobiphenyl (PCB 180) | 35065-29-3 | | 319 | ug/kg | 60.8 | 137.2 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |

PCB results have been dry weight corrected.