

BOC Limited Kooragang Groundwater Report May 2017

BOC Limited Kooragang Island

8 June 2017



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| Document Control | | | | Approved for Issue | | |
|------------------|----------|-----------------------|----------|--------------------|-----------|------------|
| Project No. | Revision | Author | Reviewer | Name | Signature | Date |
| 034-1714 | 0 | S Crosdale | B Kelly | B Kelly | | 30/05/2017 |
| 034-1714 | 1 | S Crosdale B Kelly | B Kelly | B Kelly | | 08/06/2017 |

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1 Introduction

BOC Limited Kooragang Island, herein referred to as BOC Kooragang, owns and operates a gas facility for the production and supply of gas products located at 9 Egret Street Kooragang, New South Wales. The facility operates 24 hours per day, 7 days per week. holds NSW Environmental Protection Authority (EPA) Environmental Protection Licence (EPL) 20165. The Scheduled Activities in the EPL include chemical storage waste generation, dangerous goods production and general chemicals storage.

BOC Kooragang are in the process of a development application (DA) with the Department of Planning and Environment for utilising the cooling tower effluent for irrigation purposes in specific grassed areas of the site.

The cooling tower effluent has been pre-treated using a specialised media filter unit, which was targeted at removal of fluoride.

MJM Environmental (MJM) was engaged by BOC Kooragang in May 2017 to undertake groundwater sampling and analysis prior to irrigation occurring onsite to obtain baseline concentrations. This report outlines the results of the groundwater sampling carried out on 16 and 18 May 2017.

2 Site identification and monitoring locations

BOC Kooragang operates a gas facility located at 9 Egret Street Kooragang, New South Wales. The plant vicinity map is shown in Figure 2-1



Figure 2-1: BOC Kooragang site boundary and vicinity (Spatial Information Exchange [SIXMaps] 2017)

The groundwater monitoring points described as BH1 through to BH6 inclusive are shown in Figure 2-2.



Figure 2-2: Location of BOC Kooragang's groundwater boreholes

3 Sampling Methodology

The sampling was done in accordance with ANZECC monitoring standards (AS/NZS 5667.11:1998 and AS/NZS 5667.1:1998). These procedures include the name and location of the sample point, date and time of sample collection, the type of sample point, method of sample collection, depth of sampling and sample appearance at the time of collection.

Groundwater sampling was undertaken by taking grab samples with appropriate bottles provided by a NATA accredited laboratory. A bailer was used to collect samples from all boreholes. Samples were put immediately into an esky to avoid heat and sunlight, and taken directly to the laboratory.

At the conclusion of sampling all individual, marked sealed containers were transferred to a local NATA-accredited laboratory. A certificate of analysis is presented in Appendix A and the field notes for the sampling work completed are presented in Appendix B.

4 Results

The analytical results for the 16 and 18 May 2017 groundwater monitoring event are presented in the following table.

Table 4-1: BOC Kooragang Groundwater Results – May 2017

| Analyte | Units | BH1 | BH2 | BH3 | BH4 | BH5 | BH6 |
|---------------------------------------|-------|---------|---------|---------|---------|---------|---------|
| pH | pH | 7.78 | 7.43 | 7.69 | 7.57 | 7.84 | 8.04 |
| Conductivity | µS/cm | 713 | 673 | 492 | 694 | 670 | 722 |
| Sodium Absorption Ratio | - | 0.53 | 0.37 | 0.26 | 0.48 | 1.70 | 1.10 |
| Total Alkalinity as calcium carbonate | mg/L | 228 | 244 | 181 | 248 | 233 | 269 |
| Chloride | mg/L | 22 | 20 | 11 | 19 | 41 | 34 |
| Sodium | mg/L | 20 | 14 | 8 | 18 | 50 | 39 |
| Nitrogen (total) | mg/L | 52.0 | 33.4 | 9.1 | 60.8 | 2.8 | 4.0 |
| Total Kjeldahl Nitrogen | mg/L | 52.0 | 33.4 | 8.9 | 60.8 | 2.5 | 3.8 |
| Nitrate | mg/L | 0.01 | 0.05 | 0.20 | 0.03 | 0.32 | 0.15 |
| Sulfate | mg/L | 88 | 48 | 42 | 50 | <50 | 10 |
| Phosphorus | mg/L | 29.8 | 24.2 | 14.0 | 51.2 | 1.93 | 2.60 |
| Reactive Phosphorus | mg/L | 0.02 | <0.01 | 0.14 | 0.06 | 0.30 | 0.57 |
| Total dissolved solids | mg/L | 840 | 795 | 432 | 815 | 372 | 429 |
| Fluoride | mg/L | 0.5 | 0.8 | 0.6 | 0.9 | 0.8 | 0.9 |
| Standing Water Level | m | 2 | 2 | 1.5 | 2.5 | 2 | 2 |
| Metals (dissolved) | | | | | | | |
| Arsenic | mg/L | <0.001 | <0.001 | 0.002 | <0.001 | 0.001 | 0.002 |
| Cadmium | mg/L | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Chromium | mg/L | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Copper | mg/L | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.001 |
| Nickel | mg/L | <0.001 | 0.001 | <0.001 | 0.001 | <0.001 | 0.001 |
| Lead | mg/L | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Zinc | mg/L | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| Mercury | mg/L | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |

5 Discussion

MJM Environmental was engaged by BOC Kooragang to monitor groundwater by undertaking sampling and analysis to obtain baseline concentrations prior to irrigation activities onsite. Groundwater sampling was carried out for BH1, BH2, BH3, BH4 and BH6 on 16 May 2017, and BH5 was performed on 18 May 2017.

Appendix A – NATA Laboratory Results

CERTIFICATE OF ANALYSIS

| | | | |
|--------------------------------|---|--------------------------------|--|
| Work Order | : ES1711778 | Page | : 1 of 4 |
| Amendment | : 1 | | |
| Client | : MJM ENVIRONMENTAL PTY LTD | Laboratory | : Environmental Division Sydney |
| Contact | : BRIGID KELLY | Contact | : Customer Services ES |
| Address | : OFFICE 1, 335 WHARF ROAD NEWCASTLE NSW, AUSTRALIA 2300 | Address | : 277-289 Woodpark Road Smithfield NSW Australia 2164 |
| Telephone | : +61 02 49264222 | Telephone | : +61-2-8784 8555 |
| Project | : 034 1714 | Date Samples Received | : 16-May-2017 16:00 |
| Order number | : 49264222 | Date Analysis Commenced | : 16-May-2017 |
| C-O-C number | : ---- | Issue Date | : 08-Jun-2017 11:21 |
| Sampler | : S CROSDALE | | |
| Site | : ---- | | |
| Quote number | : SYBQ/358/15 | | |
| No. of samples received | : 5 | | |
| No. of samples analysed | : 5 | | |



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Accredited for compliance with
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| <i>Signatories</i> | <i>Position</i> | <i>Accreditation Category</i> |
|--------------------|-------------------------|------------------------------------|
| Ankit Joshi | Inorganic Chemist | Sydney Inorganics, Smithfield, NSW |
| Celine Conceicao | Senior Spectroscopist | Sydney Inorganics, Smithfield, NSW |
| Neil Martin | Team Leader - Chemistry | Chemistry, Newcastle West, NSW |



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- This report has been amended following the Dissolved 8 metals added on 1/06/17



Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | | | Client sample ID | BH1 | BH2 | BH3 | BH4 | BH6 |
|---|-------------|--------|---------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | | 16-May-2017 14:00 | 16-May-2017 14:20 | 16-May-2017 14:33 | 16-May-2017 14:50 | 16-May-2017 15:05 |
| Compound | CAS Number | LOR | Unit | | ES1711778-001 | ES1711778-002 | ES1711778-003 | ES1711778-004 | ES1711778-005 |
| | | | | | Result | Result | Result | Result | Result |
| EA005: pH | | | | | | | | | |
| pH Value | ---- | 0.01 | pH Unit | | 7.78 | 7.43 | 7.69 | 7.57 | 8.04 |
| EA010P: Conductivity by PC Titrator | | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | | 713 | 673 | 492 | 694 | 722 |
| EA015: Total Dissolved Solids dried at 180 ± 5 °C | | | | | | | | | |
| Total Dissolved Solids @180°C | ---- | 10 | mg/L | | 840 | 795 | 432 | 815 | 429 |
| ED037P: Alkalinity by PC Titrator | | | | | | | | | |
| Hydroxide Alkalinity as CaCO ₃ | DMO-210-001 | 1 | mg/L | | <1 | <1 | <1 | <1 | <1 |
| Carbonate Alkalinity as CaCO ₃ | 3812-32-6 | 1 | mg/L | | <1 | <1 | <1 | <1 | <1 |
| Bicarbonate Alkalinity as CaCO ₃ | 71-52-3 | 1 | mg/L | | 228 | 244 | 181 | 248 | 269 |
| Total Alkalinity as CaCO ₃ | ---- | 1 | mg/L | | 228 | 244 | 181 | 248 | 269 |
| ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA | | | | | | | | | |
| Sulfate as SO ₄ - Turbidimetric | 14808-79-8 | 1 | mg/L | | 88 | 48 | 42 | 50 | 10 |
| ED045G: Chloride by Discrete Analyser | | | | | | | | | |
| Chloride | 16887-00-6 | 1 | mg/L | | 22 | 20 | 11 | 19 | 34 |
| ED093F: Dissolved Major Cations | | | | | | | | | |
| Sodium | 7440-23-5 | 1 | mg/L | | 20 | 14 | 8 | 18 | 39 |
| ED093F: SAR and Hardness Calculations | | | | | | | | | |
| Sodium Adsorption Ratio | ---- | 0.01 | - | | 0.53 | 0.37 | 0.26 | 0.48 | 1.10 |
| EG020F: Dissolved Metals by ICP-MS | | | | | | | | | |
| Arsenic | 7440-38-2 | 0.001 | mg/L | | <0.001 | <0.001 | 0.002 | <0.001 | 0.002 |
| Cadmium | 7440-43-9 | 0.0001 | mg/L | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Chromium | 7440-47-3 | 0.001 | mg/L | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Copper | 7440-50-8 | 0.001 | mg/L | | <0.001 | <0.001 | <0.001 | <0.001 | 0.001 |
| Nickel | 7440-02-0 | 0.001 | mg/L | | <0.001 | 0.001 | <0.001 | 0.001 | 0.001 |
| Lead | 7439-92-1 | 0.001 | mg/L | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Zinc | 7440-66-6 | 0.005 | mg/L | | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| EG020T: Total Metals by ICP-MS | | | | | | | | | |
| Arsenic | 7440-38-2 | 0.001 | mg/L | | 0.123 | 0.144 | 0.150 | 0.414 | 0.035 |
| Cadmium | 7440-43-9 | 0.0001 | mg/L | | 0.0103 | 0.0070 | 0.0023 | 0.0148 | 0.0003 |
| Chromium | 7440-47-3 | 0.001 | mg/L | | 0.833 | 0.746 | 0.322 | 0.907 | 0.154 |
| Copper | 7440-50-8 | 0.001 | mg/L | | 0.722 | 0.675 | 0.162 | 0.915 | 0.038 |
| Nickel | 7440-02-0 | 0.001 | mg/L | | 0.574 | 0.672 | 0.181 | 0.804 | 0.034 |
| Lead | 7439-92-1 | 0.001 | mg/L | | 2.20 | 2.53 | 0.419 | 3.24 | 0.044 |
| Zinc | 7440-66-6 | 0.005 | mg/L | | 11.6 | 9.92 | 2.07 | 15.3 | 0.421 |



Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | | | Client sample ID | BH1 | BH2 | BH3 | BH4 | BH6 |
|---|------------|--------|------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | | 16-May-2017 14:00 | 16-May-2017 14:20 | 16-May-2017 14:33 | 16-May-2017 14:50 | 16-May-2017 15:05 |
| Compound | CAS Number | LOR | Unit | | ES1711778-001 | ES1711778-002 | ES1711778-003 | ES1711778-004 | ES1711778-005 |
| | | | | | Result | Result | Result | Result | Result |
| EG035F: Dissolved Mercury by FIMS | | | | | | | | | |
| Mercury | 7439-97-6 | 0.0001 | mg/L | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| EG035T: Total Recoverable Mercury by FIMS | | | | | | | | | |
| Mercury | 7439-97-6 | 0.0001 | mg/L | | <0.0001 | 0.0006 | 0.0002 | 0.0001 | <0.0001 |
| EK040P: Fluoride by PC Titrator | | | | | | | | | |
| Fluoride | 16984-48-8 | 0.1 | mg/L | | 0.5 | 0.8 | 0.6 | 0.9 | 0.9 |
| EK057G: Nitrite as N by Discrete Analyser | | | | | | | | | |
| Nitrite as N | 14797-65-0 | 0.01 | mg/L | | 0.02 | <0.01 | <0.01 | <0.01 | 0.01 |
| EK058G: Nitrate as N by Discrete Analyser | | | | | | | | | |
| Nitrate as N | 14797-55-8 | 0.01 | mg/L | | 0.01 | 0.05 | 0.20 | 0.03 | 0.15 |
| EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser | | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.01 | mg/L | | 0.03 | 0.05 | 0.20 | 0.03 | 0.16 |
| EK061G: Total Kjeldahl Nitrogen By Discrete Analyser | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | | 52.0 | 33.4 | 8.9 | 60.8 | 3.8 |
| EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser | | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 0.1 | mg/L | | 52.0 | 33.4 | 9.1 | 60.8 | 4.0 |
| EK067G: Total Phosphorus as P by Discrete Analyser | | | | | | | | | |
| Total Phosphorus as P | ---- | 0.01 | mg/L | | 29.8 | 24.2 | 14.0 | 51.2 | 2.60 |
| EK071G: Reactive Phosphorus as P by discrete analyser | | | | | | | | | |
| Reactive Phosphorus as P | 14265-44-2 | 0.01 | mg/L | | 0.02 | <0.01 | 0.14 | 0.06 | 0.57 |

CERTIFICATE OF ANALYSIS

| | | | |
|--------------------------------|---|--------------------------------|--|
| Work Order | : ES1711991 | Page | : 1 of 4 |
| Amendment | : 1 | | |
| Client | : MJM ENVIRONMENTAL PTY LTD | Laboratory | : Environmental Division Sydney |
| Contact | : MS BRIGID KELLY | Contact | : Customer Services ES |
| Address | : OFFICE 1, 335 WHARF ROAD NEWCASTLE NSW, AUSTRALIA 2300 | Address | : 277-289 Woodpark Road Smithfield NSW Australia 2164 |
| Telephone | : +61 49264222 | Telephone | : +61-2-8784 8555 |
| Project | : 034 1714 | Date Samples Received | : 18-May-2017 13:21 |
| Order number | : ---- | Date Analysis Commenced | : 18-May-2017 |
| C-O-C number | : ---- | Issue Date | : 06-Jun-2017 14:18 |
| Sampler | : S CROSDALE | | |
| Site | : ---- | | |
| Quote number | : SYBQ/358/15 | | |
| No. of samples received | : 1 | | |
| No. of samples analysed | : 1 | | |



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ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| <i>Signatories</i> | <i>Position</i> | <i>Accreditation Category</i> |
|--------------------|-----------------------|------------------------------------|
| Andrea Swan | Manager | Chemistry, Newcastle West, NSW |
| Ankit Joshi | Inorganic Chemist | Sydney Inorganics, Smithfield, NSW |
| Celine Conceicao | Senior Spectroscopist | Sydney Inorganics, Smithfield, NSW |



General Comments

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Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- ED041G: LOR raised for Sulfate on sample no:1 due to sample matrix.
- This report has been amended following the dissolved 8 metals added on 1/06/17.



Analytical Results

| | | | | | | | | | |
|---|-------------|--------|---------|------------------|-------------------|-------|-------|-------|-------|
| Sub-Matrix: WATER (Matrix: WATER) | | | | Client sample ID | BH5 | ---- | ---- | ---- | ---- |
| Client sampling date / time | | | | | 18-May-2017 10:30 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | | ES1711991-001 | ----- | ----- | ----- | ----- |
| | | | | Result | ---- | ---- | ---- | ---- | ---- |
| EA005: pH | | | | | | | | | |
| pH Value | ---- | 0.01 | pH Unit | | 7.84 | ---- | ---- | ---- | ---- |
| EA010P: Conductivity by PC Titrator | | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | | 670 | ---- | ---- | ---- | ---- |
| EA015: Total Dissolved Solids dried at 180 ± 5 °C | | | | | | | | | |
| Total Dissolved Solids @180°C | ---- | 10 | mg/L | | 372 | ---- | ---- | ---- | ---- |
| ED037P: Alkalinity by PC Titrator | | | | | | | | | |
| Hydroxide Alkalinity as CaCO ₃ | DMO-210-001 | 1 | mg/L | | <1 | ---- | ---- | ---- | ---- |
| Carbonate Alkalinity as CaCO ₃ | 3812-32-6 | 1 | mg/L | | <1 | ---- | ---- | ---- | ---- |
| Bicarbonate Alkalinity as CaCO ₃ | 71-52-3 | 1 | mg/L | | 233 | ---- | ---- | ---- | ---- |
| Total Alkalinity as CaCO ₃ | ---- | 1 | mg/L | | 233 | ---- | ---- | ---- | ---- |
| ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA | | | | | | | | | |
| Sulfate as SO ₄ - Turbidimetric | 14808-79-8 | 1 | mg/L | | <50 | ---- | ---- | ---- | ---- |
| ED045G: Chloride by Discrete Analyser | | | | | | | | | |
| Chloride | 16887-00-6 | 1 | mg/L | | 41 | ---- | ---- | ---- | ---- |
| ED093F: Dissolved Major Cations | | | | | | | | | |
| Sodium | 7440-23-5 | 1 | mg/L | | 50 | ---- | ---- | ---- | ---- |
| ED093F: SAR and Hardness Calculations | | | | | | | | | |
| Sodium Adsorption Ratio | ---- | 0.01 | - | | 1.70 | ---- | ---- | ---- | ---- |
| EG020F: Dissolved Metals by ICP-MS | | | | | | | | | |
| Arsenic | 7440-38-2 | 0.001 | mg/L | | 0.002 | ---- | ---- | ---- | ---- |
| Cadmium | 7440-43-9 | 0.0001 | mg/L | | <0.0001 | ---- | ---- | ---- | ---- |
| Chromium | 7440-47-3 | 0.001 | mg/L | | <0.001 | ---- | ---- | ---- | ---- |
| Copper | 7440-50-8 | 0.001 | mg/L | | <0.001 | ---- | ---- | ---- | ---- |
| Nickel | 7440-02-0 | 0.001 | mg/L | | <0.001 | ---- | ---- | ---- | ---- |
| Lead | 7439-92-1 | 0.001 | mg/L | | <0.001 | ---- | ---- | ---- | ---- |
| Zinc | 7440-66-6 | 0.005 | mg/L | | <0.005 | ---- | ---- | ---- | ---- |
| EG020T: Total Metals by ICP-MS | | | | | | | | | |
| Arsenic | 7440-38-2 | 0.001 | mg/L | | 0.021 | ---- | ---- | ---- | ---- |
| Cadmium | 7440-43-9 | 0.0001 | mg/L | | 0.0002 | ---- | ---- | ---- | ---- |
| Chromium | 7440-47-3 | 0.001 | mg/L | | 0.018 | ---- | ---- | ---- | ---- |
| Copper | 7440-50-8 | 0.001 | mg/L | | 0.009 | ---- | ---- | ---- | ---- |
| Nickel | 7440-02-0 | 0.001 | mg/L | | 0.008 | ---- | ---- | ---- | ---- |
| Lead | 7439-92-1 | 0.001 | mg/L | | 0.015 | ---- | ---- | ---- | ---- |
| Zinc | 7440-66-6 | 0.005 | mg/L | | 0.218 | ---- | ---- | ---- | ---- |



Analytical Results

| | | | | | | | | | |
|---|------------|--------|------|------------------|----------------------|-------|-------|-------|-------|
| Sub-Matrix: WATER (Matrix: WATER) | | | | Client sample ID | BH5 | ---- | ---- | ---- | ---- |
| Client sampling date / time | | | | | 18-May-2017 10:30 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | | ES1711991-001 | ----- | ----- | ----- | ----- |
| | | | | Result | ---- | ---- | ---- | ---- | ---- |
| EG035F: Dissolved Mercury by FIMS | | | | | | | | | |
| Mercury | 7439-97-6 | 0.0001 | mg/L | | <0.0001 | ---- | ---- | ---- | ---- |
| EG035T: Total Recoverable Mercury by FIMS | | | | | | | | | |
| Mercury | 7439-97-6 | 0.0001 | mg/L | | <0.0001 | ---- | ---- | ---- | ---- |
| EK040P: Fluoride by PC Titrator | | | | | | | | | |
| Fluoride | 16984-48-8 | 0.1 | mg/L | | 0.8 | ---- | ---- | ---- | ---- |
| EK057G: Nitrite as N by Discrete Analyser | | | | | | | | | |
| Nitrite as N | 14797-65-0 | 0.01 | mg/L | | 0.02 | ---- | ---- | ---- | ---- |
| EK058G: Nitrate as N by Discrete Analyser | | | | | | | | | |
| Nitrate as N | 14797-55-8 | 0.01 | mg/L | | 0.32 | ---- | ---- | ---- | ---- |
| EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser | | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.01 | mg/L | | 0.34 | ---- | ---- | ---- | ---- |
| EK061G: Total Kjeldahl Nitrogen By Discrete Analyser | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | | 2.5 | ---- | ---- | ---- | ---- |
| EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser | | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 0.1 | mg/L | | 2.8 | ---- | ---- | ---- | ---- |
| EK067G: Total Phosphorus as P by Discrete Analyser | | | | | | | | | |
| Total Phosphorus as P | ---- | 0.01 | mg/L | | 1.93 | ---- | ---- | ---- | ---- |
| EK071G: Reactive Phosphorus as P by discrete analyser | | | | | | | | | |
| Reactive Phosphorus as P | 14265-44-2 | 0.01 | mg/L | | 0.30 | ---- | ---- | ---- | ---- |

Appendix B – Sampling Field Notes



GROUND WATER SAMPLING FORM

Client Name: BOC Limited - Kooragang

Date 16 5 2017 Time 14:00
Day Month Year

Reasons for sampling: Baseline soil water monitoring

Location of sampling point: Borehole 1

Nature of sampling point ☒ Groundwater ☐ Tradewaste sump ☐ Surface water
☐ Stormwater ☐ Other Please specify

Sample ID: BH1

Depth sample taken: 2 m

Sample appearance muddy/brown

Water Level in BH 2 m

Volume of sample taken 1.0 L

Name of Sampler SC

Method of sampling In-situ bailer

Nature of sample point Bore hole

COC Reference No. 034 1714

Number of Bottles 4

Other comments:
no odour

NOTE: ONE WATER SAMPLING FORM TO BE COMPLETED FOR EACH SAMPLE POINT



GROUND WATER SAMPLING FORM

Client Name: BOC Limited - Kooragang

Date 16 5 2017 Time 14:12

Day Month Year

Reasons for sampling: Baseline soil water monitoring

Location of sampling point: Borehole 2

Nature of sampling point ☒ Groundwater ☐ Tradewaste sump ☐ Surface water

☐ Stormwater ☐ Other Please specify

Sample ID: BH2

Depth sample taken: 2 m

Sample appearance Muddy/Brown

Water Level in BH 2 m

Volume of sample taken 1.0 L

Name of Sampler SC

Method of sampling In-situ bailer

Nature of sample point Bore hole

COC Reference No. 034 1714

Number of Bottles 4

Other comments:

no odour

NOTE: ONE WATER SAMPLING FORM TO BE COMPLETED FOR EACH SAMPLE POINT



GROUND WATER SAMPLING FORM

Client Name: BOC Limited - Kooragang

Date 16 5 2017 Time 14:33

Day Month Year

Reasons for sampling: Baseline soil water monitoring

Location of sampling point: Borehole 3

Nature of sampling point ☒ Groundwater ☐ Tradewaste sump ☐ Surface water

☐ Stormwater ☐ Other Please specify

Sample ID: BH3

Depth sample taken: 1.5 m

Sample appearance Muddy/Brown

Water Level in BH 1.5 m

Volume of sample taken 1.0 L

Name of Sampler SC

Method of sampling In-situ bailer

Nature of sample point Bore hole

COC Reference No. 034 1714

Number of Bottles 4

Other comments:

No odour

NOTE: ONE WATER SAMPLING FORM TO BE COMPLETED FOR EACH SAMPLE POINT



GROUND WATER SAMPLING FORM

Client Name: BOC Limited - Kooragang

Date 16 5 2017 Time 14:50
Day Month Year

Reasons for sampling: Baseline soil water monitoring

Location of sampling point: Borehole 4

Nature of sampling point ☒ Groundwater ☐ Tradewaste sump ☐ Surface water
☐ Stormwater ☐ Other Please specify

Sample ID: BH4

Depth sample taken: 2.5 m

Sample appearance Muddy/Brown

Water Level in BH 2.5 m

Volume of sample taken 1.0 L

Name of Sampler SC

Method of sampling In-situ bailer

Nature of sample point Bore hole

COC Reference No. 034 1714

Number of Bottles 4

Other comments:
very muddy

NOTE: ONE WATER SAMPLING FORM TO BE COMPLETED FOR EACH SAMPLE POINT



GROUND WATER SAMPLING FORM

Client Name: BOC Limited - Kooragang

Date 18 5 2017 Time 10:30

Day Month Year

Reasons for sampling: Baseline soil water monitoring

Location of sampling point: Borehole 5

Nature of sampling point ☒ Groundwater ☐ Tradewaste sump ☐ Surface water

☐ Stormwater ☐ Other Please specify

Sample ID: BH5

Depth sample taken: 2 m

Sample appearance Clear with brown suspended particulates

Water Level in BH 2 m

Volume of sample taken 1.0 L

Name of Sampler BK

Method of sampling In-situ bailer

Nature of sample point Bore hole

COC Reference No. 034 1714

Number of Bottles 4

Other comments:

Performed two days later as bore could not initially be located.

NOTE: ONE WATER SAMPLING FORM TO BE COMPLETED FOR EACH SAMPLE POINT



GROUND WATER SAMPLING FORM

Client Name: BOC Limited - Kooragang

Date 16 5 2017 Time 15:05

Day Month Year

Reasons for sampling: Baseline soil water monitoring

Location of sampling point: Borehole 6

Nature of sampling point ☒ Groundwater ☐ Tradewaste sump ☐ Surface water

☐ Stormwater ☐ Other Please specify

Sample ID: BH6

Depth sample taken: 2 m

Sample appearance Slightly brown/cloudy

Water Level in BH 2 m

Volume of sample taken 1.0 L

Name of Sampler SC

Method of sampling In-situ bailer

Nature of sample point Bore hole

COC Reference No. 034 1714

Number of Bottles 4

Other comments:

no odour - clearer than the other wells

NOTE: ONE WATER SAMPLING FORM TO BE COMPLETED FOR EACH SAMPLE POINT

BOC Kooragang Soil Monitoring Report May 2017

BOC Limited Kooragang

5 June 2017



working with
the environment



BOC Kooragang Soil Monitoring Report May 2017

BOC Limited Kooragang

5 June 2017

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| Document Control | | | | Approved for Issue | | |
|------------------|----------|-------------|----------|--------------------|-----------|------------|
| Project ID | Revision | Author | Reviewer | Name | Signature | Date |
| 036 1714 | 0 | S. Crosdale | B Kelly | B Kelly | | 05/06/2017 |
| | | | | | | |

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Appendices

- Appendix A - NATA Laboratory Results
- Appendix B - Sampling Field Notes

1 Introduction

BOC Limited Kooragang, herein referred to as BOC Kooragang, owns and operates a gas facility for the production and supply of gas products located at Lot 5 DP 1015754 9 Egret Street Kooragang, New South Wales. The facility operates 24 hours per day, 7 days per week. BOC Kooragang holds NSW Environmental Protection Authority (EPA) Environmental Protection Licence (EPL) 20165. The Scheduled Activities in the EPL include chemical storage waste generation, dangerous goods production and general chemicals storage.

BOC Kooragang currently possess two (2) cooling towers onsite. The wastewater is collected by an approved waste contractor approximately once per week. BOC Kooragang have performed internal investigations regarding the feasibility of utilising the cooling tower wastewater for irrigation purposes in grassed areas of the site. Therefore BOC Kooragang wishes to obtain consent to utilise the cooling tower blowdown stream as effluent to irrigate a selected area of land at the site as a full reuse scheme.

BOC Kooragang commissioned MJM Environmental to perform soil sampling in May 2017. This report outlines the findings of soil sampling completed on 18 May 2017.

2 Objective

Soil sampling is required for the baseline measurement of current soil conditions at the site and suitability for irrigation prior to beginning irrigation activities. Sampling parameters based on the systematic grid sampling method AS4482.1-2005 were completed on 18 May 2017 at the proposed irrigation area and three (3) background samples.

MJM Environmental performed soil sampling at BOC Kooragang's site in the identified irrigation and background areas on 18 May 2017.

3 Site Identification

BOC Kooragang's facility is located at Lot 5 DP 1015754 9 Egret Street Kooragang, New South Wales. BOC Kooragang own and operate a gas facility for the production and supply of gas products.

BOC Kooragang's site is displayed in Figure 4.1.



Figure 3-1: BOC Kooragang site boundary and vicinity (Spatial Information Exchange [SIXMaps] 2017)

4 Sampling Plan and Methodology

4.1 Sampling Points

Soil sampling was completed using the sampling grid guidelines advised by NSW EPA *Soil Sampling guidelines* and *AS4482.1-2005 – Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil*.

Soil sampling was performed at the following locations:

- Seven (7) points in the irrigation area.
- Three (3) background samples in the immediate surroundings of non-irrigated areas.

Each point was comprised of a top soil and sub-surface soil sample. The depths of the top surface soil samples were collected from 0 to 50 mm, and sub-surface samples were collected at a depth of 300 to 400 mm as available.

Figure 4.1 shows an example of a surface sample and a sub-surface soil sample.



Figure 4.1: Surface and sub-surface soil samples

4.2 Soil Quality Sampling Plan

Seven (7) soil sampling points was performed for the irrigation area and three (3) background points BG1, BG2 and BG3.

Table 4.1 shows BOC Kooragang's soil monitoring analytes and Figure 4.2 shows the locations for soil sampling at irrigation area Points S1, S2, S3, S4, S5, S6, S7, BG1, BG2 and BG3 that were sampled in May 2017.

Table 4.1: Analytes monitored for the baseline sampling program

| Pollutant | Units of Measure |
|--------------------------|---------------------------------------|
| pH | pH |
| Fluoride | milligrams per kilogram |
| Chloride | milligrams per kilogram |
| Conductivity | microsiemens per centimetre |
| Cation Exchange Capacity | millequivalents per 100 grams of soil |
| Exchangeable Calcium | millequivalents per 100 grams of soil |
| Exchangeable Magnesium | millequivalents per 100 grams of soil |
| Exchangeable Potassium | millequivalents per 100 grams of soil |
| Exchangeable Sodium | millequivalents per 100 grams of soil |
| Moisture | percent |

| Pollutant | Units of Measure |
|---|--|
| Nitrate | milligrams per kilogram |
| Nitrogen (total) (includes TKN + NO _x) | milligrams per kilogram |
| Total Kjeldahl Nitrogen (TKN) | milligrams per kilogram |
| Phosphorus (total) | milligrams per kilogram |
| Phosphorus Sorption Capacity | milligrams of phosphorus sorption per kilogram |
| Bray Phosphorus (as Fluoride Extractable Phosphorus) | milligrams per kilogram |
| Collwell Phosphorus (as Bicarbonate Extractable Phosphorus) | milligrams per kilogram |
| Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg) | milligrams per kilogram |
| Peroxide Oxidation Combined Acidity and Sulphate (SPOCAS) for Acid Sulphate Soils | pH and percentage |
| Volatile Organic Compounds (VOCs) | milligrams per kilogram |
| Polycyclic Aromatic Hydrocarbons (PAHs) | milligrams per kilogram |

In accordance with good practice, soil sampling was completed using the sampling grid advised by NSW EPA's Soil Sampling guidelines and AS4482.1-2005 – *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil* with sampling and analysis focused on the analytes outlined in Table 4.1. Soil samples were submitted to Australian Laboratory Services (ALS), a NATA accredited laboratory with accreditation number 825 located at 5/585 Maitland Road, Mayfield West NSW 2304. Certificates of analysis are presented in Appendix A and the field notes for the sampling for all points are presented in Appendix B.

The irrigation area has an estimated area of 0.2 hectares. A systematic grid sampling method was chosen as the preferred soil sampling method for BOC Kooragang's annual soil sampling requirements. The systematic grid sampling locations for all points, including background points, are shown in Figure 4.2.



Figure 4.2: Soil sampling locations for irrigation area and background points

The samples were labelled as follows according to depth:

- Surface samples:
 - S1A through to BG3A
- Sub-surface samples:
 - S1B through to BG3B

4.3 Description of Sampling Equipment and Decontamination

The soil samples were collected using a petrol-operated soil auger. The sample containers used were two (2) glass jars and a zip-lock bag provided by the laboratory for each sample.

Decontamination is the process of neutralising, washing, rinsing and removing material from exposed outer surfaces of equipment and protective clothing to minimise cross-contamination of samples.

Manual sampling equipment decontamination is dependent on the extent to which the equipment is in contact with the sample. The sampling equipment was decontaminated satisfactorily after each composite sampling location by:

- removing soil adhering to the equipment by wiping with disposable towels
- washed thoroughly in a bucket with phosphate-free detergent using brushes
- rinsed in clean water
- dried

Figure 4.3 shows the auger equipment and washing containers used.



Figure 4.3: Auger equipment and decontamination equipment

4.4 Sampling Handling Procedures

Soil samples were enclosed in laboratory-provided glass jars and zip lock bags. The samples were kept away from sources of heat and light once sampled and placed in an esky containing ice packs. The maximum sample holding time of 14 days for the extraction and analysis of specific analytes was not exceeded. The samples were taken to the laboratory within the sample preservation holding times.

5 Field Quality Assurance and Quality Control

5.1 Sampling Team

The soil sampling team consisted of MJM employees presented in Table 5.1.

Table 5.1: Sampling team

| Name | Role |
|----------------|---|
| Brigid Kelly | Project Engineer, sampler and data collector |
| Sharn Crosdale | Project Scientist, sampler and data collector |

The sampling field notes including time, location and site observations are available in Appendix B.

5.2 Quality Control

In order to provide comparison of the soil quality away from the irrigated points, background samples were taken at BOC Kooragang at locations outside of the proposed irrigation area. The background samples were taken for the purposes of this report to determine differences in soil surrounding the proposed irrigation area and general soil quality of the site.

5.3 Field Sampling Forms

The field sampling forms are available in Appendix B. They include:

- Time and date
- Site description
- Samplers and company
- Location of each sampling point
- Depth of samples and sample type
- Any observations unique to each sampling point
- Container type(s)

6 Laboratory QA/QC

The NATA laboratory results reports are available in Appendix A. The reports include:

- Analytical methods used
- Laboratory accreditation for analytical methods
- Surrogates and spikes used, including percent recoveries
- Instrument detection limit and method detection limits
- Matrix results
- Laboratory duplicate results
- Record of holding times
- All QC sample results

7 QA/QC data Evaluation

The soil samples were within holding times for analysis. All samples were evaluated within holding times and the laboratory documentation demonstrates the results. No sample container non-compliances occurred.

8 Results

8.1 Soil Sampling Results for BOC Kooragang Irrigation Area

Table 8.1 shows the results for the soil sampling performed at BOC Kooragang's proposed irrigation area.

Appendix A contains the full laboratory report. In order to be concise, specific analytes below the limit of detection have not been included in the tables.

Table 8.1: Results for BOC Koorangang proposed irrigation area samples 18 May 2017

| Analyte | Units | S1A | S1B | S2A | S2B | S3A | S3B | S4A | S4B | S5A | S5B | S6A | S6B | S7A | S7B |
|--|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| pH | pH Unit | 7.9 | 8.9 | 8.5 | 8.9 | 7.8 | 8.5 | 8.4 | 8.8 | 7.9 | 8.7 | 8.2 | 8.7 | 8.2 | 8.6 |
| Fluoride | mg/kg | 40 | <40 | 70 | <40 | 80 | 60 | 50 | 50 | 50 | <40 | 60 | <40 | 40 | <40 |
| Chloride | mg/kg | 20 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Conductivity | µS/cm | 95 | 44 | 46 | 45 | 97 | 60 | 56 | 46 | 81 | 50 | 76 | 55 | 67 | 52 |
| Cation Exchange Capacity | meq/100g | 2.1 | 0.7 | 1.0 | 1.0 | 4.0 | 1.9 | 1.3 | 0.7 | 1.5 | 0.9 | 1.8 | 1.3 | 1.5 | 1.3 |
| Exchangeable Calcium | meq/100g | 2.1 | 0.7 | 1.0 | 1.0 | 4.0 | 1.9 | 1.3 | 0.7 | 1.5 | 0.9 | 1.8 | 1.3 | 1.5 | 1.3 |
| Exchangeable Magnesium | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Sodium | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Moisture | % | 3.2 | <1.0 | 1.2 | 1.4 | 4.6 | 2.1 | 1.8 | 1.2 | 2.6 | 1.4 | 2.9 | 2.3 | 2.0 | 1.4 |
| Nitrate | mg/kg | 0.9 | 0.2 | 0.3 | 0.3 | 2.7 | 0.7 | 0.8 | 0.4 | 1.3 | 0.5 | 1.3 | 0.6 | 0.8 | 0.3 |
| Nitrogen (total; TKN + NO _x) | mg/kg | 630 | 220 | 230 | 160 | 1,250 | 320 | 480 | 220 | 1,010 | 200 | 670 | 250 | 660 | 220 |
| Total Kjeldahl Nitrogen (TKN) | mg/kg | 630 | 220 | 230 | 160 | 1,250 | 320 | 480 | 220 | 1,010 | 200 | 670 | 250 | 660 | 220 |
| Phosphorus (total) | mg/kg | 154 | 72 | 67 | 55 | 182 | 79 | 141 | 71 | 182 | 61 | 135 | 85 | 127 | 60 |
| Phosphorus Sorption Capacity | mg P sorbed/kg | 292 | <250 | <250 | 273 | 575 | <250 | 319 | <250 | 339 | <250 | 404 | <250 | <250 | <250 |
| Bray Phosphorus * | mg/kg | 21.0 | 1.4 | 3.8 | 1.3 | 4.1 | 4.9 | 18.1 | 2.6 | 6.3 | 2.3 | 15.3 | 3.3 | 4.0 | 1.3 |
| Collwell Phosphorus ** | mg/kg | 22 | 8 | 15 | 8 | 19 | 14 | 19 | 12 | 14 | 10 | 18 | 10 | 7 | 7 |
| Arsenic | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Cadmium | mg/kg | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Chromium | mg/kg | 5 | <2 | 2 | 2 | 8 | 4 | 5 | 3 | 4 | 2 | 5 | 3 | 4 | 2 |
| Copper | mg/kg | 6 | <5 | <5 | <5 | 13 | <5 | 8 | <5 | 7 | <5 | 10 | <5 | 7 | <5 |
| Lead | mg/kg | 17 | <5 | 11 | <5 | 45 | 14 | 31 | 11 | 26 | 6 | 34 | 11 | 23 | 8 |
| Nickel | mg/kg | 4 | <2 | <2 | <2 | 5 | 3 | 3 | <2 | 3 | <2 | 3 | 3 | 2 | <2 |
| Zinc | mg/kg | 102 | 21 | 44 | 24 | 183 | 68 | 109 | 46 | 103 | 30 | 124 | 59 | 75 | 28 |
| Mercury | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| SPOCAS *** | | | | | | | | | | | | | | | |
| pH _{KCL} | pH Unit | 9.2 | 9.6 | 9.6 | 9.6 | 8.9 | 9.4 | 9.5 | 9.6 | 9.2 | 9.6 | 9.5 | 9.6 | 9.5 | 9.5 |
| pH OX | pH Unit | 7.5 | 8.3 | 7.9 | 8.2 | 6.8 | 8.2 | 7.8 | 8.0 | 7.2 | 8.1 | 7.8 | 8.4 | 7.7 | 7.9 |
| KCl Extractable Sulphur | % S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 |
| Titratable Actual Acidity | mole H ⁺ / t | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Titratable Peroxide Acidity | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 |
| Acidity - Peroxide Oxidisable Sulphur | mole H ⁺ / t | 13 | <10 | <10 | <10 | 20 | <10 | 14 | <10 | 14 | <10 | 15 | <10 | <10 | <10 |

| Analyte | Units | S1A | S1B | S2A | S2B | S3A | S3B | S4A | S4B | S5A | S5B | S6A | S6B | S7A | S7B |
|--|-------------------------|------|-------|-------|-------|------|-------|------|-------|------|-------|------|-------|-------|-------|
| Net acidity excluding ANC [†] (sulfur units) | %S | 0.02 | <0.02 | <0.02 | <0.02 | 0.03 | <0.02 | 0.02 | <0.02 | 0.02 | <0.02 | 0.02 | <0.02 | <0.02 | <0.02 |
| Net acidity excluding ANC [†] (acidity units) | mole H ⁺ / t | 13 | <10 | <10 | <10 | 20 | <10 | 14 | <10 | 14 | <10 | 15 | <10 | <10 | <10 |
| Liming rate excluding ANC | kg/CaCO ₃ /t | <1 | <1 | <1 | <1 | 2 | <1 | 1 | <1 | 1 | <1 | 1 | <1 | <1 | <1 |
| Volatile Organic Compounds (VOCs) | | | | | | | | | | | | | | | |
| Dichlorodifluoromethane | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Chloromethane | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Vinyl chloride | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Bromomethane | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Chloroethane | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| 1,2-dichloroethane | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Tetrachloroethene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Trichloroethene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1,1-trichloroethane | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1,2-Dichloroethene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Carbon Tetrachloride | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Polycyclic Aromatic Hydrocarbons (PAHs) | | | | | | | | | | | | | | | |
| Sum PAHs | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Naphthalene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Acenaphthylene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluorene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Phenanthrene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Anthracene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Pyrene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(a)anthracene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(a)pyrene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(b+j)fluoranthene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(g,h,i)perylene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(k)fluoranthene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Chrysene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

*As Fluoride Extractable P **As Bicarbonate Extractable P ***Peroxide Oxidation Combined Acidity and Sulphate for Acid Sulphate Soils

† Acid neutralising capacity

8.2 Background Soil Sampling Results for BOC Kooragang

Table 8.2 shows the results for the soil sampling performed at BOC Kooragang's background samples.

Table 8.2: Results for BOC Kooragang background soil samples 18 May 2017

| Analyte | Units | BG1A | BG1B | BG2A | BG2B | BG3A | BG3B |
|--|----------------|------|------|------|------|------|------|
| pH | pH | 8.3 | 8.9 | 8.3 | 8.8 | 8.3 | 8.4 |
| Fluoride | mg/kg | 70 | 50 | 60 | 90 | 50 | 60 |
| Chloride | mg/kg | <10 | <10 | <10 | <10 | <10 | <10 |
| Conductivity | dS/m | 42 | 45 | 92 | 75 | 70 | 62 |
| Cation Exchange Capacity | meq/100g | 1.6 | 0.8 | 3.7 | 4.0 | 1.4 | 1.2 |
| Exchangeable Calcium | meq/100g | 1.6 | 0.8 | 3.6 | 3.8 | 1.4 | 1.2 |
| Exchangeable Magnesium | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium | meq/100g | <0.2 | <0.2 | <0.2 | 0.2 | <0.2 | <0.2 |
| Exchangeable Sodium | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Moisture | % | 2.0 | 1.1 | 3.3 | 5.1 | 2.1 | 1.4 |
| Nitrate | mg/kg | 0.8 | 0.3 | 2.0 | 0.9 | 3.0 | 1.7 |
| Nitrogen (total; TKN + NO _x) | mg/kg | 530 | 140 | 940 | 460 | 450 | 430 |
| Total Kjeldahl Nitrogen (TKN) | mg/kg | 530 | 140 | 940 | 460 | 450 | 430 |
| Phosphorus (total) | mg/kg | 149 | 59 | 266 | 356 | 150 | 155 |
| Phosphorus Sorption Capacity | mg P sorbed/kg | 403 | <250 | 607 | 910 | 424 | 376 |
| Bray Phosphorus * | mg/kg | 5.8 | 1.3 | 34.2 | 16.2 | 21.5 | 19.9 |
| Collwell Phosphorus ** | mg/kg | 18 | 8 | 41 | 31 | 24 | 21 |
| Arsenic | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 |
| Cadmium | mg/kg | <1 | <1 | <1 | <1 | <1 | <1 |
| Chromium | mg/kg | 4 | <2 | 6 | 8 | 5 | 5 |
| Copper | mg/kg | 6 | <5 | 8 | 8 | <5 | 6 |
| Lead | mg/kg | 23 | <5 | 13 | 11 | 10 | 13 |
| Nickel | mg/kg | 2 | <2 | 5 | 7 | 3 | 3 |
| Zinc | mg/kg | 82 | 17 | 79 | 57 | 67 | 109 |
| Mercury | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| SPOCAS *** | | | | | | | |
| pH _{KCl} | pH Unit | 9.6 | 9.6 | 9.3 | 9.4 | 9.4 | 9.4 |
| pH _{OX} | pH Unit | 8.2 | 8.1 | 7.7 | 8.2 | 7.4 | 7.7 |

| Analyte | Units | BG1A | BG1B | BG2A | BG2B | BG3A | BG3B |
|--|-------------------------|--------|--------|--------|--------|--------|--------|
| KCl Extractable Sulphur | % | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 |
| Titrateable Actual Acidity | mole H+ / t | <2 | <2 | <2 | <2 | <2 | <2 |
| Titrateable Peroxide Acidity | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 |
| Acidity - Peroxide Oxidisable Sulphur | mole H+ / t | <10 | <10 | 15 | <10 | 13 | 16 |
| Net acidity excluding ANC ⁺ (sulfur units) | %S | <0.02 | <0.02 | 0.02 | <0.02 | 0.02 | 0.02 |
| Net acidity excluding ANC ⁺ (acidity units) | mole H+ / t | <10 | <10 | 15 | <10 | 13 | 16 |
| Liming rate excluding ANC ⁺ | kg/CaCO ₃ /t | <1 | <1 | 1 | <1 | <1 | 1 |
| Volatile Organic Compounds (VOCs) | | | | | | | |
| Dichlorodifluoromethane | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 |
| Chloromethane | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 |
| Vinyl chloride | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 |
| Bromomethane | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 |
| chloroethane | mg/kg | <5 | <5 | <5 | <5 | <5 | <5 |
| 1,2-dichloroethane | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| tetrachloroethene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| trichloroethene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1,1-trichloroethane | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1.2-Dichloroethene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Carbon Tetrachloride | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 | <1 | <1 |
| Polycyclic Aromatic Hydrocarbons (PAHs) | | | | | | | |
| Sum PAHs | mg/kg | <0.5 | <0.5 | 0.6 | 1.6 | <0.5 | <0.5 |
| Naphthalene | mg/kg | <0.5 | <0.5 | 0.6 | 0.6 | <0.5 | <0.5 |
| Acenaphthylene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluorene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Phenanthrene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Anthracene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Pyrene | mg/kg | <0.5 | <0.5 | 0.5 | 0.5 | <0.5 | <0.5 |
| Benzo(a)anthracene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(a)pyrene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(b+j)fluoranthene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(g,h,i)perylene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

| Analyte | Units | BG1A | BG1B | BG2A | BG2B | BG3A | BG3B |
|----------------------|-------|------|------|------|------|------|------|
| Benzo(k)fluoranthene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Chrysene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

*As Fluoride Extractable P **As Bicarbonate Extractable P ***Peroxide Oxidation Combined Acidity and Sulphate for Acid Sulphate Soils † Acid neutralising capacity

8.3 Average Soil Sampling Results for BOC Kooragang

Table 8.3 presents the average results for the proposed irrigation area and background samples.

Table 8.3: Average results for irrigation area and background points

| Analyte | Unit | Average Irrigation Area result | | Average Background Result | |
|---|----------------|--------------------------------|-------------|---------------------------|-------------|
| | | Surface | Sub surface | Surface | Sub surface |
| pH | pH Unit | 8.1 | 8.7 | 8.3 | 8.7 |
| Fluoride | mg/kg | 56 | 30 | 60 | 67 |
| Chloride | mg/kg | 7 | <10 | <10 | <10 |
| Conductivity | μS/cm | 74 | 50 | 68 | 61 |
| Cation Exchange Capacity | meq/100g | 1.9 | 1.1 | 2.2 | 2.0 |
| Exchangeable Calcium | meq/100g | 1.9 | 1.1 | 2.2 | 1.9 |
| Exchangeable Magnesium | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Sodium | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 |
| Moisture | % | 3 | 2 | 2.5 | 2.5 |
| Nitrate | mg/kg | 1 | 0 | 1.9 | 1.0 |
| Nitrogen (total; TKN + NOX) | mg/kg | 704 | 227 | 640 | 343 |
| Total Kjeldahl Nitrogen (TKN) | mg/kg | 704 | 227 | 640 | 343 |
| Phosphorus (total) | mg/kg | 141 | 69 | 188 | 190 |
| Phosphorus Sorption Capacity | mg P sorbed/kg | 311 | 146 | 478 | 470 |
| Bray Phosphorus * | mg/kg | 10 | 2 | 20.5 | 12.5 |
| Collwell Phosphorus ** | mg/kg | 16 | 10 | 28 | 20 |
| Arsenic | mg/kg | <5 | <5 | <5 | <5 |
| Cadmium | mg/kg | <1 | <1 | <1 | <1 |
| Chromium | mg/kg | 4.7 | 2.7 | 5 | 5 |
| Copper | mg/kg | 7.6 | <5 | 5.5 | 5.5 |
| Lead | mg/kg | 27 | 8 | 15 | 9 |
| Nickel | mg/kg | 3 | 2 | 3 | 4 |
| Zinc | mg/kg | 106 | 39 | 76 | 61 |
| Mercury | mg/kg | <0.1 | <0.1 | <0.1 | <0.1 |
| SPOCAS | | | | | |
| pHKCl | pH Unit | 9.3 | 9.6 | 9.4 | 9.5 |
| pH OX | pH Unit | 7.5 | 8.2 | 7.8 | 8.0 |
| KCl Extractable Sulphur | % S | <0.02 | <0.02 | <0.020 | <0.020 |
| Titrateable Actual Acidity | mole H+ / t | <2 | <2 | <2 | <2 |
| Titrateable Peroxide Sulphur | % pyrite S | <0.02 | <0.02 | <0.020 | <0.020 |
| Acidity - Peroxide Oxidisable Sulphur | mole H+ / t | 12.3 | <10 | 11 | 9 |
| Net acidity excluding ANC [†] (sulfur units) | %S | 0.02 | <0.02 | 0.02 | 0.01 |

| Analyte | Unit | Average Irrigation Area result | | Average Background Result | |
|---|-------------------------|--------------------------------|-------------|---------------------------|-------------|
| | | Surface | Sub surface | Surface | Sub surface |
| Net acidity excluding ANC [†] (acidity units) | mole H ⁺ / t | 12 | <10 | 11 | 9 |
| Liming rate excluding ANC [†] | kg/CaCO ₃ /t | 0.9 | <1 | 0.7 | 0.7 |
| Volatile Organic Compounds (VOCs) | | | | | |
| Dichlorodifluoromethane | mg/kg | <5 | <5 | <5 | <5 |
| Chloromethane | mg/kg | <5 | <5 | <5 | <5 |
| Vinyl chloride | mg/kg | <5 | <5 | <5 | <5 |
| Bromomethane | mg/kg | <5 | <5 | <5 | <5 |
| Chloroethane | mg/kg | <5 | <5 | <5 | <5 |
| 1,2-dichloroethane | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Tetrachloroethene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Trichloroethene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1,1-trichloroethane | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1,2-Dichloroethene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Carbon Tetrachloride | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Naphthalene | mg/kg | <1 | <1 | <1 | <1 |
| Polycyclic Aromatic Hydrocarbons (PAHs) | | | | | |
| Sum PAHs | mg/kg | <0.5 | <0.5 | 0.4 | 0.7 |
| Naphthalene | mg/kg | <0.5 | <0.5 | 0.4 | 0.4 |
| Acenaphthylene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluorene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Phenanthrene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Anthracene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Pyrene | mg/kg | <0.5 | <0.5 | 0.3 | 0.3 |
| Benzo(a)anthracene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(a)pyrene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(b+j)fluoranthene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(g,h,i)perylene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(k)fluoranthene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |
| Chrysene | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 |

*As Fluoride Extractable P

**As Bicarbonate Extractable P

***Peroxide Oxidation Combined Acidity and Sulphate for Acid Sulphate Soil

† Acid neutralising capacity

9 Discussion

MJM Environmental was commissioned to perform soil sampling at BOC Limited Kooragang on 18 May 2017.

The soil pH ranged from 7.8 to 8.9. The top soil had a lower pH range of 7.8 to 8.5, while the sub-surface soil range was slightly higher 8.6 to 8.9. All three background points show a consistent pH range similar to the proposed irrigation area of 8.3 to 8.9.

Fluoride was detected for most samples from 40 mg/kg to 80 mg/kg at the proposed irrigation area, which were comparable to the background samples which ranged from 50 to 90 mg/kg.

The majority of results for Chloride at the proposed irrigation area did not reach the limit of reporting, which was comparable to the background samples.

The Conductivity results show a consistent range in both the proposed irrigation area and background soils, ranging from 42 $\mu\text{S}/\text{cm}$ to 95 $\mu\text{S}/\text{cm}$.

The Exchangeable Cations Magnesium, Potassium and Sodium in the irrigation and background soil were below the limit of reporting. The Exchangeable Calcium and Cation Exchange Capacity ranged from 0.7 to 4.0 meq/100g which appears to be due to the Exchangeable Calcium. The surface soil had a higher range of 1.0 to 4.0 meq/100g, while the sub-surface soil range was 0.7 to 1.9 meq/100g.

The moisture shared a similar higher trend in the surface soil from 1.2 to 4.6 %, while the sub-surface soil was lower ranging from <1.0 to 2.3%. BG2B observed the highest moisture result at 5.1%.

Total Nitrogen in the surface soil of the proposed irrigation area ranges from 230 to 1,250 mg/kg, while the surface soil in the background samples range from 140 to 940 mg/kg. The nitrogen appears to be comprised of mostly Total Kjeldahl Nitrogen (TKN).

Total Phosphorus in the surface soil of the proposed irrigation area range from 67 to 182 mg/kg, which appeared to show a slightly higher trend than the sub-surface samples ranging from 55 to 85 mg/kg. The surface soil in the background samples range from 59 to 356 mg/kg. The nitrogen appears to be comprised of mostly Total Kjeldahl Nitrogen (TKN) and the background samples appear comparable to the proposed irrigation area results.

The Bray Phosphorus (as Fluoride Extractable P) at the proposed irrigation area ranged from 1.3 to 21 mg/kg, which was comparable to the background results range of 1.3 to 34.2 mg/kg.

The Colwell Phosphorus (as Bicarbonate Extractable P) at the proposed irrigation area ranged from 7 to 22 mg/kg, which was reasonably comparable to the background results range of 8 to 41 mg/kg.

Phosphorous sorption capacity ranged <250 to 404 mg P sorbed/kg at the proposed irrigation area, which was slightly lower than the background samples ranging from <250 to 910 mg P sorbed/kg.

The irrigation area and background points appeared to contain trace amounts of chromium, copper, lead, nickel and zinc in ranges consistent with those found in the background samples. One sample in the proposed irrigation area showed a trace detection of Mercury.

Arsenic and Cadmium were not detected in the proposed irrigation area samples or the background samples.

Polycyclic Aromatic Hydrocarbons (PAHs) were non-detectable with the exception of a low detection at BG2A and BG2B.

Volatile Organic Compounds (VOCs) were non-detectable.

The SPOCAS suite measures an 'acid trail' (determination of acidity produced by oxidation) and a 'sulfur trail' (determination of sulfur to predict potential acidity). The tests use an acid-base accounting method to calculate net acidity of a sample and estimate the quantity of materials required to neutralise the acid. The results for the Suspension Peroxide Oxidation –

Combined Acidity and Sulfate (SPOCAS) appear to have low traces of acid forming sulphur and pyrite. The Acidity Trail results, including the Titratable Actual Acidity (TAA) and Titratable Peroxide Acidity results were below detection for all samples.

The Titratable Actual Acidity (TAA) results show a current pH (pHKCl) range of 8.9 to 9.6 in the irrigation area and background points. By oxidising the TAA, the results show a minor pH change in the irrigation and background soil, with a pH range between 7.4 to 8.2 as pH OX.

It can be seen that the samples taken at the proposed irrigation area had net acidity results below or close to the limits of detection. The calculated liming rates for potential treatment of the acid is also shown as less than the limit of reporting for most of the samples. Therefore acid sulphate soils in the site's current state based upon the sampling performed is considered a low risk. The project does not intend to perform excavation to disturb potential acid sulphate soils.

10 Limitations

10.1 Scope of Services and Reliance of Data

This Soil Monitoring May 2017 report ('the report') has been prepared in accordance with the scope of work/services agreed, between MJM Environmental Pty Ltd (MJM) and the Client. In preparing the report, MJM has relied upon data and other information provided by the Client and other individuals and organisations. Except as otherwise stated in the report, MJM has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ('conclusions/summary') are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. MJM will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to MJM.

10.2 Study for Benefit of Client

This report has been prepared for the exclusive benefit of the Client and no other party. MJM assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with in this report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in this report (including without limitation matters arising from any negligent act or omission of MJM or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in this report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own inquiries and obtain independent advice in relation to such matters.

10.3 Other Limitations

To the best of MJM's knowledge, the proposal presented and the facts and matters described in this report reasonably represent the Client's intentions at the time of printing of the report. However, the passage of time, the manifestation of latent conditions or the impact of future events (including a change in applicable law) may have resulted in a variation of the Proposal and of its possible environmental impact. MJM will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

Appendix A - NATA Laboratory Results

CERTIFICATE OF ANALYSIS

Work Order : **ES1711992**
Client : **MJM ENVIRONMENTAL PTY LTD**
Contact : **BRIGID KELLY**
Address : **OFFICE 1, 335 WHARF ROAD**
NEWCASTLE NSW, AUSTRALIA 2300
Telephone : **+61 02 49264222**
Project : **034 1714**
Order number : **49264222**
C-O-C number : **----**
Sampler : **S CROSDALE**
Site : **----**
Quote number : **SYBQ/358/15**
No. of samples received : **20**
No. of samples analysed : **20**

Page : 1 of 27
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 18-May-2017 13:23
Date Analysis Commenced : 19-May-2017
Issue Date : 30-May-2017 17:11



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories | Position | Accreditation Category |
|------------------|--------------------------|---|
| Ankit Joshi | Inorganic Chemist | Sydney Inorganics, Smithfield, NSW |
| Celine Conceicao | Senior Spectroscopist | Sydney Inorganics, Smithfield, NSW |
| Edwandy Fadjjar | Organic Coordinator | Sydney Inorganics, Smithfield, NSW |
| Edwandy Fadjjar | Organic Coordinator | Sydney Organics, Smithfield, NSW |
| Kim McCabe | Senior Inorganic Chemist | Brisbane Acid Sulphate Soils, Stafford, QLD |
| Kim McCabe | Senior Inorganic Chemist | Brisbane Inorganics, Stafford, QLD |
| Merrin Avery | Supervisor - Inorganic | Newcastle - Inorganics, Mayfield West, NSW |
| Sanjeshni Jyoti | Senior Chemist Volatiles | Sydney Organics, Smithfield, NSW |
| Wisam Marassa | Inorganics Coordinator | Sydney Inorganics, Smithfield, NSW |



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EK067G: Poor duplicate precision for Total P due to sample heterogeneity. Confirmed by re-digestion and re-analysis.
- ASS: EA029 (SPOCAS): Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO₃) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m³ in-situ soil, multiply reported results x wet bulk density of soil in t/m³.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | S1A | S1B | S2A | S2B | S3A |
|--|------------|------|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----|
| Client sampling date / time | | | | 18-May-2017 11:10 | 18-May-2017 11:10 | 18-May-2017 11:20 | 18-May-2017 11:20 | 18-May-2017 11:30 | |
| Compound | CAS Number | LOR | Unit | ES1711992-001 | ES1711992-002 | ES1711992-003 | ES1711992-004 | ES1711992-005 | |
| | | | | Result | Result | Result | Result | Result | |
| EA002 : pH (Soils) | | | | | | | | | |
| pH Value | ---- | 0.1 | pH Unit | 7.9 | 8.9 | 8.5 | 8.9 | 7.8 | |
| EA010: Conductivity | | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | 95 | 44 | 46 | 45 | 97 | |
| EA029-A: pH Measurements | | | | | | | | | |
| pH KCl (23A) | ---- | 0.1 | pH Unit | 9.2 | 9.6 | 9.6 | 9.6 | 8.9 | |
| pH OX (23B) | ---- | 0.1 | pH Unit | 7.5 | 8.3 | 7.9 | 8.2 | 6.8 | |
| EA029-B: Acidity Trail | | | | | | | | | |
| Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | <2 | <2 | <2 | <2 | <2 | |
| Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | <2 | <2 | <2 | <2 | <2 | |
| Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | <2 | <2 | <2 | <2 | <2 | |
| sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| EA029-C: Sulfur Trail | | | | | | | | | |
| KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Peroxide Sulfur (23De) | ---- | 0.02 | % S | 0.020 | <0.020 | <0.020 | <0.020 | 0.033 | |
| Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | 0.020 | <0.020 | <0.020 | <0.020 | 0.033 | |
| acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | 13 | <10 | <10 | <10 | 20 | |
| EA029-D: Calcium Values | | | | | | | | | |
| KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | 0.185 | 0.165 | 0.169 | 0.172 | 0.276 | |
| Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | 0.853 | 2.45 | 1.03 | 1.68 | 0.906 | |
| Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | 0.668 | 2.29 | 0.860 | 1.50 | 0.629 | |
| acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | 333 | 1140 | 429 | 751 | 314 | |
| sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | 0.534 | 1.83 | 0.688 | 1.20 | 0.504 | |
| EA029-E: Magnesium Values | | | | | | | | | |
| KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | <10 | <10 | <10 | <10 | |
| sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| EA029-F: Excess Acid Neutralising Capacity | | | | | | | | | |



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

| | | | | S1A | S1B | S2A | S2B | S3A |
|---|------------|------|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | 18-May-2017 11:10 | 18-May-2017 11:10 | 18-May-2017 11:20 | 18-May-2017 11:20 | 18-May-2017 11:30 |
| Compound | CAS Number | LOR | Unit | ES1711992-001 | ES1711992-002 | ES1711992-003 | ES1711992-004 | ES1711992-005 |
| | | | | Result | Result | Result | Result | Result |
| EA029-F: Excess Acid Neutralising Capacity - Continued | | | | | | | | |
| Excess Acid Neutralising Capacity (23Q) | ---- | 0.02 | % CaCO3 | 1.65 | 6.45 | 2.25 | 3.69 | 2.00 |
| acidity - Excess Acid Neutralising Capacity (a-23Q) | ---- | 10 | mole H+ / t | 330 | 1290 | 450 | 738 | 400 |
| sulfidic - Excess Acid Neutralising Capacity (s-23Q) | ---- | 0.02 | % S | 0.528 | 2.06 | 0.721 | 1.18 | 0.641 |
| EA029-H: Acid Base Accounting | | | | | | | | |
| ANC Fineness Factor | ---- | 0.5 | - | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Net Acidity (sulfur units) | ---- | 0.02 | % S | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Net Acidity (acidity units) | ---- | 10 | mole H+ / t | <10 | <10 | <10 | <10 | <10 |
| Liming Rate | ---- | 1 | kg CaCO3/t | <1 | <1 | <1 | <1 | <1 |
| Net Acidity excluding ANC (sulfur units) | ---- | 0.02 | % S | 0.02 | <0.02 | <0.02 | <0.02 | 0.03 |
| Net Acidity excluding ANC (acidity units) | ---- | 10 | mole H+ / t | 13 | <10 | <10 | <10 | 20 |
| Liming Rate excluding ANC | ---- | 1 | kg CaCO3/t | <1 | <1 | <1 | <1 | 2 |
| EA055: Moisture Content | | | | | | | | |
| Moisture Content (dried @ 103°C) | ---- | 1 | % | 3.2 | <1.0 | 1.2 | 1.4 | 4.6 |
| ED006: Exchangeable Cations on Alkaline Soils | | | | | | | | |
| Exchangeable Calcium | ---- | 0.2 | meq/100g | 2.1 | 0.7 | 1.0 | 1.0 | 4.0 |
| Exchangeable Magnesium | ---- | 0.2 | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium | ---- | 0.2 | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Sodium | ---- | 0.2 | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Cation Exchange Capacity | ---- | 0.2 | meq/100g | 2.1 | 0.7 | 1.0 | 1.0 | 4.0 |
| Exchangeable Calcium Percent | ---- | 0.2 | % | 100 | 100 | 100 | 100 | 100 |
| Exchangeable Magnesium Percent | ---- | 0.2 | % | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium Percent | ---- | 0.2 | % | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Sodium Percent | ---- | 0.2 | % | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Calcium/Magnesium Ratio | ---- | 0.2 | - | N/A | N/A | N/A | N/A | N/A |
| Magnesium/Potassium Ratio | ---- | 0.2 | - | N/A | N/A | N/A | N/A | N/A |
| ED045G: Chloride by Discrete Analyser | | | | | | | | |
| Chloride | 16887-00-6 | 10 | mg/kg | 20 | <10 | <10 | <10 | <10 |
| EG005T: Total Metals by ICP-AES | | | | | | | | |
| Arsenic | 7440-38-2 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Cadmium | 7440-43-9 | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| Chromium | 7440-47-3 | 2 | mg/kg | 5 | <2 | 2 | 2 | 8 |
| Copper | 7440-50-8 | 5 | mg/kg | 6 | <5 | <5 | <5 | 13 |



Analytical Results

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | S1A | S1B | S2A | S2B | S3A |
|---|-------------------|-----|----------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | | 18-May-2017 11:10 | 18-May-2017 11:10 | 18-May-2017 11:20 | 18-May-2017 11:20 | 18-May-2017 11:30 |
| Compound | CAS Number | LOR | Unit | | ES1711992-001 | ES1711992-002 | ES1711992-003 | ES1711992-004 | ES1711992-005 |
| | | | | | Result | Result | Result | Result | Result |
| EG005T: Total Metals by ICP-AES - Continued | | | | | | | | | |
| Lead | 7439-92-1 | 5 | mg/kg | | 17 | <5 | 11 | <5 | 45 |
| Nickel | 7440-02-0 | 2 | mg/kg | | 4 | <2 | <2 | <2 | 5 |
| Zinc | 7440-66-6 | 5 | mg/kg | | 102 | 21 | 44 | 24 | 183 |
| EG035T: Total Recoverable Mercury by FIMS | | | | | | | | | |
| Mercury | 7439-97-6 | 0.1 | mg/kg | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| EK040T: Fluoride Total | | | | | | | | | |
| Fluoride | 16984-48-8 | 40 | mg/kg | | 40 | <40 | 70 | <40 | 80 |
| EK055: Ammonia as N | | | | | | | | | |
| Ammonia as N | 7664-41-7 | 20 | mg/kg | | <20 | <20 | <20 | <20 | <20 |
| EK057G: Nitrite as N by Discrete Analyser | | | | | | | | | |
| Nitrite as N (Sol.) | 14797-65-0 | 0.1 | mg/kg | | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 |
| EK058G: Nitrate as N by Discrete Analyser | | | | | | | | | |
| Nitrate as N (Sol.) | 14797-55-8 | 0.1 | mg/kg | | 0.9 | 0.2 | 0.3 | 0.3 | 2.7 |
| EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser | | | | | | | | | |
| Nitrite + Nitrate as N (Sol.) | ---- | 0.1 | mg/kg | | 0.9 | 0.2 | 0.3 | 0.3 | 2.8 |
| EK061G: Total Kjeldahl Nitrogen By Discrete Analyser | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 20 | mg/kg | | 630 | 220 | 230 | 160 | 1250 |
| EK062: Total Nitrogen as N (TKN + NOx) | | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 20 | mg/kg | | 630 | 220 | 230 | 160 | 1250 |
| EK067G: Total Phosphorus as P by Discrete Analyser | | | | | | | | | |
| Total Phosphorus as P | ---- | 2 | mg/kg | | 154 | 72 | 67 | 55 | 182 |
| EK072: Phosphate Sorption Capacity | | | | | | | | | |
| Phosphate Sorption Capacity | ---- | 250 | mg P sorbed/kg | | 292 | <250 | <250 | 273 | 575 |
| EK074: Fluoride Extractable Phosphorus (Bray) | | | | | | | | | |
| Fluoride Extractable P (Bray) | ---- | 1 | mg/kg | | 21.0 | 1.4 | 3.8 | 1.3 | 4.1 |
| EK080: Bicarbonate Extractable Phosphorus (Colwell) | | | | | | | | | |
| Bicarbonate Ext. P (Colwell) | ---- | 5 | mg/kg | | 22 | 8 | 15 | 8 | 19 |
| EP074A: Monocyclic Aromatic Hydrocarbons | | | | | | | | | |
| Benzene | 71-43-2 | 0.2 | mg/kg | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | 108-88-3 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Ethylbenzene | 100-41-4 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| meta- & para-Xylene | 108-38-3 106-42-3 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

| | | | | S1A | S1B | S2A | S2B | S3A |
|---|------------|-----|-------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | 18-May-2017 11:10 | 18-May-2017 11:10 | 18-May-2017 11:20 | 18-May-2017 11:20 | 18-May-2017 11:30 |
| Compound | CAS Number | LOR | Unit | ES1711992-001 | ES1711992-002 | ES1711992-003 | ES1711992-004 | ES1711992-005 |
| | | | | Result | Result | Result | Result | Result |
| EP074A: Monocyclic Aromatic Hydrocarbons - Continued | | | | | | | | |
| Styrene | 100-42-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ortho-Xylene | 95-47-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Isopropylbenzene | 98-82-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| n-Propylbenzene | 103-65-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,3,5-Trimethylbenzene | 108-67-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| sec-Butylbenzene | 135-98-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2,4-Trimethylbenzene | 95-63-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| tert-Butylbenzene | 98-06-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| p-Isopropyltoluene | 99-87-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| n-Butylbenzene | 104-51-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074B: Oxygenated Compounds | | | | | | | | |
| Vinyl Acetate | 108-05-4 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Butanone (MEK) | 78-93-3 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 4-Methyl-2-pentanone (MIBK) | 108-10-1 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Hexanone (MBK) | 591-78-6 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| EP074C: Sulfonated Compounds | | | | | | | | |
| Carbon disulfide | 75-15-0 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074D: Fumigants | | | | | | | | |
| 2,2-Dichloropropane | 594-20-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2-Dichloropropane | 78-87-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1,3-Dichloropropylene | 10061-01-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1,3-Dichloropropylene | 10061-02-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2-Dibromoethane (EDB) | 106-93-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074E: Halogenated Aliphatic Compounds | | | | | | | | |
| Dichlorodifluoromethane | 75-71-8 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Chloromethane | 74-87-3 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Vinyl chloride | 75-01-4 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Bromomethane | 74-83-9 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Chloroethane | 75-00-3 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane | 75-69-4 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethene | 75-35-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Iodomethane | 74-88-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1,2-Dichloroethene | 156-60-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1-Dichloroethane | 75-34-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | S1A | S1B | S2A | S2B | S3A |
|---|------------|-----|-------|-------------------|-------------------|-------------------|-------------------|-------------------|-----|
| Client sampling date / time | | | | 18-May-2017 11:10 | 18-May-2017 11:10 | 18-May-2017 11:20 | 18-May-2017 11:20 | 18-May-2017 11:30 | |
| Compound | CAS Number | LOR | Unit | ES1711992-001 | ES1711992-002 | ES1711992-003 | ES1711992-004 | ES1711992-005 | |
| | | | | Result | Result | Result | Result | Result | |
| EP074E: Halogenated Aliphatic Compounds - Continued | | | | | | | | | |
| cis-1.2-Dichloroethene | 156-59-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.1.1-Trichloroethane | 71-55-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.1-Dichloropropylene | 563-58-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Carbon Tetrachloride | 56-23-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2-Dichloroethane | 107-06-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Trichloroethene | 79-01-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Dibromomethane | 74-95-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.1.2-Trichloroethane | 79-00-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.3-Dichloropropane | 142-28-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Tetrachloroethene | 127-18-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.1.1.2-Tetrachloroethane | 630-20-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| trans-1.4-Dichloro-2-butene | 110-57-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| cis-1.4-Dichloro-2-butene | 1476-11-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.1.2.2-Tetrachloroethane | 79-34-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2.3-Trichloropropane | 96-18-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Pentachloroethane | 76-01-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2-Dibromo-3-chloropropane | 96-12-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Hexachlorobutadiene | 87-68-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| EP074F: Halogenated Aromatic Compounds | | | | | | | | | |
| Chlorobenzene | 108-90-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Bromobenzene | 108-86-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 2-Chlorotoluene | 95-49-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 4-Chlorotoluene | 106-43-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.3-Dichlorobenzene | 541-73-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.4-Dichlorobenzene | 106-46-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2-Dichlorobenzene | 95-50-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2.4-Trichlorobenzene | 120-82-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2.3-Trichlorobenzene | 87-61-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| EP074G: Trihalomethanes | | | | | | | | | |
| Chloroform | 67-66-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Bromodichloromethane | 75-27-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Dibromochloromethane | 124-48-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Bromoform | 75-25-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| EP074H: Naphthalene | | | | | | | | | |



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

| | | | | S1A | S1B | S2A | S2B | S3A |
|---|-------------------|-----|-------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | 18-May-2017 11:10 | 18-May-2017 11:10 | 18-May-2017 11:20 | 18-May-2017 11:20 | 18-May-2017 11:30 |
| Compound | CAS Number | LOR | Unit | ES1711992-001 | ES1711992-002 | ES1711992-003 | ES1711992-004 | ES1711992-005 |
| | | | | Result | Result | Result | Result | Result |
| EP074H: Naphthalene - Continued | | | | | | | | |
| Naphthalene | 91-20-3 | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| EP075(SIM)B: Polynuclear Aromatic Hydrocarbons | | | | | | | | |
| Naphthalene | 91-20-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Acenaphthylene | 208-96-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Acenaphthene | 83-32-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluorene | 86-73-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Phenanthrene | 85-01-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Anthracene | 120-12-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluoranthene | 206-44-0 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Pyrene | 129-00-0 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benz(a)anthracene | 56-55-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Chrysene | 218-01-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(b+j)fluoranthene | 205-99-2 205-82-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(k)fluoranthene | 207-08-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(a)pyrene | 50-32-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Indeno(1.2.3.cd)pyrene | 193-39-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dibenz(a.h)anthracene | 53-70-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(g,h,i)perylene | 191-24-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Sum of polycyclic aromatic hydrocarbons | ---- | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Benzo(a)pyrene TEQ (zero) | ---- | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Benzo(a)pyrene TEQ (half LOR) | ---- | 0.5 | mg/kg | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| ^ Benzo(a)pyrene TEQ (LOR) | ---- | 0.5 | mg/kg | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| EP074S: VOC Surrogates | | | | | | | | |
| 1,2-Dichloroethane-D4 | 17060-07-0 | 0.5 | % | 73.8 | 71.3 | 72.6 | 83.0 | 69.2 |
| Toluene-D8 | 2037-26-5 | 0.5 | % | 87.8 | 85.4 | 82.3 | 95.8 | 76.5 |
| 4-Bromofluorobenzene | 460-00-4 | 0.5 | % | 85.1 | 81.6 | 72.7 | 85.4 | 66.9 |
| EP075(SIM)S: Phenolic Compound Surrogates | | | | | | | | |
| Phenol-d6 | 13127-88-3 | 0.5 | % | 78.4 | 80.9 | 78.1 | 79.5 | 79.4 |
| 2-Chlorophenol-D4 | 93951-73-6 | 0.5 | % | 78.9 | 82.7 | 81.6 | 80.9 | 81.1 |
| 2,4,6-Tribromophenol | 118-79-6 | 0.5 | % | 67.9 | 61.7 | 59.4 | 52.4 | 66.4 |
| EP075(SIM)T: PAH Surrogates | | | | | | | | |
| 2-Fluorobiphenyl | 321-60-8 | 0.5 | % | 89.9 | 91.5 | 90.0 | 91.4 | 91.8 |
| Anthracene-d10 | 1719-06-8 | 0.5 | % | 85.2 | 87.0 | 85.6 | 84.8 | 85.1 |
| 4-Terphenyl-d14 | 1718-51-0 | 0.5 | % | 84.7 | 87.0 | 85.3 | 86.8 | 86.4 |

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | | S3B | S4A | S4B | S5A | S5B | |
|---|------------|------|-------------|-------------------|--|-------------------|-----|-------------------|-----|-------------------|--|
| Client sampling date / time | | | | 18-May-2017 11:30 | | 18-May-2017 11:45 | | 18-May-2017 11:48 | | 18-May-2017 11:55 | |
| Compound | CAS Number | LOR | Unit | ES1711992-006 | | ES1711992-007 | | ES1711992-008 | | ES1711992-009 | |
| | | | | Result | | Result | | Result | | Result | |
| EA002 : pH (Soils) | | | | | | | | | | | |
| pH Value | ---- | 0.1 | pH Unit | 8.5 | | 8.4 | | 8.8 | | 7.9 | |
| EA010: Conductivity | | | | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | 60 | | 56 | | 46 | | 81 | |
| EA029-A: pH Measurements | | | | | | | | | | | |
| pH KCl (23A) | ---- | 0.1 | pH Unit | 9.4 | | 9.5 | | 9.6 | | 9.2 | |
| pH OX (23B) | ---- | 0.1 | pH Unit | 8.2 | | 7.8 | | 8.0 | | 7.2 | |
| EA029-B: Acidity Trail | | | | | | | | | | | |
| Titrateable Actual Acidity (23F) | ---- | 2 | mole H+ / t | <2 | | <2 | | <2 | | <2 | |
| Titrateable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | <2 | | <2 | | <2 | | <2 | |
| Titrateable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | <2 | | <2 | | <2 | | <2 | |
| sulfidic - Titrateable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | <0.020 | | <0.020 | | <0.020 | | <0.020 | |
| sulfidic - Titrateable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | <0.020 | | <0.020 | | <0.020 | | <0.020 | |
| sulfidic - Titrateable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | <0.020 | | <0.020 | | <0.020 | | <0.020 | |
| EA029-C: Sulfur Trail | | | | | | | | | | | |
| KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.020 | | <0.020 | | <0.020 | | <0.020 | |
| Peroxide Sulfur (23De) | ---- | 0.02 | % S | <0.020 | | 0.023 | | <0.020 | | 0.023 | |
| Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | <0.020 | | 0.023 | | <0.020 | | 0.023 | |
| acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | <10 | | 14 | | <10 | | 14 | |
| EA029-D: Calcium Values | | | | | | | | | | | |
| KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | 0.176 | | 0.159 | | 0.167 | | 0.213 | |
| Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | 1.26 | | 0.943 | | 2.21 | | 1.37 | |
| Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | 1.08 | | 0.784 | | 2.04 | | 1.16 | |
| acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | 539 | | 391 | | 1020 | | 577 | |
| sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | 0.864 | | 0.627 | | 1.64 | | 0.926 | |
| EA029-E: Magnesium Values | | | | | | | | | | | |
| KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | <0.020 | | <0.020 | | <0.020 | | <0.020 | |
| Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | <0.020 | | <0.020 | | <0.020 | | <0.020 | |
| Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.020 | | <0.020 | | <0.020 | | <0.020 | |
| Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | | <10 | | <10 | | <10 | |
| sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.020 | | <0.020 | | <0.020 | | <0.020 | |
| EA029-F: Excess Acid Neutralising Capacity | | | | | | | | | | | |



Analytical Results

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | S3B | S4A | S4B | S5A | S5B |
|---|------------|------|-------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | | 18-May-2017 11:30 | 18-May-2017 11:45 | 18-May-2017 11:48 | 18-May-2017 11:55 | 18-May-2017 11:55 |
| Compound | CAS Number | LOR | Unit | | ES1711992-006 | ES1711992-007 | ES1711992-008 | ES1711992-009 | ES1711992-010 |
| | | | | | Result | Result | Result | Result | Result |
| EA029-F: Excess Acid Neutralising Capacity - Continued | | | | | | | | | |
| Excess Acid Neutralising Capacity (23Q) | ---- | 0.02 | % CaCO3 | | 3.45 | 2.30 | 5.66 | 3.49 | 6.27 |
| acidity - Excess Acid Neutralising Capacity (a-23Q) | ---- | 10 | mole H+ / t | | 689 | 460 | 1130 | 698 | 1250 |
| sulfidic - Excess Acid Neutralising Capacity (s-23Q) | ---- | 0.02 | % S | | 1.10 | 0.737 | 1.81 | 1.12 | 2.01 |
| EA029-H: Acid Base Accounting | | | | | | | | | |
| ANC Fineness Factor | ---- | 0.5 | - | | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Net Acidity (sulfur units) | ---- | 0.02 | % S | | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Net Acidity (acidity units) | ---- | 10 | mole H+ / t | | <10 | <10 | <10 | <10 | <10 |
| Liming Rate | ---- | 1 | kg CaCO3/t | | <1 | <1 | <1 | <1 | <1 |
| Net Acidity excluding ANC (sulfur units) | ---- | 0.02 | % S | | <0.02 | 0.02 | <0.02 | 0.02 | <0.02 |
| Net Acidity excluding ANC (acidity units) | ---- | 10 | mole H+ / t | | <10 | 14 | <10 | 14 | <10 |
| Liming Rate excluding ANC | ---- | 1 | kg CaCO3/t | | <1 | 1 | <1 | 1 | <1 |
| EA055: Moisture Content | | | | | | | | | |
| Moisture Content (dried @ 103°C) | ---- | 1 | % | | 2.1 | 1.8 | 1.2 | 2.6 | 1.4 |
| ED006: Exchangeable Cations on Alkaline Soils | | | | | | | | | |
| Exchangeable Calcium | ---- | 0.2 | meq/100g | | 1.9 | 1.3 | 0.7 | 1.5 | 0.9 |
| Exchangeable Magnesium | ---- | 0.2 | meq/100g | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium | ---- | 0.2 | meq/100g | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Sodium | ---- | 0.2 | meq/100g | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Cation Exchange Capacity | ---- | 0.2 | meq/100g | | 1.9 | 1.3 | 0.7 | 1.5 | 0.9 |
| Exchangeable Calcium Percent | ---- | 0.2 | % | | 100 | 100 | 100 | 100 | 100 |
| Exchangeable Magnesium Percent | ---- | 0.2 | % | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium Percent | ---- | 0.2 | % | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Sodium Percent | ---- | 0.2 | % | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Calcium/Magnesium Ratio | ---- | 0.2 | - | | N/A | N/A | N/A | N/A | N/A |
| Magnesium/Potassium Ratio | ---- | 0.2 | - | | N/A | N/A | N/A | N/A | N/A |
| ED045G: Chloride by Discrete Analyser | | | | | | | | | |
| Chloride | 16887-00-6 | 10 | mg/kg | | <10 | <10 | <10 | <10 | <10 |
| EG005T: Total Metals by ICP-AES | | | | | | | | | |
| Arsenic | 7440-38-2 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| Cadmium | 7440-43-9 | 1 | mg/kg | | <1 | <1 | <1 | <1 | <1 |
| Chromium | 7440-47-3 | 2 | mg/kg | | 4 | 5 | 3 | 4 | 2 |
| Copper | 7440-50-8 | 5 | mg/kg | | <5 | 8 | <5 | 7 | <5 |



Analytical Results

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | S3B | S4A | S4B | S5A | S5B |
|---|-------------------|-----|----------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | | 18-May-2017 11:30 | 18-May-2017 11:45 | 18-May-2017 11:48 | 18-May-2017 11:55 | 18-May-2017 11:55 |
| Compound | CAS Number | LOR | Unit | | ES1711992-006 | ES1711992-007 | ES1711992-008 | ES1711992-009 | ES1711992-010 |
| | | | | | Result | Result | Result | Result | Result |
| EG005T: Total Metals by ICP-AES - Continued | | | | | | | | | |
| Lead | 7439-92-1 | 5 | mg/kg | | 14 | 31 | 11 | 26 | 6 |
| Nickel | 7440-02-0 | 2 | mg/kg | | 3 | 3 | <2 | 3 | <2 |
| Zinc | 7440-66-6 | 5 | mg/kg | | 68 | 109 | 46 | 103 | 30 |
| EG035T: Total Recoverable Mercury by FIMS | | | | | | | | | |
| Mercury | 7439-97-6 | 0.1 | mg/kg | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| EK040T: Fluoride Total | | | | | | | | | |
| Fluoride | 16984-48-8 | 40 | mg/kg | | 60 | 50 | 50 | 50 | <40 |
| EK055: Ammonia as N | | | | | | | | | |
| Ammonia as N | 7664-41-7 | 20 | mg/kg | | <20 | <20 | <20 | <20 | <20 |
| EK057G: Nitrite as N by Discrete Analyser | | | | | | | | | |
| Nitrite as N (Sol.) | 14797-65-0 | 0.1 | mg/kg | | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 |
| EK058G: Nitrate as N by Discrete Analyser | | | | | | | | | |
| Nitrate as N (Sol.) | 14797-55-8 | 0.1 | mg/kg | | 0.7 | 0.8 | 0.4 | 1.3 | 0.5 |
| EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser | | | | | | | | | |
| Nitrite + Nitrate as N (Sol.) | ---- | 0.1 | mg/kg | | 0.7 | 0.8 | 0.4 | 1.4 | 0.5 |
| EK061G: Total Kjeldahl Nitrogen By Discrete Analyser | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 20 | mg/kg | | 320 | 480 | 220 | 1010 | 200 |
| EK062: Total Nitrogen as N (TKN + NOx) | | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 20 | mg/kg | | 320 | 480 | 220 | 1010 | 200 |
| EK067G: Total Phosphorus as P by Discrete Analyser | | | | | | | | | |
| Total Phosphorus as P | ---- | 2 | mg/kg | | 79 | 141 | 71 | 182 | 61 |
| EK072: Phosphate Sorption Capacity | | | | | | | | | |
| Phosphate Sorption Capacity | ---- | 250 | mg P sorbed/kg | | <250 | 319 | <250 | 339 | <250 |
| EK074: Fluoride Extractable Phosphorus (Bray) | | | | | | | | | |
| Fluoride Extractable P (Bray) | ---- | 1 | mg/kg | | 4.9 | 18.1 | 2.6 | 6.3 | 2.3 |
| EK080: Bicarbonate Extractable Phosphorus (Colwell) | | | | | | | | | |
| Bicarbonate Ext. P (Colwell) | ---- | 5 | mg/kg | | 14 | 19 | 12 | 14 | 10 |
| EP074A: Monocyclic Aromatic Hydrocarbons | | | | | | | | | |
| Benzene | 71-43-2 | 0.2 | mg/kg | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | 108-88-3 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Ethylbenzene | 100-41-4 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| meta- & para-Xylene | 108-38-3 106-42-3 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

| | | | | S3B | S4A | S4B | S5A | S5B |
|---|------------|-----|-------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | 18-May-2017 11:30 | 18-May-2017 11:45 | 18-May-2017 11:48 | 18-May-2017 11:55 | 18-May-2017 11:55 |
| Compound | CAS Number | LOR | Unit | ES1711992-006 | ES1711992-007 | ES1711992-008 | ES1711992-009 | ES1711992-010 |
| | | | | Result | Result | Result | Result | Result |
| EP074A: Monocyclic Aromatic Hydrocarbons - Continued | | | | | | | | |
| Styrene | 100-42-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ortho-Xylene | 95-47-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Isopropylbenzene | 98-82-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| n-Propylbenzene | 103-65-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,3,5-Trimethylbenzene | 108-67-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| sec-Butylbenzene | 135-98-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2,4-Trimethylbenzene | 95-63-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| tert-Butylbenzene | 98-06-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| p-Isopropyltoluene | 99-87-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| n-Butylbenzene | 104-51-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074B: Oxygenated Compounds | | | | | | | | |
| Vinyl Acetate | 108-05-4 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Butanone (MEK) | 78-93-3 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 4-Methyl-2-pentanone (MIBK) | 108-10-1 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Hexanone (MBK) | 591-78-6 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| EP074C: Sulfonated Compounds | | | | | | | | |
| Carbon disulfide | 75-15-0 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074D: Fumigants | | | | | | | | |
| 2,2-Dichloropropane | 594-20-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2-Dichloropropane | 78-87-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1,3-Dichloropropylene | 10061-01-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1,3-Dichloropropylene | 10061-02-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2-Dibromoethane (EDB) | 106-93-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074E: Halogenated Aliphatic Compounds | | | | | | | | |
| Dichlorodifluoromethane | 75-71-8 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Chloromethane | 74-87-3 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Vinyl chloride | 75-01-4 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Bromomethane | 74-83-9 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Chloroethane | 75-00-3 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane | 75-69-4 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethene | 75-35-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Iodomethane | 74-88-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1,2-Dichloroethene | 156-60-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1-Dichloroethane | 75-34-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | | S3B | | S4A | | S4B | | S5A | | S5B | |
|---|------------|-----|-------|-------------------|--|-------------------|--|-------------------|--|-------------------|--|-------------------|--|-----|--|
| Client sampling date / time | | | | 18-May-2017 11:30 | | 18-May-2017 11:45 | | 18-May-2017 11:48 | | 18-May-2017 11:55 | | 18-May-2017 11:55 | | | |
| Compound | CAS Number | LOR | Unit | ES1711992-006 | | ES1711992-007 | | ES1711992-008 | | ES1711992-009 | | ES1711992-010 | | | |
| | | | | Result | | Result | | Result | | Result | | Result | | | |
| EP074E: Halogenated Aliphatic Compounds - Continued | | | | | | | | | | | | | | | |
| cis-1.2-Dichloroethene | 156-59-2 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.1.1-Trichloroethane | 71-55-6 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.1-Dichloropropylene | 563-58-6 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| Carbon Tetrachloride | 56-23-5 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.2-Dichloroethane | 107-06-2 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| Trichloroethene | 79-01-6 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| Dibromomethane | 74-95-3 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.1.2-Trichloroethane | 79-00-5 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.3-Dichloropropane | 142-28-9 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| Tetrachloroethene | 127-18-4 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.1.1.2-Tetrachloroethane | 630-20-6 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| trans-1.4-Dichloro-2-butene | 110-57-6 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| cis-1.4-Dichloro-2-butene | 1476-11-5 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.1.2.2-Tetrachloroethane | 79-34-5 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.2.3-Trichloropropane | 96-18-4 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| Pentachloroethane | 76-01-7 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.2-Dibromo-3-chloropropane | 96-12-8 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| Hexachlorobutadiene | 87-68-3 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| EP074F: Halogenated Aromatic Compounds | | | | | | | | | | | | | | | |
| Chlorobenzene | 108-90-7 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| Bromobenzene | 108-86-1 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 2-Chlorotoluene | 95-49-8 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 4-Chlorotoluene | 106-43-4 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.3-Dichlorobenzene | 541-73-1 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.4-Dichlorobenzene | 106-46-7 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.2-Dichlorobenzene | 95-50-1 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.2.4-Trichlorobenzene | 120-82-1 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| 1.2.3-Trichlorobenzene | 87-61-6 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| EP074G: Trihalomethanes | | | | | | | | | | | | | | | |
| Chloroform | 67-66-3 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| Bromodichloromethane | 75-27-4 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| Dibromochloromethane | 124-48-1 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| Bromoform | 75-25-2 | 0.5 | mg/kg | <0.5 | | <0.5 | | <0.5 | | <0.5 | | <0.5 | | | |
| EP074H: Naphthalene | | | | | | | | | | | | | | | |



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

| | | | | S3B | S4A | S4B | S5A | S5B |
|---|-------------------|-----|-------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | 18-May-2017 11:30 | 18-May-2017 11:45 | 18-May-2017 11:48 | 18-May-2017 11:55 | 18-May-2017 11:55 |
| Compound | CAS Number | LOR | Unit | ES1711992-006 | ES1711992-007 | ES1711992-008 | ES1711992-009 | ES1711992-010 |
| | | | | Result | Result | Result | Result | Result |
| EP074H: Naphthalene - Continued | | | | | | | | |
| Naphthalene | 91-20-3 | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| EP075(SIM)B: Polynuclear Aromatic Hydrocarbons | | | | | | | | |
| Naphthalene | 91-20-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Acenaphthylene | 208-96-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Acenaphthene | 83-32-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluorene | 86-73-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Phenanthrene | 85-01-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Anthracene | 120-12-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluoranthene | 206-44-0 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Pyrene | 129-00-0 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benz(a)anthracene | 56-55-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Chrysene | 218-01-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(b+j)fluoranthene | 205-99-2 205-82-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(k)fluoranthene | 207-08-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(a)pyrene | 50-32-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Indeno(1.2.3.cd)pyrene | 193-39-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dibenz(a.h)anthracene | 53-70-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(g,h,i)perylene | 191-24-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Sum of polycyclic aromatic hydrocarbons | ---- | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Benzo(a)pyrene TEQ (zero) | ---- | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Benzo(a)pyrene TEQ (half LOR) | ---- | 0.5 | mg/kg | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| ^ Benzo(a)pyrene TEQ (LOR) | ---- | 0.5 | mg/kg | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| EP074S: VOC Surrogates | | | | | | | | |
| 1,2-Dichloroethane-D4 | 17060-07-0 | 0.5 | % | 74.4 | 84.2 | 84.9 | 82.0 | 84.2 |
| Toluene-D8 | 2037-26-5 | 0.5 | % | 83.2 | 94.6 | 94.8 | 89.5 | 95.2 |
| 4-Bromofluorobenzene | 460-00-4 | 0.5 | % | 72.8 | 84.9 | 85.7 | 81.7 | 83.3 |
| EP075(SIM)S: Phenolic Compound Surrogates | | | | | | | | |
| Phenol-d6 | 13127-88-3 | 0.5 | % | 72.1 | 79.9 | 83.9 | 82.7 | 80.4 |
| 2-Chlorophenol-D4 | 93951-73-6 | 0.5 | % | 70.1 | 82.1 | 85.7 | 84.8 | 82.2 |
| 2,4,6-Tribromophenol | 118-79-6 | 0.5 | % | 46.6 | 59.0 | 59.6 | 68.9 | 57.6 |
| EP075(SIM)T: PAH Surrogates | | | | | | | | |
| 2-Fluorobiphenyl | 321-60-8 | 0.5 | % | 74.6 | 92.2 | 96.3 | 95.1 | 91.4 |
| Anthracene-d10 | 1719-06-8 | 0.5 | % | 75.2 | 86.7 | 90.2 | 89.8 | 86.4 |
| 4-Terphenyl-d14 | 1718-51-0 | 0.5 | % | 72.1 | 87.2 | 92.4 | 91.7 | 88.5 |

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | S6A | S6B | S7A | S7B | BG1A |
|--|------------|------|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| Client sampling date / time | | | | 18-May-2017 12:03 | 18-May-2017 12:05 | 18-May-2017 12:00 | 18-May-2017 12:10 | 18-May-2017 12:25 | |
| Compound | CAS Number | LOR | Unit | ES1711992-011 | ES1711992-012 | ES1711992-013 | ES1711992-014 | ES1711992-015 | |
| | | | | Result | Result | Result | Result | Result | |
| EA002 : pH (Soils) | | | | | | | | | |
| pH Value | ---- | 0.1 | pH Unit | 8.2 | 8.7 | 8.2 | 8.6 | 8.3 | |
| EA010: Conductivity | | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | 76 | 55 | 67 | 52 | 42 | |
| EA029-A: pH Measurements | | | | | | | | | |
| pH KCl (23A) | ---- | 0.1 | pH Unit | 9.5 | 9.6 | 9.5 | 9.5 | 9.6 | |
| pH OX (23B) | ---- | 0.1 | pH Unit | 7.8 | 8.4 | 7.7 | 7.9 | 8.2 | |
| EA029-B: Acidity Trail | | | | | | | | | |
| Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | <2 | <2 | <2 | <2 | <2 | |
| Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | <2 | <2 | <2 | <2 | <2 | |
| Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | <2 | <2 | <2 | <2 | <2 | |
| sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| EA029-C: Sulfur Trail | | | | | | | | | |
| KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Peroxide Sulfur (23De) | ---- | 0.02 | % S | 0.024 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | 0.024 | <0.020 | <0.020 | <0.020 | <0.020 | |
| acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | 15 | <10 | <10 | <10 | <10 | |
| EA029-D: Calcium Values | | | | | | | | | |
| KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | 0.202 | 0.177 | 0.178 | 0.164 | 0.188 | |
| Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | 1.69 | 2.44 | 1.72 | 0.985 | 2.05 | |
| Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | 1.48 | 2.27 | 1.54 | 0.820 | 1.86 | |
| acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | 741 | 1130 | 770 | 409 | 929 | |
| sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | 1.19 | 1.81 | 1.24 | 0.656 | 1.49 | |
| EA029-E: Magnesium Values | | | | | | | | | |
| KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | <10 | <10 | <10 | <10 | |
| sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| EA029-F: Excess Acid Neutralising Capacity | | | | | | | | | |



Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Client sample ID

| | | | | S6A | S6B | S7A | S7B | BG1A |
|---|------------|------|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | 18-May-2017 12:03 | 18-May-2017 12:05 | 18-May-2017 12:00 | 18-May-2017 12:10 | 18-May-2017 12:25 |
| Compound | CAS Number | LOR | Unit | ES1711992-011 | ES1711992-012 | ES1711992-013 | ES1711992-014 | ES1711992-015 |
| | | | | Result | Result | Result | Result | Result |
| EA029-F: Excess Acid Neutralising Capacity - Continued | | | | | | | | |
| Excess Acid Neutralising Capacity (23Q) | ---- | 0.02 | % CaCO3 | 3.97 | 6.20 | 4.15 | 2.50 | 2.63 |
| acidity - Excess Acid Neutralising Capacity (a-23Q) | ---- | 10 | mole H+ / t | 792 | 1240 | 830 | 500 | 525 |
| sulfidic - Excess Acid Neutralising Capacity (s-23Q) | ---- | 0.02 | % S | 1.27 | 1.98 | 1.33 | 0.801 | 0.841 |
| EA029-H: Acid Base Accounting | | | | | | | | |
| ANC Fineness Factor | ---- | 0.5 | - | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Net Acidity (sulfur units) | ---- | 0.02 | % S | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Net Acidity (acidity units) | ---- | 10 | mole H+ / t | <10 | <10 | <10 | <10 | <10 |
| Liming Rate | ---- | 1 | kg CaCO3/t | <1 | <1 | <1 | <1 | <1 |
| Net Acidity excluding ANC (sulfur units) | ---- | 0.02 | % S | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Net Acidity excluding ANC (acidity units) | ---- | 10 | mole H+ / t | 15 | <10 | <10 | <10 | <10 |
| Liming Rate excluding ANC | ---- | 1 | kg CaCO3/t | 1 | <1 | <1 | <1 | <1 |
| EA055: Moisture Content | | | | | | | | |
| Moisture Content (dried @ 103°C) | ---- | 1 | % | 2.9 | 2.3 | 2.0 | 1.4 | 2.0 |
| ED006: Exchangeable Cations on Alkaline Soils | | | | | | | | |
| Exchangeable Calcium | ---- | 0.2 | meq/100g | 1.8 | 1.3 | 1.5 | 1.3 | 1.6 |
| Exchangeable Magnesium | ---- | 0.2 | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium | ---- | 0.2 | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Sodium | ---- | 0.2 | meq/100g | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Cation Exchange Capacity | ---- | 0.2 | meq/100g | 1.8 | 1.3 | 1.5 | 1.3 | 1.6 |
| Exchangeable Calcium Percent | ---- | 0.2 | % | 100 | 100 | 100 | 100 | 100 |
| Exchangeable Magnesium Percent | ---- | 0.2 | % | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium Percent | ---- | 0.2 | % | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Sodium Percent | ---- | 0.2 | % | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Calcium/Magnesium Ratio | ---- | 0.2 | - | N/A | N/A | N/A | N/A | N/A |
| Magnesium/Potassium Ratio | ---- | 0.2 | - | N/A | N/A | N/A | N/A | N/A |
| ED045G: Chloride by Discrete Analyser | | | | | | | | |
| Chloride | 16887-00-6 | 10 | mg/kg | <10 | <10 | <10 | <10 | <10 |
| EG005T: Total Metals by ICP-AES | | | | | | | | |
| Arsenic | 7440-38-2 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Cadmium | 7440-43-9 | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| Chromium | 7440-47-3 | 2 | mg/kg | 5 | 3 | 4 | 2 | 4 |
| Copper | 7440-50-8 | 5 | mg/kg | 10 | <5 | 7 | <5 | 6 |



Analytical Results

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | S6A | S6B | S7A | S7B | BG1A |
|---|-------------------|-----|----------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | | 18-May-2017 12:03 | 18-May-2017 12:05 | 18-May-2017 12:00 | 18-May-2017 12:10 | 18-May-2017 12:25 |
| Compound | CAS Number | LOR | Unit | | ES1711992-011 | ES1711992-012 | ES1711992-013 | ES1711992-014 | ES1711992-015 |
| | | | | | Result | Result | Result | Result | Result |
| EG005T: Total Metals by ICP-AES - Continued | | | | | | | | | |
| Lead | 7439-92-1 | 5 | mg/kg | | 34 | 11 | 23 | 8 | 23 |
| Nickel | 7440-02-0 | 2 | mg/kg | | 3 | 3 | 2 | <2 | 2 |
| Zinc | 7440-66-6 | 5 | mg/kg | | 124 | 59 | 75 | 28 | 82 |
| EG035T: Total Recoverable Mercury by FIMS | | | | | | | | | |
| Mercury | 7439-97-6 | 0.1 | mg/kg | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| EK040T: Fluoride Total | | | | | | | | | |
| Fluoride | 16984-48-8 | 40 | mg/kg | | 60 | <40 | 40 | <40 | 70 |
| EK055: Ammonia as N | | | | | | | | | |
| Ammonia as N | 7664-41-7 | 20 | mg/kg | | <20 | <20 | <20 | <20 | <20 |
| EK057G: Nitrite as N by Discrete Analyser | | | | | | | | | |
| Nitrite as N (Sol.) | 14797-65-0 | 0.1 | mg/kg | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| EK058G: Nitrate as N by Discrete Analyser | | | | | | | | | |
| Nitrate as N (Sol.) | 14797-55-8 | 0.1 | mg/kg | | 1.3 | 0.6 | 0.8 | 0.3 | 0.8 |
| EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser | | | | | | | | | |
| Nitrite + Nitrate as N (Sol.) | ---- | 0.1 | mg/kg | | 1.3 | 0.6 | 0.8 | 0.3 | 0.8 |
| EK061G: Total Kjeldahl Nitrogen By Discrete Analyser | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 20 | mg/kg | | 670 | 250 | 660 | 220 | 530 |
| EK062: Total Nitrogen as N (TKN + NOx) | | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 20 | mg/kg | | 670 | 250 | 660 | 220 | 530 |
| EK067G: Total Phosphorus as P by Discrete Analyser | | | | | | | | | |
| Total Phosphorus as P | ---- | 2 | mg/kg | | 135 | 85 | 127 | 60 | 149 |
| EK072: Phosphate Sorption Capacity | | | | | | | | | |
| Phosphate Sorption Capacity | ---- | 250 | mg P sorbed/kg | | 404 | <250 | <250 | <250 | 403 |
| EK074: Fluoride Extractable Phosphorus (Bray) | | | | | | | | | |
| Fluoride Extractable P (Bray) | ---- | 1 | mg/kg | | 15.3 | 3.3 | 4.0 | 1.3 | 5.8 |
| EK080: Bicarbonate Extractable Phosphorus (Colwell) | | | | | | | | | |
| Bicarbonate Ext. P (Colwell) | ---- | 5 | mg/kg | | 18 | 10 | 7 | 7 | 18 |
| EP074A: Monocyclic Aromatic Hydrocarbons | | | | | | | | | |
| Benzene | 71-43-2 | 0.2 | mg/kg | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | 108-88-3 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Ethylbenzene | 100-41-4 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| meta- & para-Xylene | 108-38-3 106-42-3 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

| | | | | S6A | S6B | S7A | S7B | BG1A |
|---|------------|-----|-------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | 18-May-2017 12:03 | 18-May-2017 12:05 | 18-May-2017 12:00 | 18-May-2017 12:10 | 18-May-2017 12:25 |
| Compound | CAS Number | LOR | Unit | ES1711992-011 | ES1711992-012 | ES1711992-013 | ES1711992-014 | ES1711992-015 |
| | | | | Result | Result | Result | Result | Result |
| EP074A: Monocyclic Aromatic Hydrocarbons - Continued | | | | | | | | |
| Styrene | 100-42-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ortho-Xylene | 95-47-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Isopropylbenzene | 98-82-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| n-Propylbenzene | 103-65-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,3,5-Trimethylbenzene | 108-67-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| sec-Butylbenzene | 135-98-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2,4-Trimethylbenzene | 95-63-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| tert-Butylbenzene | 98-06-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| p-Isopropyltoluene | 99-87-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| n-Butylbenzene | 104-51-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074B: Oxygenated Compounds | | | | | | | | |
| Vinyl Acetate | 108-05-4 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Butanone (MEK) | 78-93-3 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 4-Methyl-2-pentanone (MIBK) | 108-10-1 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 2-Hexanone (MBK) | 591-78-6 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| EP074C: Sulfonated Compounds | | | | | | | | |
| Carbon disulfide | 75-15-0 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074D: Fumigants | | | | | | | | |
| 2,2-Dichloropropane | 594-20-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2-Dichloropropane | 78-87-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1,3-Dichloropropylene | 10061-01-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1,3-Dichloropropylene | 10061-02-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2-Dibromoethane (EDB) | 106-93-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074E: Halogenated Aliphatic Compounds | | | | | | | | |
| Dichlorodifluoromethane | 75-71-8 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Chloromethane | 74-87-3 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Vinyl chloride | 75-01-4 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Bromomethane | 74-83-9 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Chloroethane | 75-00-3 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane | 75-69-4 | 5 | mg/kg | <5 | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethene | 75-35-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Iodomethane | 74-88-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1,2-Dichloroethene | 156-60-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,1-Dichloroethane | 75-34-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | S6A | S6B | S7A | S7B | BG1A |
|---|------------|-----|-------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| Client sampling date / time | | | | 18-May-2017 12:03 | 18-May-2017 12:05 | 18-May-2017 12:00 | 18-May-2017 12:10 | 18-May-2017 12:25 | |
| Compound | CAS Number | LOR | Unit | ES1711992-011 | ES1711992-012 | ES1711992-013 | ES1711992-014 | ES1711992-015 | |
| | | | | Result | Result | Result | Result | Result | |
| EP074E: Halogenated Aliphatic Compounds - Continued | | | | | | | | | |
| cis-1.2-Dichloroethene | 156-59-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.1.1-Trichloroethane | 71-55-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.1-Dichloropropylene | 563-58-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Carbon Tetrachloride | 56-23-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2-Dichloroethane | 107-06-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Trichloroethene | 79-01-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Dibromomethane | 74-95-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.1.2-Trichloroethane | 79-00-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.3-Dichloropropane | 142-28-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Tetrachloroethene | 127-18-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.1.1.2-Tetrachloroethane | 630-20-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| trans-1.4-Dichloro-2-butene | 110-57-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| cis-1.4-Dichloro-2-butene | 1476-11-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.1.2.2-Tetrachloroethane | 79-34-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2.3-Trichloropropane | 96-18-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Pentachloroethane | 76-01-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2-Dibromo-3-chloropropane | 96-12-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Hexachlorobutadiene | 87-68-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| EP074F: Halogenated Aromatic Compounds | | | | | | | | | |
| Chlorobenzene | 108-90-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Bromobenzene | 108-86-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 2-Chlorotoluene | 95-49-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 4-Chlorotoluene | 106-43-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.3-Dichlorobenzene | 541-73-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.4-Dichlorobenzene | 106-46-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2-Dichlorobenzene | 95-50-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2.4-Trichlorobenzene | 120-82-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| 1.2.3-Trichlorobenzene | 87-61-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| EP074G: Trihalomethanes | | | | | | | | | |
| Chloroform | 67-66-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Bromodichloromethane | 75-27-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Dibromochloromethane | 124-48-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| Bromoform | 75-25-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | |
| EP074H: Naphthalene | | | | | | | | | |



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

| | | | | S6A | S6B | S7A | S7B | BG1A |
|---|-------------------|-----|-------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | 18-May-2017 12:03 | 18-May-2017 12:05 | 18-May-2017 12:00 | 18-May-2017 12:10 | 18-May-2017 12:25 |
| Compound | CAS Number | LOR | Unit | ES1711992-011 | ES1711992-012 | ES1711992-013 | ES1711992-014 | ES1711992-015 |
| | | | | Result | Result | Result | Result | Result |
| EP074H: Naphthalene - Continued | | | | | | | | |
| Naphthalene | 91-20-3 | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| EP075(SIM)B: Polynuclear Aromatic Hydrocarbons | | | | | | | | |
| Naphthalene | 91-20-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Acenaphthylene | 208-96-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Acenaphthene | 83-32-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluorene | 86-73-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Phenanthrene | 85-01-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Anthracene | 120-12-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluoranthene | 206-44-0 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Pyrene | 129-00-0 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benz(a)anthracene | 56-55-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Chrysene | 218-01-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(b+j)fluoranthene | 205-99-2 205-82-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(k)fluoranthene | 207-08-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(a)pyrene | 50-32-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Indeno(1.2.3.cd)pyrene | 193-39-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dibenz(a.h)anthracene | 53-70-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(g.h.i)perylene | 191-24-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Sum of polycyclic aromatic hydrocarbons | ---- | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Benzo(a)pyrene TEQ (zero) | ---- | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Benzo(a)pyrene TEQ (half LOR) | ---- | 0.5 | mg/kg | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| ^ Benzo(a)pyrene TEQ (LOR) | ---- | 0.5 | mg/kg | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| EP074S: VOC Surrogates | | | | | | | | |
| 1,2-Dichloroethane-D4 | 17060-07-0 | 0.5 | % | 72.9 | 84.0 | 83.1 | 85.4 | 83.8 |
| Toluene-D8 | 2037-26-5 | 0.5 | % | 78.7 | 91.4 | 88.3 | 91.5 | 87.0 |
| 4-Bromofluorobenzene | 460-00-4 | 0.5 | % | 67.8 | 81.7 | 79.7 | 82.2 | 76.5 |
| EP075(SIM)S: Phenolic Compound Surrogates | | | | | | | | |
| Phenol-d6 | 13127-88-3 | 0.5 | % | 81.1 | 83.0 | 86.5 | 83.0 | 80.4 |
| 2-Chlorophenol-D4 | 93951-73-6 | 0.5 | % | 83.8 | 85.2 | 89.0 | 85.4 | 82.5 |
| 2,4,6-Tribromophenol | 118-79-6 | 0.5 | % | 64.8 | 60.7 | 66.8 | 56.4 | 57.4 |
| EP075(SIM)T: PAH Surrogates | | | | | | | | |
| 2-Fluorobiphenyl | 321-60-8 | 0.5 | % | 93.7 | 94.5 | 100 | 95.0 | 93.3 |
| Anthracene-d10 | 1719-06-8 | 0.5 | % | 88.4 | 90.4 | 95.4 | 89.7 | 88.1 |
| 4-Terphenyl-d14 | 1718-51-0 | 0.5 | % | 89.8 | 91.8 | 97.2 | 92.3 | 88.2 |

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | BG1B | BG2A | BG2B | BG3A | BG3B |
|--|------------|------|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| Client sampling date / time | | | | 18-May-2017 12:25 | 18-May-2017 12:40 | 18-May-2017 12:40 | 18-May-2017 12:55 | 18-May-2017 12:55 | |
| Compound | CAS Number | LOR | Unit | ES1711992-016 | ES1711992-017 | ES1711992-018 | ES1711992-019 | ES1711992-020 | |
| | | | | Result | Result | Result | Result | Result | |
| EA002 : pH (Soils) | | | | | | | | | |
| pH Value | ---- | 0.1 | pH Unit | 8.9 | 8.3 | 8.8 | 8.3 | 8.4 | |
| EA010: Conductivity | | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | 45 | 92 | 75 | 70 | 62 | |
| EA029-A: pH Measurements | | | | | | | | | |
| pH KCl (23A) | ---- | 0.1 | pH Unit | 9.6 | 9.3 | 9.4 | 9.4 | 9.4 | |
| pH OX (23B) | ---- | 0.1 | pH Unit | 8.1 | 7.7 | 8.2 | 7.4 | 7.7 | |
| EA029-B: Acidity Trail | | | | | | | | | |
| Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | <2 | <2 | <2 | <2 | <2 | |
| Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | <2 | <2 | <2 | <2 | <2 | |
| Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | <2 | <2 | <2 | <2 | <2 | |
| sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| EA029-C: Sulfur Trail | | | | | | | | | |
| KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Peroxide Sulfur (23De) | ---- | 0.02 | % S | <0.020 | 0.024 | <0.020 | 0.020 | 0.025 | |
| Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | <0.020 | 0.024 | <0.020 | 0.020 | 0.025 | |
| acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | <10 | 15 | <10 | 13 | 16 | |
| EA029-D: Calcium Values | | | | | | | | | |
| KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | 0.155 | 0.229 | 0.248 | 0.164 | 0.182 | |
| Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | 2.51 | 1.56 | 1.48 | 0.734 | 0.881 | |
| Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | 2.35 | 1.33 | 1.23 | 0.571 | 0.699 | |
| acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | 1170 | 663 | 614 | 285 | 349 | |
| sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | 1.88 | 1.06 | 0.984 | 0.456 | 0.559 | |
| EA029-E: Magnesium Values | | | | | | | | | |
| KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | <0.020 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | <0.020 | <0.020 | 0.032 | <0.020 | 0.029 | |
| Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.020 | <0.020 | 0.032 | <0.020 | 0.029 | |
| Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | <10 | 26 | <10 | 24 | |
| sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.020 | <0.020 | 0.042 | <0.020 | 0.038 | |
| EA029-F: Excess Acid Neutralising Capacity | | | | | | | | | |



Analytical Results

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | BG1B | BG2A | BG2B | BG3A | BG3B |
|---|------------|------|-------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | | 18-May-2017 12:25 | 18-May-2017 12:40 | 18-May-2017 12:40 | 18-May-2017 12:55 | 18-May-2017 12:55 |
| Compound | CAS Number | LOR | Unit | | ES1711992-016 | ES1711992-017 | ES1711992-018 | ES1711992-019 | ES1711992-020 |
| | | | | | Result | Result | Result | Result | Result |
| EA029-F: Excess Acid Neutralising Capacity - Continued | | | | | | | | | |
| Excess Acid Neutralising Capacity (23Q) | ---- | 0.02 | % CaCO3 | | 6.67 | 3.75 | 3.63 | 1.81 | 1.84 |
| acidity - Excess Acid Neutralising Capacity (a-23Q) | ---- | 10 | mole H+ / t | | 1330 | 750 | 725 | 362 | 368 |
| sulfidic - Excess Acid Neutralising Capacity (s-23Q) | ---- | 0.02 | % S | | 2.13 | 1.20 | 1.16 | 0.580 | 0.589 |
| EA029-H: Acid Base Accounting | | | | | | | | | |
| ANC Fineness Factor | ---- | 0.5 | - | | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| Net Acidity (sulfur units) | ---- | 0.02 | % S | | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| Net Acidity (acidity units) | ---- | 10 | mole H+ / t | | <10 | <10 | <10 | <10 | <10 |
| Liming Rate | ---- | 1 | kg CaCO3/t | | <1 | <1 | <1 | <1 | <1 |
| Net Acidity excluding ANC (sulfur units) | ---- | 0.02 | % S | | <0.02 | 0.02 | <0.02 | 0.02 | 0.02 |
| Net Acidity excluding ANC (acidity units) | ---- | 10 | mole H+ / t | | <10 | 15 | <10 | 13 | 16 |
| Liming Rate excluding ANC | ---- | 1 | kg CaCO3/t | | <1 | 1 | <1 | <1 | 1 |
| EA055: Moisture Content | | | | | | | | | |
| Moisture Content (dried @ 103°C) | ---- | 1 | % | | 1.1 | 3.3 | 5.1 | 2.1 | 1.4 |
| ED006: Exchangeable Cations on Alkaline Soils | | | | | | | | | |
| Exchangeable Calcium | ---- | 0.2 | meq/100g | | 0.8 | 3.6 | 3.8 | 1.4 | 1.2 |
| Exchangeable Magnesium | ---- | 0.2 | meq/100g | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium | ---- | 0.2 | meq/100g | | <0.2 | <0.2 | 0.2 | <0.2 | <0.2 |
| Exchangeable Sodium | ---- | 0.2 | meq/100g | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Cation Exchange Capacity | ---- | 0.2 | meq/100g | | 0.8 | 3.7 | 4.0 | 1.4 | 1.2 |
| Exchangeable Calcium Percent | ---- | 0.2 | % | | 100 | 95.2 | 94.9 | 100 | 100 |
| Exchangeable Magnesium Percent | ---- | 0.2 | % | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Exchangeable Potassium Percent | ---- | 0.2 | % | | <0.2 | 4.8 | 5.1 | <0.2 | <0.2 |
| Exchangeable Sodium Percent | ---- | 0.2 | % | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Calcium/Magnesium Ratio | ---- | 0.2 | - | | N/A | N/A | N/A | N/A | N/A |
| Magnesium/Potassium Ratio | ---- | 0.2 | - | | N/A | N/A | ---- | N/A | N/A |
| Magnesium/Potassium Ratio | ---- | 0.2 | - | | ---- | ---- | <0.2 | ---- | ---- |
| ED045G: Chloride by Discrete Analyser | | | | | | | | | |
| Chloride | 16887-00-6 | 10 | mg/kg | | <10 | <10 | <10 | <10 | <10 |
| EG005T: Total Metals by ICP-AES | | | | | | | | | |
| Arsenic | 7440-38-2 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| Cadmium | 7440-43-9 | 1 | mg/kg | | <1 | <1 | <1 | <1 | <1 |
| Chromium | 7440-47-3 | 2 | mg/kg | | <2 | 6 | 8 | 5 | 5 |



Analytical Results

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | BG1B | BG2A | BG2B | BG3A | BG3B |
|---|------------|-----|----------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | | 18-May-2017 12:25 | 18-May-2017 12:40 | 18-May-2017 12:40 | 18-May-2017 12:55 | 18-May-2017 12:55 |
| Compound | CAS Number | LOR | Unit | | ES1711992-016 | ES1711992-017 | ES1711992-018 | ES1711992-019 | ES1711992-020 |
| | | | | | Result | Result | Result | Result | Result |
| EG005T: Total Metals by ICP-AES - Continued | | | | | | | | | |
| Copper | 7440-50-8 | 5 | mg/kg | | <5 | 8 | 8 | <5 | 6 |
| Lead | 7439-92-1 | 5 | mg/kg | | <5 | 13 | 11 | 10 | 13 |
| Nickel | 7440-02-0 | 2 | mg/kg | | <2 | 5 | 7 | 3 | 3 |
| Zinc | 7440-66-6 | 5 | mg/kg | | 17 | 79 | 57 | 67 | 109 |
| EG035T: Total Recoverable Mercury by FIMS | | | | | | | | | |
| Mercury | 7439-97-6 | 0.1 | mg/kg | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| EK040T: Fluoride Total | | | | | | | | | |
| Fluoride | 16984-48-8 | 40 | mg/kg | | 50 | 60 | 90 | 50 | 60 |
| EK055: Ammonia as N | | | | | | | | | |
| Ammonia as N | 7664-41-7 | 20 | mg/kg | | <20 | <20 | <20 | <20 | <20 |
| EK057G: Nitrite as N by Discrete Analyser | | | | | | | | | |
| Nitrite as N (Sol.) | 14797-65-0 | 0.1 | mg/kg | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| EK058G: Nitrate as N by Discrete Analyser | | | | | | | | | |
| Nitrate as N (Sol.) | 14797-55-8 | 0.1 | mg/kg | | 0.3 | 2.0 | 0.9 | 3.0 | 1.7 |
| EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser | | | | | | | | | |
| Nitrite + Nitrate as N (Sol.) | ---- | 0.1 | mg/kg | | 0.3 | 2.0 | 0.9 | 3.0 | 1.7 |
| EK061G: Total Kjeldahl Nitrogen By Discrete Analyser | | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 20 | mg/kg | | 140 | 940 | 460 | 450 | 430 |
| EK062: Total Nitrogen as N (TKN + NOx) | | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 20 | mg/kg | | 140 | 940 | 460 | 450 | 430 |
| EK067G: Total Phosphorus as P by Discrete Analyser | | | | | | | | | |
| Total Phosphorus as P | ---- | 2 | mg/kg | | 59 | 266 | 356 | 150 | 155 |
| EK072: Phosphate Sorption Capacity | | | | | | | | | |
| Phosphate Sorption Capacity | ---- | 250 | mg P sorbed/kg | | <250 | 607 | 910 | 424 | 376 |
| EK074: Fluoride Extractable Phosphorus (Bray) | | | | | | | | | |
| Fluoride Extractable P (Bray) | ---- | 1 | mg/kg | | 1.3 | 34.2 | 16.2 | 21.5 | 19.9 |
| EK080: Bicarbonate Extractable Phosphorus (Colwell) | | | | | | | | | |
| Bicarbonate Ext. P (Colwell) | ---- | 5 | mg/kg | | 8 | 41 | 31 | 24 | 21 |
| EP074A: Monocyclic Aromatic Hydrocarbons | | | | | | | | | |
| Benzene | 71-43-2 | 0.2 | mg/kg | | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |
| Toluene | 108-88-3 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Ethylbenzene | 100-41-4 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |



Analytical Results

| Sub-Matrix: SOIL (Matrix: SOIL) | | | | Client sample ID | BG1B | BG2A | BG2B | BG3A | BG3B |
|---|-------------------|-----|-------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | | 18-May-2017 12:25 | 18-May-2017 12:40 | 18-May-2017 12:40 | 18-May-2017 12:55 | 18-May-2017 12:55 |
| Compound | CAS Number | LOR | Unit | | ES1711992-016 | ES1711992-017 | ES1711992-018 | ES1711992-019 | ES1711992-020 |
| | | | | | Result | Result | Result | Result | Result |
| EP074A: Monocyclic Aromatic Hydrocarbons - Continued | | | | | | | | | |
| meta- & para-Xylene | 108-38-3 106-42-3 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Styrene | 100-42-5 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ortho-Xylene | 95-47-6 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Isopropylbenzene | 98-82-8 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| n-Propylbenzene | 103-65-1 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,3,5-Trimethylbenzene | 108-67-8 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| sec-Butylbenzene | 135-98-8 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2,4-Trimethylbenzene | 95-63-6 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| tert-Butylbenzene | 98-06-6 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| p-Isopropyltoluene | 99-87-6 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| n-Butylbenzene | 104-51-8 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074B: Oxygenated Compounds | | | | | | | | | |
| Vinyl Acetate | 108-05-4 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| 2-Butanone (MEK) | 78-93-3 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| 4-Methyl-2-pentanone (MIBK) | 108-10-1 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| 2-Hexanone (MBK) | 591-78-6 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| EP074C: Sulfonated Compounds | | | | | | | | | |
| Carbon disulfide | 75-15-0 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074D: Fumigants | | | | | | | | | |
| 2,2-Dichloropropane | 594-20-7 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2-Dichloropropane | 78-87-5 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1,3-Dichloropropylene | 10061-01-5 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1,3-Dichloropropylene | 10061-02-6 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1,2-Dibromoethane (EDB) | 106-93-4 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074E: Halogenated Aliphatic Compounds | | | | | | | | | |
| Dichlorodifluoromethane | 75-71-8 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| Chloromethane | 74-87-3 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| Vinyl chloride | 75-01-4 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| Bromomethane | 74-83-9 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| Chloroethane | 75-00-3 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane | 75-69-4 | 5 | mg/kg | | <5 | <5 | <5 | <5 | <5 |
| 1,1-Dichloroethene | 75-35-4 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Iodomethane | 74-88-4 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1,2-Dichloroethene | 156-60-5 | 0.5 | mg/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

| | | | | BG1B | BG2A | BG2B | BG3A | BG3B |
|--|------------|-----|-------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | 18-May-2017 12:25 | 18-May-2017 12:40 | 18-May-2017 12:40 | 18-May-2017 12:55 | 18-May-2017 12:55 |
| Compound | CAS Number | LOR | Unit | ES1711992-016 | ES1711992-017 | ES1711992-018 | ES1711992-019 | ES1711992-020 |
| | | | | Result | Result | Result | Result | Result |
| EP074E: Halogenated Aliphatic Compounds - Continued | | | | | | | | |
| 1.1-Dichloroethane | 75-34-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1.2-Dichloroethene | 156-59-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.1.1-Trichloroethane | 71-55-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.1-Dichloropropylene | 563-58-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Carbon Tetrachloride | 56-23-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.2-Dichloroethane | 107-06-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Trichloroethene | 79-01-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dibromomethane | 74-95-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.1.2-Trichloroethane | 79-00-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.3-Dichloropropane | 142-28-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Tetrachloroethene | 127-18-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.1.1.2-Tetrachloroethane | 630-20-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| trans-1.4-Dichloro-2-butene | 110-57-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| cis-1.4-Dichloro-2-butene | 1476-11-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.1.2.2-Tetrachloroethane | 79-34-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.2.3-Trichloropropane | 96-18-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Pentachloroethane | 76-01-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.2-Dibromo-3-chloropropane | 96-12-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Hexachlorobutadiene | 87-68-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074F: Halogenated Aromatic Compounds | | | | | | | | |
| Chlorobenzene | 108-90-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Bromobenzene | 108-86-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 2-Chlorotoluene | 95-49-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 4-Chlorotoluene | 106-43-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.3-Dichlorobenzene | 541-73-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.4-Dichlorobenzene | 106-46-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.2-Dichlorobenzene | 95-50-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.2.4-Trichlorobenzene | 120-82-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| 1.2.3-Trichlorobenzene | 87-61-6 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| EP074G: Trihalomethanes | | | | | | | | |
| Chloroform | 67-66-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Bromodichloromethane | 75-27-4 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dibromochloromethane | 124-48-1 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Bromoform | 75-25-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

| | | | | BG1B | BG2A | BG2B | BG3A | BG3B |
|---|-------------------|-----|-------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time | | | | 18-May-2017 12:25 | 18-May-2017 12:40 | 18-May-2017 12:40 | 18-May-2017 12:55 | 18-May-2017 12:55 |
| Compound | CAS Number | LOR | Unit | ES1711992-016 | ES1711992-017 | ES1711992-018 | ES1711992-019 | ES1711992-020 |
| | | | | Result | Result | Result | Result | Result |
| EP074H: Naphthalene | | | | | | | | |
| Naphthalene | 91-20-3 | 1 | mg/kg | <1 | <1 | <1 | <1 | <1 |
| EP075(SIM)B: Polynuclear Aromatic Hydrocarbons | | | | | | | | |
| Naphthalene | 91-20-3 | 0.5 | mg/kg | <0.5 | 0.6 | 0.6 | <0.5 | <0.5 |
| Acenaphthylene | 208-96-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Acenaphthene | 83-32-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluorene | 86-73-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Phenanthrene | 85-01-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Anthracene | 120-12-7 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluoranthene | 206-44-0 | 0.5 | mg/kg | <0.5 | <0.5 | 0.5 | <0.5 | <0.5 |
| Pyrene | 129-00-0 | 0.5 | mg/kg | <0.5 | <0.5 | 0.5 | <0.5 | <0.5 |
| Benz(a)anthracene | 56-55-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Chrysene | 218-01-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(b+j)fluoranthene | 205-99-2 205-82-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(k)fluoranthene | 207-08-9 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(a)pyrene | 50-32-8 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Indeno(1.2.3.cd)pyrene | 193-39-5 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dibenz(a.h)anthracene | 53-70-3 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(g.h.i)perylene | 191-24-2 | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Sum of polycyclic aromatic hydrocarbons | ---- | 0.5 | mg/kg | <0.5 | 0.6 | 1.6 | <0.5 | <0.5 |
| ^ Benzo(a)pyrene TEQ (zero) | ---- | 0.5 | mg/kg | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| ^ Benzo(a)pyrene TEQ (half LOR) | ---- | 0.5 | mg/kg | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| ^ Benzo(a)pyrene TEQ (LOR) | ---- | 0.5 | mg/kg | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| EP074S: VOC Surrogates | | | | | | | | |
| 1,2-Dichloroethane-D4 | 17060-07-0 | 0.5 | % | 87.4 | 78.0 | 83.2 | 86.7 | 85.6 |
| Toluene-D8 | 2037-26-5 | 0.5 | % | 92.8 | 81.8 | 83.9 | 89.7 | 86.2 |
| 4-Bromofluorobenzene | 460-00-4 | 0.5 | % | 84.6 | 72.6 | 76.0 | 81.9 | 78.3 |
| EP075(SIM)S: Phenolic Compound Surrogates | | | | | | | | |
| Phenol-d6 | 13127-88-3 | 0.5 | % | 82.6 | 85.0 | 80.2 | 79.7 | 82.6 |
| 2-Chlorophenol-D4 | 93951-73-6 | 0.5 | % | 84.8 | 87.7 | 83.0 | 84.1 | 84.6 |
| 2,4,6-Tribromophenol | 118-79-6 | 0.5 | % | 51.4 | 68.6 | 67.1 | 62.2 | 66.2 |
| EP075(SIM)T: PAH Surrogates | | | | | | | | |
| 2-Fluorobiphenyl | 321-60-8 | 0.5 | % | 94.9 | 97.6 | 91.9 | 93.0 | 95.3 |
| Anthracene-d10 | 1719-06-8 | 0.5 | % | 90.2 | 93.4 | 87.4 | 88.7 | 90.6 |
| 4-Terphenyl-d14 | 1718-51-0 | 0.5 | % | 92.4 | 95.2 | 89.2 | 90.6 | 93.0 |



Surrogate Control Limits

Sub-Matrix: **SOIL**

| | | Recovery Limits (%) | |
|--|------------|---------------------|------|
| Compound | CAS Number | Low | High |
| EP074S: VOC Surrogates | | | |
| 1,2-Dichloroethane-D4 | 17060-07-0 | 64 | 130 |
| Toluene-D8 | 2037-26-5 | 66 | 136 |
| 4-Bromofluorobenzene | 460-00-4 | 60 | 122 |
| EP075(SIM)S: Phenolic Compound Surrogates | | | |
| Phenol-d6 | 13127-88-3 | 63 | 123 |
| 2-Chlorophenol-D4 | 93951-73-6 | 66 | 122 |
| 2,4,6-Tribromophenol | 118-79-6 | 40 | 138 |
| EP075(SIM)T: PAH Surrogates | | | |
| 2-Fluorobiphenyl | 321-60-8 | 70 | 122 |
| Anthracene-d10 | 1719-06-8 | 66 | 128 |
| 4-Terphenyl-d14 | 1718-51-0 | 65 | 129 |

Appendix B - Sampling Field Notes



SOIL STRATA LOG

Strata Log No. 1 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 11:10

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S1A Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384413 E

63 61023 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) Surface - 0 mm

Soil Profile:

Fill -

Layers:

A horizon depth (usually dark in colour) - mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) - %

Size (record dominant size range) - mm

Lithology

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

Comments Dark sandy soil

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |



SOIL STRATA LOG

Strata Log No. 2 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 11:10

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S1B Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384413 E

63 61023 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) 300

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) 200 mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Light brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 10 to 20 %

Size (record dominant size range) 10 to 20 mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

| Second letter | |
|---------------|--|
| Letter | Definition |
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Light sandy soil with shells present



SOIL STRATA LOG

Strata Log No. 3 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 11:20

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S2A Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 684419 E

63 61014 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) Surface - 0 mm

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) - mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) - %

Size (record dominant size range) - mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

| Second letter | |
|---------------|--|
| Letter | Definition |
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Dark sandy soil



SOIL STRATA LOG

Strata Log No. 4 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 11:20

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S2B Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 684419 E

63 61014 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) 300

Soil Profile:

Fill -

Layers:

A horizon depth (usually dark in colour) 200 mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Light brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 10 %

Size (record dominant size range) 10 mm

Lithology

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour See odour page

Type N/A

Strength N/A

Comments Light sandy soil with shells present

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |



SOIL STRATA LOG

Strata Log No. 5 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 11:30

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S3A Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384436 E

63 61013 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) Surface - 0 mm

Soil Profile:

Fill -

Layers:

A horizon depth (usually dark in colour) - mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 10 %

Size (record dominant size range) 10 mm

Lithology

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour See odour page

Type N/A

Strength N/A

Comments Dark sandy soil

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |



SOIL STRATA LOG

Strata Log No. 6 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 11:30

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S3B Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384436 E

63 61013 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) 300

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) 200 mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Light brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 10 %

Size (record dominant size range) 10 to 20 mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

Second letter

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Light sandy soil with shells present



SOIL STRATA LOG

Strata Log No. 7 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 11:45

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S4A Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384437 E

63 61000 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) Surface - 0 mm

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) - mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) - %

Size (record dominant size range) - mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

| Second letter | |
|---------------|--|
| Letter | Definition |
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Dark sandy soil



SOIL STRATA LOG

Strata Log No. 8 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 11:48

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S4B Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384437 E

63 61000 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) 300

Soil Profile:

Fill -

Layers:

A horizon depth (usually dark in colour) 200 mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Light brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 10 %

Size (record dominant size range) 10 to 20 mm

Lithology

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

Comments

Light sandy soil with shells present

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |



SOIL STRATA LOG

Strata Log No. 9 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 11:55

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S5A Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384453 E

63 60999 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) Surface - 0 mm

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) - mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) - %

Size (record dominant size range) - mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

| Second letter | |
|---------------|--|
| Letter | Definition |
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Dark sandy soil



SOIL STRATA LOG

Strata Log No. 10 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 11:55

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S5B Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384453 E

63 60999 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) 300

Soil Profile:

Fill -

Layers:

A horizon depth (usually dark in colour) 200 mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Light brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 10 %

Size (record dominant size range) 10 to 20 mm

Lithology

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour See odour page

Type N/A

Strength N/A

Comments Light sandy soil with shells present

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |



SOIL STRATA LOG

Strata Log No. 11 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 12:03

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S6A Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384461 E

63 60993 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) Surface - 0 mm

Soil Profile:

Fill -

Layers:

A horizon depth (usually dark in colour) - mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) - %

Size (record dominant size range) - mm

Lithology

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour See odour page

Type N/A

Strength N/A

Comments Dark sandy soil

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |



SOIL STRATA LOG

Strata Log No. 12 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 12:05

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S6B Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384461 E

63 60993 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) 300

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) 200 mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Light brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 10 %

Size (record dominant size range) 10 to 20 mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

Second letter

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Light sandy soil with shells present



SOIL STRATA LOG

Strata Log No. 13 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 12:10

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S7A Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384474 E

63 60994 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) Surface - 0 mm

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) - mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) - %

Size (record dominant size range) - mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

| Second letter | |
|---------------|--|
| Letter | Definition |
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Dark sandy soil



SOIL STRATA LOG

Strata Log No. 14 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 12:10

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) S7B Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384474 E

63 60994 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) 300

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) 200 mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Light brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 10 %

Size (record dominant size range) 10 to 20 mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

Second letter

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Light sandy soil with shells present



SOIL STRATA LOG

Strata Log No. 15 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 12:25

Location BOC Limited Kooragang

Reason Baseline soil monitoring

Sample ID(s) BG1A Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384474 E

63 61030 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) Surface - 0 mm

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) - mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) - %

Size (record dominant size range) - mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

| Second letter | |
|---------------|--|
| Letter | Definition |
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Dark sandy soil



SOIL STRATA LOG

Strata Log No. 16 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 12:25

Location BOC Limited Kooragang

Reason Baseline soil monitoring background sample

Sample ID(s) BG1B Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384474 E

63 61030 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) 300

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) 200 mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Light brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 10 %

Size (record dominant size range) 10 to 20 mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

Second letter

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Light sandy soil with shells present



SOIL STRATA LOG

Strata Log No 17 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 12:40

Location BOC Limited Kooragang

Reason Baseline soil monitoring background sample

Sample ID(s) BG2A Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384378 E

63 61020 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) Surface - 0 mm

Soil Profile:

Fill -

Layers:

A horizon depth (usually dark in colour) - mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) - %

Size (record dominant size range) - mm

Lithology

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

Comments Dark sandy soil

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |



SOIL STRATA LOG

Strata Log No. 18 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 12:40

Location BOC Limited Kooragang

Reason Baseline soil monitoring background sample

Sample ID(s) BG2B Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384378 E

63 61020 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) 250

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) 200 mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 30 %

Size (record dominant size range) 20 - 30 mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

Second letter

| Letter | Definition |
|--------|--|
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Dark sandy soil. Colour darker than irrigation area soils.

Rocks present.



SOIL STRATA LOG

Strata Log No. 19 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 12:55

Location BOC Limited Kooragang

Reason Baseline soil monitoring background sample

Sample ID(s) BG3A Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384338 E

63 61009 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) Surface - 0 mm

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) - mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) - %

Size (record dominant size range) - mm

Lithology

First and/or second letters

| Letter | Definition |
|--------|------------|
| G | gravel |
| S | sand |
| M | silt |
| C | clay |
| O | organic |

Unfilled Soil Classification (see tables) SP

Hydrology

Moisture contents 0

Interface drainage -

Odour

See odour page

Type N/A

Strength N/A

| Second letter | |
|---------------|--|
| Letter | Definition |
| P | poorly graded (uniform particle sizes) |
| W | well graded (diversified particle sizes) |
| H | high plasticity |
| L | low plasticity |

Comments

Dark sandy soil



SOIL STRATA LOG

Strata Log No. 20 Lodged by BK/SC

Date 18-May-17 Job No. 034 1714 Time 12:55

Location BOC Limited Kooragang

Reason Baseline soil monitoring background sample

Sample ID(s) BG2B Sample container type Glass/bag Volume 500 mL in 2 glass jars

Drill type/method Auger 1 plastic bag

Slope Position N/A Slope % 0

Groundwater depth 1.2 to 2.2 metres

Land surface observation Surface Hydrology Clay Soil Mark/circle

Coords: Dry Wet

56 384338 E

63 61009 N

Obvious surface runoff Yes No

STRATIGRAPHIC DESCRIPTION

Depth (mm) 250

Soil Profile:

Fill -

Layers: A horizon depth (usually dark in colour) 200 mm

B horizon depth (aggregates and intensification of colour) - mm

C horizon depth (substrate under soil; may be rocky) - mm

Colour Dark brown sand

Mottle (circle) Yes No

Field Texture - tick/circle Fine Grain (<0.2mm) Coarse grain (0.2 to 63 mm)

Coarse Fragments (>63mm)

Abundance (% where <2% = very few, >90% is profuse) 30 %

Size (record dominant size range) 20 - 30 mm

Lithology

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Comments

Dark sandy soil. Colour darker than irrigation area soils.

Rocks present.