



Appendix 4 - Laboratory COC and QA/QC

QUALITY CONTROL REPORT

| | | | |
|---------------------|---|--------------------------------|--|
| Work Order | : EB1330241 | Page | : 1 of 11 |
| Client | : WORLEY PARSONS - INFRASTRUCTURE MWE | Laboratory | : Environmental Division Brisbane |
| Contact | : LUCIE MISSEN | Contact | : Steven McGrath |
| Address | : LEVEL 12, 333 COLLINS STREET MELBOURNE VIC, AUSTRALIA 3000 | Address | : 2 Byth Street Stafford QLD Australia 4053 |
| E-mail | : lucie.missen@worleyparsons.com | E-mail | : steven.mcgrath@alsenviro.com |
| Telephone | : +61 03 8676 3500 | Telephone | : +61-3-8549 9600 |
| Facsimile | : +61 03 86763770 | Facsimile | : +61-3-8549 9601 |
| Project | : 401010-01002 LOLIPIP | QC Level | : NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Site | : ---- | Date Samples Received | : 04-DEC-2013 |
| C-O-C number | : ---- | Issue Date | : 16-DEC-2013 |
| Sampler | : ---- | No. of samples received | : 48 |
| Order number | : 401010-01002 WBS 3G2003A | No. of samples analysed | : 48 |
| Quote number | : ME/507/13 | | |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

| Signatories | Position | Accreditation Category |
|----------------|------------------------------------|------------------------------|
| SATISH.TRIVEDI | 2 IC Acid Sulfate Soils Supervisor | Brisbane Acid Sulphate Soils |



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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 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
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|---|------------------|---|------------|-----------------------------------|-------------|-----------------|------------------|---------|---------------------|
| Laboratory sample ID | Client sample ID | Method: Compound | CAS Number | LOR | Unit | Original Result | Duplicate Result | RPD (%) | Recovery Limits (%) |
| EA029-A: pH Measurements (QC Lot: 3203871) | | | | | | | | | |
| EB1330241-001 | BH48 0.1-0.2 | EA029: pH KCl (23A) | ---- | 0.1 | pH Unit | 4.3 | 4.3 | 0.0 | 0% - 20% |
| | | EA029: pH OX (23B) | ---- | 0.1 | pH Unit | 4.1 | 4.2 | 2.4 | 0% - 20% |
| EB1330241-011 | BH47 0.1-0.2 | EA029: pH KCl (23A) | ---- | 0.1 | pH Unit | 4.2 | 4.2 | 0.0 | 0% - 20% |
| | | EA029: pH OX (23B) | ---- | 0.1 | pH Unit | 4.2 | 4.2 | 0.0 | 0% - 20% |
| EA029-A: pH Measurements (QC Lot: 3203872) | | | | | | | | | |
| EB1330241-021 | BH64 0.1-0.2 | EA029: pH KCl (23A) | ---- | 0.1 | pH Unit | 4.8 | 4.8 | 0.0 | 0% - 20% |
| | | EA029: pH OX (23B) | ---- | 0.1 | pH Unit | 4.9 | 4.8 | 2.1 | 0% - 20% |
| EB1330241-031 | BH7 0.1-0.2 | EA029: pH KCl (23A) | ---- | 0.1 | pH Unit | 4.8 | 4.8 | 0.0 | 0% - 20% |
| | | EA029: pH OX (23B) | ---- | 0.1 | pH Unit | 4.9 | 5.1 | 4.0 | 0% - 20% |
| EA029-A: pH Measurements (QC Lot: 3203873) | | | | | | | | | |
| EB1330241-041 | BH26 0.4-0.6 | EA029: pH KCl (23A) | ---- | 0.1 | pH Unit | 4.7 | 4.7 | 0.0 | 0% - 20% |
| | | EA029: pH OX (23B) | ---- | 0.1 | pH Unit | 4.2 | 4.1 | 2.4 | 0% - 20% |
| EA029-B: Acidity Trail (QC Lot: 3203871) | | | | | | | | | |
| EB1330241-001 | BH48 0.1-0.2 | EA029: sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | 0.05 | 0.06 | 0.0 | No Limit |
| | | EA029: sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | 0.08 | 0.09 | 0.0 | No Limit |
| | | EA029: sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | 0.03 | 0.04 | 0.0 | No Limit |
| | | EA029: Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | 34 | 36 | 7.4 | 0% - 50% |
| | | EA029: Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | 54 | 59 | 9.9 | 0% - 20% |
| | | EA029: Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | 20 | 23 | 14.2 | 0% - 50% |
| EB1330241-011 | BH47 0.1-0.2 | EA029: sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | 0.10 | 0.10 | 0.0 | No Limit |
| | | EA029: sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | 0.21 | 0.21 | 0.0 | 0% - 50% |
| | | EA029: sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | 0.11 | 0.12 | 0.0 | No Limit |
| | | EA029: Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | 64 | 60 | 6.4 | 0% - 20% |
| | | EA029: Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | 132 | 132 | 0.0 | 0% - 20% |
| | | EA029: Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | 68 | 72 | 5.7 | 0% - 20% |
| EA029-B: Acidity Trail (QC Lot: 3203872) | | | | | | | | | |
| EB1330241-021 | BH64 0.1-0.2 | EA029: sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | 0.03 | 0.03 | 0.0 | No Limit |
| | | EA029: sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | 19 | 20 | 0.0 | No Limit |



| Sub-Matrix: SOIL | | | | Laboratory Duplicate (DUP) Report | | | | | |
|---|------------------|---|------------|-----------------------------------|-------------|-----------------|------------------|---------|---------------------|
| Laboratory sample ID | Client sample ID | Method: Compound | CAS Number | LOR | Unit | Original Result | Duplicate Result | RPD (%) | Recovery Limits (%) |
| EA029-B: Acidity Trail (QC Lot: 3203872) - continued | | | | | | | | | |
| EB1330241-021 | BH64 0.1-0.2 | EA029: Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | <2 | <2 | 0.0 | No Limit |
| | | EA029: Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | <2 | <2 | 0.0 | No Limit |
| EB1330241-031 | BH7 0.1-0.2 | EA029: sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | 0.03 | 0.03 | 0.0 | No Limit |
| | | EA029: sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | 21 | 20 | 5.2 | 0% - 50% |
| | | EA029: Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | <2 | <2 | 0.0 | No Limit |
| | | EA029: Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | <2 | <2 | 0.0 | No Limit |
| EA029-B: Acidity Trail (QC Lot: 3203873) | | | | | | | | | |
| EB1330241-041 | BH26 0.4-0.6 | EA029: sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | 0.04 | 0.04 | 0.0 | No Limit |
| | | EA029: sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | 0.15 | 0.16 | 0.0 | No Limit |
| | | EA029: sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | 0.11 | 0.12 | 0.0 | No Limit |
| | | EA029: Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | 26 | 27 | 0.0 | 0% - 50% |
| | | EA029: Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | 96 | 100 | 4.8 | 0% - 20% |
| | | EA029: Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | 69 | 73 | 5.2 | 0% - 20% |
| EA029-C: Sulfur Trail (QC Lot: 3203871) | | | | | | | | | |
| EB1330241-001 | BH48 0.1-0.2 | EA029: KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Peroxide Sulfur (23De) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EB1330241-011 | BH47 0.1-0.2 | EA029: KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Peroxide Sulfur (23De) | ---- | 0.02 | % S | 0.04 | 0.03 | 0.0 | No Limit |
| | | EA029: Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | 0.04 | 0.03 | 0.0 | No Limit |
| | | EA029: acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | 23 | 20 | 12.2 | No Limit |
| EA029-C: Sulfur Trail (QC Lot: 3203872) | | | | | | | | | |
| EB1330241-021 | BH64 0.1-0.2 | EA029: KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Peroxide Sulfur (23De) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EB1330241-031 | BH7 0.1-0.2 | EA029: KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Peroxide Sulfur (23De) | ---- | 0.02 | % S | 0.03 | 0.02 | 0.0 | No Limit |
| | | EA029: Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | 0.03 | 0.02 | 0.0 | No Limit |



| Sub-Matrix: SOIL | | | | Laboratory Duplicate (DUP) Report | | | | | |
|--|------------------|---|------------|-----------------------------------|-------------|-----------------|------------------|---------|---------------------|
| Laboratory sample ID | Client sample ID | Method: Compound | CAS Number | LOR | Unit | Original Result | Duplicate Result | RPD (%) | Recovery Limits (%) |
| EA029-C: Sulfur Trail (QC Lot: 3203872) - continued | | | | | | | | | |
| EB1330241-031 | BH7 0.1-0.2 | EA029: acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | 17 | 16 | 7.0 | No Limit |
| EA029-C: Sulfur Trail (QC Lot: 3203873) | | | | | | | | | |
| EB1330241-041 | BH26 0.4-0.6 | EA029: KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Peroxide Sulfur (23De) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EA029-D: Calcium Values (QC Lot: 3203871) | | | | | | | | | |
| EB1330241-001 | BH48 0.1-0.2 | EA029: KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | 0.09 | 0.09 | 0.0 | No Limit |
| | | EA029: Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | 0.08 | 0.08 | 0.0 | No Limit |
| | | EA029: Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EB1330241-011 | BH47 0.1-0.2 | EA029: KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | 0.12 | 0.13 | 0.0 | No Limit |
| | | EA029: Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | 0.13 | 0.12 | 0.0 | No Limit |
| | | EA029: Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EA029-D: Calcium Values (QC Lot: 3203872) | | | | | | | | | |
| EB1330241-021 | BH64 0.1-0.2 | EA029: KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | 0.06 | 0.06 | 0.0 | No Limit |
| | | EA029: Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | 0.06 | 0.06 | 0.0 | No Limit |
| | | EA029: Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EB1330241-031 | BH7 0.1-0.2 | EA029: KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | 0.13 | 0.13 | 0.0 | No Limit |
| | | EA029: Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | 0.13 | 0.13 | 0.0 | No Limit |
| | | EA029: Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EA029-D: Calcium Values (QC Lot: 3203873) | | | | | | | | | |
| EB1330241-041 | BH26 0.4-0.6 | EA029: KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | 0.04 | 0.04 | 0.0 | No Limit |
| | | EA029: Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | 0.04 | 0.04 | 0.0 | No Limit |
| | | EA029: Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EA029-E: Magnesium Values (QC Lot: 3203871) | | | | | | | | | |
| EB1330241-001 | BH48 0.1-0.2 | EA029: KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | 0.06 | 0.06 | 0.0 | No Limit |
| | | EA029: Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | 0.06 | 0.06 | 0.0 | No Limit |
| | | EA029: Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.02 | <0.02 | 0.0 | No Limit |



| Sub-Matrix: SOIL | | | | Laboratory Duplicate (DUP) Report | | | | | |
|--|------------------|---|------------|-----------------------------------|-------------|-----------------|------------------|---------|---------------------|
| Laboratory sample ID | Client sample ID | Method: Compound | CAS Number | LOR | Unit | Original Result | Duplicate Result | RPD (%) | Recovery Limits (%) |
| EA029-E: Magnesium Values (QC Lot: 3203871) - continued | | | | | | | | | |
| EB1330241-001 | BH48 0.1-0.2 | EA029: sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EB1330241-011 | BH47 0.1-0.2 | EA029: KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | 0.04 | 0.04 | 0.0 | No Limit |
| | | EA029: Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | 0.04 | 0.04 | 0.0 | No Limit |
| | | EA029: Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EA029-E: Magnesium Values (QC Lot: 3203872) | | | | | | | | | |
| EB1330241-021 | BH64 0.1-0.2 | EA029: KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | 0.04 | 0.04 | 0.0 | No Limit |
| | | EA029: Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | 0.04 | 0.04 | 0.0 | No Limit |
| | | EA029: Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EB1330241-031 | BH7 0.1-0.2 | EA029: KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | 0.08 | 0.08 | 0.0 | No Limit |
| | | EA029: Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | 0.07 | 0.07 | 0.0 | No Limit |
| | | EA029: Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EA029-E: Magnesium Values (QC Lot: 3203873) | | | | | | | | | |
| EB1330241-041 | BH26 0.4-0.6 | EA029: KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EA029-G: Retained Acidity (QC Lot: 3203871) | | | | | | | | | |
| EB1330241-001 | BH48 0.1-0.2 | EA029: sulfidic - Net Acid Soluble Sulfur (s-20J) | ---- | 0.02 | % pyrite S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Net Acid Soluble Sulfur (20Je) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: HCl Extractable Sulfur (20Be) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: acidity - Net Acid Soluble Sulfur (a-20J) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EB1330241-011 | BH47 0.1-0.2 | EA029: sulfidic - Net Acid Soluble Sulfur (s-20J) | ---- | 0.02 | % pyrite S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: Net Acid Soluble Sulfur (20Je) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |



| Sub-Matrix: SOIL | | | | Laboratory Duplicate (DUP) Report | | | | | |
|--|------------------|--|------------|-----------------------------------|-------------|-----------------|------------------|---------|---------------------|
| Laboratory sample ID | Client sample ID | Method: Compound | CAS Number | LOR | Unit | Original Result | Duplicate Result | RPD (%) | Recovery Limits (%) |
| EA029-G: Retained Acidity (QC Lot: 3203871) - continued | | | | | | | | | |
| EB1330241-011 | BH47 0.1-0.2 | EA029: HCl Extractable Sulfur (20Be) | ---- | 0.02 | % S | <0.02 | <0.02 | 0.0 | No Limit |
| | | EA029: acidity - Net Acid Soluble Sulfur (a-20J) | ---- | 10 | mole H+ / t | <10 | <10 | 0.0 | No Limit |
| EA029-H: Acid Base Accounting (QC Lot: 3203871) | | | | | | | | | |
| EB1330241-001 | BH48 0.1-0.2 | EA029: ANC Fineness Factor | ---- | 0.5 | - | 1.5 | 1.5 | 0.0 | No Limit |
| | | EA029: Net Acidity (sulfur units) | ---- | 0.02 | % S | 0.05 | 0.06 | 0.0 | No Limit |
| | | EA029: Liming Rate | ---- | 1 | kg CaCO3/t | 2 | 3 | 0.0 | No Limit |
| | | EA029: Net Acidity (acidity units) | ---- | 10 | mole H+ / t | 34 | 36 | 7.4 | No Limit |
| EB1330241-011 | BH47 0.1-0.2 | EA029: ANC Fineness Factor | ---- | 0.5 | - | 1.5 | 1.5 | 0.0 | No Limit |
| | | EA029: Net Acidity (sulfur units) | ---- | 0.02 | % S | 0.14 | 0.13 | 7.9 | No Limit |
| | | EA029: Liming Rate | ---- | 1 | kg CaCO3/t | 6 | 6 | 0.0 | No Limit |
| | | EA029: Net Acidity (acidity units) | ---- | 10 | mole H+ / t | 87 | 80 | 7.9 | No Limit |
| EA029-H: Acid Base Accounting (QC Lot: 3203872) | | | | | | | | | |
| EB1330241-021 | BH64 0.1-0.2 | EA029: ANC Fineness Factor | ---- | 0.5 | - | 1.5 | 1.5 | 0.0 | No Limit |
| | | EA029: Net Acidity (sulfur units) | ---- | 0.02 | % S | 0.03 | 0.03 | 0.0 | No Limit |
| | | EA029: Liming Rate | ---- | 1 | kg CaCO3/t | 1 | 1 | 0.0 | No Limit |
| | | EA029: Net Acidity (acidity units) | ---- | 10 | mole H+ / t | 19 | 20 | 0.0 | No Limit |
| EB1330241-031 | BH7 0.1-0.2 | EA029: ANC Fineness Factor | ---- | 0.5 | - | 1.5 | 1.5 | 0.0 | No Limit |
| | | EA029: Net Acidity (sulfur units) | ---- | 0.02 | % S | 0.06 | 0.06 | 0.0 | No Limit |
| | | EA029: Liming Rate | ---- | 1 | kg CaCO3/t | 3 | 3 | 0.0 | No Limit |
| | | EA029: Net Acidity (acidity units) | ---- | 10 | mole H+ / t | 38 | 36 | 6.0 | No Limit |
| EA029-H: Acid Base Accounting (QC Lot: 3203873) | | | | | | | | | |
| EB1330241-041 | BH26 0.4-0.6 | EA029: ANC Fineness Factor | ---- | 0.5 | - | 1.5 | 1.5 | 0.0 | No Limit |
| | | EA029: Net Acidity (sulfur units) | ---- | 0.02 | % S | 0.04 | 0.04 | 0.0 | No Limit |
| | | EA029: Liming Rate | ---- | 1 | kg CaCO3/t | 2 | 2 | 0.0 | No Limit |
| | | EA029: Net Acidity (acidity units) | ---- | 10 | mole H+ / t | 26 | 27 | 0.0 | No Limit |



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL

| Method: Compound | CAS Number | LOR | Unit | Method Blank (MB) Report | Laboratory Control Spike (LCS) Report | | | | |
|---|------------|------|-------------|-----------------------------|---------------------------------------|--------------------|------|---------------------|--|
| | | | | Result | Spike Concentration | Spike Recovery (%) | | Recovery Limits (%) | |
| | | | | | | LCS | Low | High | |
| EA029-A: pH Measurements (QCLot: 3203871) | | | | | | | | | |
| EA029: pH KCl (23A) | ---- | 0.1 | pH Unit | <0.1 | 4.50 pH Unit | 95.6 | 70 | 130 | |
| EA029: pH OX (23B) | ---- | 0.1 | pH Unit | <0.1 | 3.45 pH Unit | 98.6 | 70 | 130 | |
| EA029-A: pH Measurements (QCLot: 3203872) | | | | | | | | | |
| EA029: pH KCl (23A) | ---- | 0.1 | pH Unit | <0.1 | 4.50 pH Unit | 95.6 | 70 | 130 | |
| EA029: pH OX (23B) | ---- | 0.1 | pH Unit | <0.1 | 3.45 pH Unit | 104 | 70 | 130 | |
| EA029-A: pH Measurements (QCLot: 3203873) | | | | | | | | | |
| EA029: pH KCl (23A) | ---- | 0.1 | pH Unit | <0.1 | 4.50 pH Unit | 95.6 | 70 | 130 | |
| EA029: pH OX (23B) | ---- | 0.1 | pH Unit | <0.1 | 3.45 pH Unit | 95.6 | 70 | 130 | |
| EA029-B: Acidity Trail (QCLot: 3203871) | | | | | | | | | |
| EA029: Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | <2 | 25.2 mole H+ / t | 106 | 70 | 130 | |
| EA029: Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | <2 | 79.3 mole H+ / t | 113 | 70 | 130 | |
| EA029: Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | <2 | ---- | ---- | ---- | ---- | |
| EA029: sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- | |
| EA029: sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- | |
| EA029: sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- | |
| EA029-B: Acidity Trail (QCLot: 3203872) | | | | | | | | | |
| EA029: Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | <2 | 25.2 mole H+ / t | 100 | 70 | 130 | |
| EA029: Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | <2 | 79.3 mole H+ / t | 106 | 70 | 130 | |
| EA029: Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | <2 | ---- | ---- | ---- | ---- | |
| EA029: sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- | |
| EA029: sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- | |
| EA029: sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- | |
| EA029-B: Acidity Trail (QCLot: 3203873) | | | | | | | | | |
| EA029: Titratable Actual Acidity (23F) | ---- | 2 | mole H+ / t | <2 | 25.2 mole H+ / t | 104 | 70 | 130 | |
| EA029: Titratable Peroxide Acidity (23G) | ---- | 2 | mole H+ / t | <2 | 79.3 mole H+ / t | 112 | 70 | 130 | |
| EA029: Titratable Sulfidic Acidity (23H) | ---- | 2 | mole H+ / t | <2 | ---- | ---- | ---- | ---- | |
| EA029: sulfidic - Titratable Actual Acidity (s-23F) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- | |
| EA029: sulfidic - Titratable Peroxide Acidity (s-23G) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- | |
| EA029: sulfidic - Titratable Sulfidic Acidity (s-23H) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- | |
| EA029-C: Sulfur Trail (QCLot: 3203871) | | | | | | | | | |
| EA029: KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.02 | 0.055 % S | 93.1 | 70 | 130 | |
| EA029: Peroxide Sulfur (23De) | ---- | 0.02 | % S | <0.02 | 0.196 % S | 95.7 | 70 | 130 | |
| EA029: Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- | |
| EA029: acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- | |



Sub-Matrix: SOIL

| Method: Compound | CAS Number | LOR | Unit | Method Blank (MB) Report Result | Laboratory Control Spike (LCS) Report | | | |
|---|------------|------|-------------|---------------------------------|---------------------------------------|--------------------|---------------------|------|
| | | | | | Spike Concentration | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | LCS | Low | High |
| EA029-C: Sulfur Trail (QCLot: 3203872) | | | | | | | | |
| EA029: KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.02 | 0.055 % S | 91.6 | 70 | 130 |
| EA029: Peroxide Sulfur (23De) | ---- | 0.02 | % S | <0.02 | 0.196 % S | 100 | 70 | 130 |
| EA029: Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029: acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029-C: Sulfur Trail (QCLot: 3203873) | | | | | | | | |
| EA029: KCl Extractable Sulfur (23Ce) | ---- | 0.02 | % S | <0.02 | 0.055 % S | 98.9 | 70 | 130 |
| EA029: Peroxide Sulfur (23De) | ---- | 0.02 | % S | <0.02 | 0.196 % S | 95.1 | 70 | 130 |
| EA029: Peroxide Oxidisable Sulfur (23E) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029: acidity - Peroxide Oxidisable Sulfur (a-23E) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029-D: Calcium Values (QCLot: 3203871) | | | | | | | | |
| EA029: KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | <0.02 | 0.121 % Ca | 94.5 | 70 | 130 |
| EA029: Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | <0.02 | 0.280 % Ca | 95.2 | 70 | 130 |
| EA029: Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | <0.02 | ---- | ---- | ---- | ---- |
| EA029: acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029: sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029-D: Calcium Values (QCLot: 3203872) | | | | | | | | |
| EA029: KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | <0.02 | 0.121 % Ca | 95.7 | 70 | 130 |
| EA029: Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | <0.02 | 0.280 % Ca | 92.5 | 70 | 130 |
| EA029: Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | <0.02 | ---- | ---- | ---- | ---- |
| EA029: acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029: sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029-D: Calcium Values (QCLot: 3203873) | | | | | | | | |
| EA029: KCl Extractable Calcium (23Vh) | ---- | 0.02 | % Ca | <0.02 | 0.121 % Ca | 98.4 | 70 | 130 |
| EA029: Peroxide Calcium (23Wh) | ---- | 0.02 | % Ca | <0.02 | 0.280 % Ca | 94.3 | 70 | 130 |
| EA029: Acid Reacted Calcium (23X) | ---- | 0.02 | % Ca | <0.02 | ---- | ---- | ---- | ---- |
| EA029: acidity - Acid Reacted Calcium (a-23X) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029: sulfidic - Acid Reacted Calcium (s-23X) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029-E: Magnesium Values (QCLot: 3203871) | | | | | | | | |
| EA029: KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | <0.02 | 0.293 % Mg | 94.1 | 70 | 130 |
| EA029: Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | <0.02 | 0.259 % Mg | 97.9 | 70 | 130 |
| EA029: Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.02 | ---- | ---- | ---- | ---- |
| EA029: Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029: sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029-E: Magnesium Values (QCLot: 3203872) | | | | | | | | |
| EA029: KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | <0.02 | 0.293 % Mg | 92.6 | 70 | 130 |
| EA029: Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | <0.02 | 0.259 % Mg | 90.5 | 70 | 130 |
| EA029: Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.02 | ---- | ---- | ---- | ---- |
| EA029: Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |



Sub-Matrix: SOIL

| Method: Compound | CAS Number | LOR | Unit | Method Blank (MB) Report Result | Laboratory Control Spike (LCS) Report | | | |
|---|------------|------|-------------|------------------------------------|---------------------------------------|--------------------|---------------------|------|
| | | | | | Spike Concentration | Spike Recovery (%) | Recovery Limits (%) | |
| | | | | | | LCS | Low | High |
| EA029-E: Magnesium Values (QCLot: 3203872) - continued | | | | | | | | |
| EA029: sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029-E: Magnesium Values (QCLot: 3203873) | | | | | | | | |
| EA029: KCl Extractable Magnesium (23Sm) | ---- | 0.02 | % Mg | <0.02 | 0.293 % Mg | 95.8 | 70 | 130 |
| EA029: Peroxide Magnesium (23Tm) | ---- | 0.02 | % Mg | <0.02 | 0.259 % Mg | 91.7 | 70 | 130 |
| EA029: Acid Reacted Magnesium (23U) | ---- | 0.02 | % Mg | <0.02 | ---- | ---- | ---- | ---- |
| EA029: Acidity - Acid Reacted Magnesium (a-23U) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029: sulfidic - Acid Reacted Magnesium (s-23U) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029-G: Retained Acidity (QCLot: 3203871) | | | | | | | | |
| EA029: Net Acid Soluble Sulfur (20Je) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029: acidity - Net Acid Soluble Sulfur (a-20J) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029: sulfidic - Net Acid Soluble Sulfur (s-20J) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- |
| EA029: HCl Extractable Sulfur (20Be) | ---- | 0.02 | % S | <0.02 | 0.0692 % S | 99.7 | 70 | 130 |
| EA029-G: Retained Acidity (QCLot: 3203872) | | | | | | | | |
| EA029: Net Acid Soluble Sulfur (20Je) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029: acidity - Net Acid Soluble Sulfur (a-20J) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029: sulfidic - Net Acid Soluble Sulfur (s-20J) | ---- | 0.02 | % pyrite S | <0.02 | ---- | ---- | ---- | ---- |
| EA029: HCl Extractable Sulfur (20Be) | ---- | 0.02 | % S | <0.02 | 0.0692 % S | 103 | 70 | 130 |
| EA029-H: Acid Base Accounting (QCLot: 3203871) | | | | | | | | |
| EA029: ANC Fineness Factor | ---- | 0.5 | - | <0.5 | ---- | ---- | ---- | ---- |
| EA029: Net Acidity (sulfur units) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029: Net Acidity (acidity units) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029: Liming Rate | ---- | 1 | kg CaCO3/t | <1 | ---- | ---- | ---- | ---- |
| EA029-H: Acid Base Accounting (QCLot: 3203872) | | | | | | | | |
| EA029: ANC Fineness Factor | ---- | 0.5 | - | <0.5 | ---- | ---- | ---- | ---- |
| EA029: Net Acidity (sulfur units) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029: Net Acidity (acidity units) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029: Liming Rate | ---- | 1 | kg CaCO3/t | <1 | ---- | ---- | ---- | ---- |
| EA029-H: Acid Base Accounting (QCLot: 3203873) | | | | | | | | |
| EA029: ANC Fineness Factor | ---- | 0.5 | - | <0.5 | ---- | ---- | ---- | ---- |
| EA029: Net Acidity (sulfur units) | ---- | 0.02 | % S | <0.02 | ---- | ---- | ---- | ---- |
| EA029: Net Acidity (acidity units) | ---- | 10 | mole H+ / t | <10 | ---- | ---- | ---- | ---- |
| EA029: Liming Rate | ---- | 1 | kg CaCO3/t | <1 | ---- | ---- | ---- | ---- |

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**
-



INTERPRETIVE QUALITY CONTROL REPORT

| | | | |
|--------------|---|-------------------------|--|
| Work Order | : EB1330241 | Page | : 1 of 12 |
| Client | : WORLEY PARSONS - INFRASTRUCTURE MWE | Laboratory | : Environmental Division Brisbane |
| Contact | : LUCIE MISSEN | Contact | : Steven McGrath |
| Address | : LEVEL 12, 333 COLLINS STREET MELBOURNE VIC, AUSTRALIA 3000 | Address | : 2 Byth Street Stafford QLD Australia 4053 |
| E-mail | : lucie.missen@worleyparsons.com | E-mail | : steven.mcgrath@alsenviro.com |
| Telephone | : +61 03 8676 3500 | Telephone | : +61-3-8549 9600 |
| Facsimile | : +61 03 86763770 | Facsimile | : +61-3-8549 9601 |
| Project | : 401010-01002 LOLIPIP | QC Level | : NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Site | : ---- | Date Samples Received | : 04-DEC-2013 |
| C-O-C number | : ---- | Issue Date | : 16-DEC-2013 |
| Sampler | : ---- | No. of samples received | : 48 |
| Order number | : 401010-01002 WBS 3G2003A | No. of samples analysed | : 48 |
| Quote number | : ME/507/13 | | |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | | |
|--|--|--------------------------|--------------------|-------------|---------------|------------------|-------------|---|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation | |
| EA029-H: Acid Base Accounting | | | | | | | | |
| 80* dried soil (EA029) BH12 0.1-0.2, BH14 0.1-0.2, BH11 0.1-0.2, BH7 0.1-0.2, BH16 0.1-0.2, BH23 0.1-0.2, BH24 0.1-0.2, BH25 0.1-0.2, BH26 0.4-0.6, BH27 0.1-0.2, | BH12 0.4-0.6, BH14 0.8-1.2, BH11 0.4-0.6, BH7 0.4-0.6, BH16 0.4-0.6, BH23 0.4-0.6, BH24 0.4-0.6, BH25 0.4-0.6, BH26 0.8-1.2, BH27 0.4-0.6 | 23-OCT-2013 | 10-DEC-2013 | 23-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH48 0.1-0.2, BH49 0.1-0.2, BH45 0.1-0.2, BH44 0.1-0.2, BH46 0.1-0.2, BH47 0.1-0.2, | BH48 0.4-0.6, BH49 0.4-0.6, BH49 0.8-1.2, BH44 0.8-1.2, BH46 0.8-1.2, BH47 0.4-0.6 | 24-OCT-2013 | 10-DEC-2013 | 24-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH50 0.1-0.2, BH53 0.1-0.2, BH66 0.1-0.2, BH69 0.1-0.2, BH64 0.1-0.2, BH65 0.1-0.2, | BH50 0.4-0.6, BH53 0.4-0.6, BH66 0.8-1.2, BH69 0.8-1.2, BH64 0.4-0.6, BH65 0.4-0.6 | 25-OCT-2013 | 10-DEC-2013 | 25-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| Pulp Bag (EA029) BH62 0.2-0.3, BH67 0.05-0.3, | BH62 0.7-0.8, BH67 0.6-0.9 | 20-NOV-2013 | 10-DEC-2013 | 20-NOV-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EA029-B: Acidity Trail | | | | | | | |
| 80* dried soil (EA029) BH12 0.1-0.2, BH14 0.1-0.2, BH11 0.1-0.2, BH7 0.1-0.2, BH16 0.1-0.2, BH23 0.1-0.2, BH24 0.1-0.2, BH25 0.1-0.2, BH26 0.4-0.6, BH27 0.1-0.2, BH12 0.4-0.6, BH14 0.8-1.2, BH11 0.4-0.6, BH7 0.4-0.6, BH16 0.4-0.6, BH23 0.4-0.6, BH24 0.4-0.6, BH25 0.4-0.6, BH26 0.8-1.2, BH27 0.4-0.6 | 23-OCT-2013 | 10-DEC-2013 | 23-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH48 0.1-0.2, BH49 0.1-0.2, BH45 0.1-0.2, BH44 0.1-0.2, BH46 0.1-0.2, BH47 0.1-0.2, BH48 0.4-0.6, BH49 0.4-0.6, BH49 0.8-1.2, BH44 0.8-1.2, BH46 0.8-1.2, BH47 0.4-0.6 | 24-OCT-2013 | 10-DEC-2013 | 24-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH50 0.1-0.2, BH53 0.1-0.2, BH66 0.1-0.2, BH69 0.1-0.2, BH64 0.1-0.2, BH65 0.1-0.2, BH50 0.4-0.6, BH53 0.4-0.6, BH66 0.8-1.2, BH69 0.8-1.2, BH64 0.4-0.6, BH65 0.4-0.6 | 25-OCT-2013 | 10-DEC-2013 | 25-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| Pulp Bag (EA029) BH62 0.2-0.3, BH67 0.05-0.3, BH62 0.7-0.8, BH67 0.6-0.9 | 20-NOV-2013 | 10-DEC-2013 | 20-NOV-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EA029-D: Calcium Values | | | | | | | |
| 80* dried soil (EA029) BH12 0.1-0.2, BH14 0.1-0.2, BH11 0.1-0.2, BH7 0.1-0.2, BH16 0.1-0.2, BH23 0.1-0.2, BH24 0.1-0.2, BH25 0.1-0.2, BH26 0.4-0.6, BH27 0.1-0.2, BH12 0.4-0.6, BH14 0.8-1.2, BH11 0.4-0.6, BH7 0.4-0.6, BH16 0.4-0.6, BH23 0.4-0.6, BH24 0.4-0.6, BH25 0.4-0.6, BH26 0.8-1.2, BH27 0.4-0.6 | 23-OCT-2013 | 10-DEC-2013 | 23-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH48 0.1-0.2, BH49 0.1-0.2, BH45 0.1-0.2, BH44 0.1-0.2, BH46 0.1-0.2, BH47 0.1-0.2, BH48 0.4-0.6, BH49 0.4-0.6, BH49 0.8-1.2, BH44 0.8-1.2, BH46 0.8-1.2, BH47 0.4-0.6 | 24-OCT-2013 | 10-DEC-2013 | 24-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH50 0.1-0.2, BH53 0.1-0.2, BH66 0.1-0.2, BH69 0.1-0.2, BH64 0.1-0.2, BH65 0.1-0.2, BH50 0.4-0.6, BH53 0.4-0.6, BH66 0.8-1.2, BH69 0.8-1.2, BH64 0.4-0.6, BH65 0.4-0.6 | 25-OCT-2013 | 10-DEC-2013 | 25-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| Pulp Bag (EA029) BH62 0.2-0.3, BH67 0.05-0.3, BH62 0.7-0.8, BH67 0.6-0.9 | 20-NOV-2013 | 10-DEC-2013 | 20-NOV-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | | |
|--|--------------------|--------------------------|--------------------|------------|--------------------|------------------|------------|--|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation | |
| EA029-F: Excess Acid Neutralising Capacity | | | | | | | | |
| 80* dried soil (EA029) BH12 0.1-0.2, BH14 0.1-0.2, BH11 0.1-0.2, BH7 0.1-0.2, BH16 0.1-0.2, BH23 0.1-0.2, BH24 0.1-0.2, BH25 0.1-0.2, BH26 0.4-0.6, BH27 0.1-0.2, BH12 0.4-0.6, BH14 0.8-1.2, BH11 0.4-0.6, BH7 0.4-0.6, BH16 0.4-0.6, BH23 0.4-0.6, BH24 0.4-0.6, BH25 0.4-0.6, BH26 0.8-1.2, BH27 0.4-0.6 | 23-OCT-2013 | 10-DEC-2013 | 23-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ | |
| 80* dried soil (EA029) BH48 0.1-0.2, BH49 0.1-0.2, BH45 0.1-0.2, BH44 0.1-0.2, BH46 0.1-0.2, BH47 0.1-0.2, BH48 0.4-0.6, BH49 0.4-0.6, BH49 0.8-1.2, BH44 0.8-1.2, BH46 0.8-1.2, BH47 0.4-0.6 | 24-OCT-2013 | 10-DEC-2013 | 24-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ | |
| 80* dried soil (EA029) BH50 0.1-0.2, BH53 0.1-0.2, BH66 0.1-0.2, BH69 0.1-0.2, BH64 0.1-0.2, BH65 0.1-0.2, BH50 0.4-0.6, BH53 0.4-0.6, BH66 0.8-1.2, BH69 0.8-1.2, BH64 0.4-0.6, BH65 0.4-0.6 | 25-OCT-2013 | 10-DEC-2013 | 25-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ | |
| Pulp Bag (EA029) BH62 0.2-0.3, BH67 0.05-0.3, BH62 0.7-0.8, BH67 0.6-0.9 | 20-NOV-2013 | 10-DEC-2013 | 20-NOV-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ | |



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EA029-E: Magnesium Values | | | | | | | |
| 80* dried soil (EA029) BH12 0.1-0.2, BH14 0.1-0.2, BH11 0.1-0.2, BH7 0.1-0.2, BH16 0.1-0.2, BH23 0.1-0.2, BH24 0.1-0.2, BH25 0.1-0.2, BH26 0.4-0.6, BH27 0.1-0.2, BH12 0.4-0.6, BH14 0.8-1.2, BH11 0.4-0.6, BH7 0.4-0.6, BH16 0.4-0.6, BH23 0.4-0.6, BH24 0.4-0.6, BH25 0.4-0.6, BH26 0.8-1.2, BH27 0.4-0.6 | 23-OCT-2013 | 10-DEC-2013 | 23-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH48 0.1-0.2, BH49 0.1-0.2, BH45 0.1-0.2, BH44 0.1-0.2, BH46 0.1-0.2, BH47 0.1-0.2, BH48 0.4-0.6, BH49 0.4-0.6, BH49 0.8-1.2, BH44 0.8-1.2, BH46 0.8-1.2, BH47 0.4-0.6 | 24-OCT-2013 | 10-DEC-2013 | 24-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH50 0.1-0.2, BH53 0.1-0.2, BH66 0.1-0.2, BH69 0.1-0.2, BH64 0.1-0.2, BH65 0.1-0.2, BH50 0.4-0.6, BH53 0.4-0.6, BH66 0.8-1.2, BH69 0.8-1.2, BH64 0.4-0.6, BH65 0.4-0.6 | 25-OCT-2013 | 10-DEC-2013 | 25-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| Pulp Bag (EA029) BH62 0.2-0.3, BH67 0.05-0.3, BH62 0.7-0.8, BH67 0.6-0.9 | 20-NOV-2013 | 10-DEC-2013 | 20-NOV-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EA029-A: pH Measurements | | | | | | | |
| 80* dried soil (EA029) BH12 0.1-0.2, BH14 0.1-0.2, BH11 0.1-0.2, BH7 0.1-0.2, BH16 0.1-0.2, BH23 0.1-0.2, BH24 0.1-0.2, BH25 0.1-0.2, BH26 0.4-0.6, BH27 0.1-0.2, BH12 0.4-0.6, BH14 0.8-1.2, BH11 0.4-0.6, BH7 0.4-0.6, BH16 0.4-0.6, BH23 0.4-0.6, BH24 0.4-0.6, BH25 0.4-0.6, BH26 0.8-1.2, BH27 0.4-0.6 | 23-OCT-2013 | 10-DEC-2013 | 23-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH48 0.1-0.2, BH49 0.1-0.2, BH45 0.1-0.2, BH44 0.1-0.2, BH46 0.1-0.2, BH47 0.1-0.2, BH48 0.4-0.6, BH49 0.4-0.6, BH49 0.8-1.2, BH44 0.8-1.2, BH46 0.8-1.2, BH47 0.4-0.6 | 24-OCT-2013 | 10-DEC-2013 | 24-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH50 0.1-0.2, BH53 0.1-0.2, BH66 0.1-0.2, BH69 0.1-0.2, BH64 0.1-0.2, BH65 0.1-0.2, BH50 0.4-0.6, BH53 0.4-0.6, BH66 0.8-1.2, BH69 0.8-1.2, BH64 0.4-0.6, BH65 0.4-0.6 | 25-OCT-2013 | 10-DEC-2013 | 25-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| Pulp Bag (EA029) BH62 0.2-0.3, BH67 0.05-0.3, BH62 0.7-0.8, BH67 0.6-0.9 | 20-NOV-2013 | 10-DEC-2013 | 20-NOV-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EA029-G: Retained Acidity | | | | | | | |
| 80* dried soil (EA029) BH12 0.1-0.2, BH14 0.1-0.2, BH11 0.1-0.2, BH7 0.1-0.2, BH16 0.1-0.2, BH23 0.1-0.2, BH24 0.1-0.2, BH25 0.1-0.2, BH26 0.4-0.6, BH27 0.1-0.2, BH12 0.4-0.6, BH14 0.8-1.2, BH11 0.4-0.6, BH7 0.4-0.6, BH16 0.4-0.6, BH23 0.4-0.6, BH24 0.4-0.6, BH25 0.4-0.6, BH26 0.8-1.2, BH27 0.4-0.6 | 23-OCT-2013 | 10-DEC-2013 | 23-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH48 0.1-0.2, BH49 0.1-0.2, BH45 0.1-0.2, BH44 0.1-0.2, BH46 0.1-0.2, BH47 0.1-0.2, BH48 0.4-0.6, BH49 0.4-0.6, BH49 0.8-1.2, BH44 0.8-1.2, BH46 0.8-1.2, BH47 0.4-0.6 | 24-OCT-2013 | 10-DEC-2013 | 24-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH50 0.1-0.2, BH53 0.1-0.2, BH66 0.1-0.2, BH69 0.1-0.2, BH64 0.1-0.2, BH65 0.1-0.2, BH50 0.4-0.6, BH53 0.4-0.6, BH66 0.8-1.2, BH69 0.8-1.2, BH64 0.4-0.6, BH65 0.4-0.6 | 25-OCT-2013 | 10-DEC-2013 | 25-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| Pulp Bag (EA029) BH62 0.2-0.3, BH67 0.05-0.3, BH62 0.7-0.8, BH67 0.6-0.9 | 20-NOV-2013 | 10-DEC-2013 | 20-NOV-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|--|-------------|--------------------------|--------------------|------------|---------------|------------------|------------|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| EA029-C: Sulfur Trail | | | | | | | |
| 80* dried soil (EA029) BH12 0.1-0.2, BH14 0.1-0.2, BH11 0.1-0.2, BH7 0.1-0.2, BH16 0.1-0.2, BH23 0.1-0.2, BH24 0.1-0.2, BH25 0.1-0.2, BH26 0.4-0.6, BH27 0.1-0.2, BH12 0.4-0.6, BH14 0.8-1.2, BH11 0.4-0.6, BH7 0.4-0.6, BH16 0.4-0.6, BH23 0.4-0.6, BH24 0.4-0.6, BH25 0.4-0.6, BH26 0.8-1.2, BH27 0.4-0.6 | 23-OCT-2013 | 10-DEC-2013 | 23-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH48 0.1-0.2, BH49 0.1-0.2, BH45 0.1-0.2, BH44 0.1-0.2, BH46 0.1-0.2, BH47 0.1-0.2, BH48 0.4-0.6, BH49 0.4-0.6, BH49 0.8-1.2, BH44 0.8-1.2, BH46 0.8-1.2, BH47 0.4-0.6 | 24-OCT-2013 | 10-DEC-2013 | 24-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| 80* dried soil (EA029) BH50 0.1-0.2, BH53 0.1-0.2, BH66 0.1-0.2, BH69 0.1-0.2, BH64 0.1-0.2, BH65 0.1-0.2, BH50 0.4-0.6, BH53 0.4-0.6, BH66 0.8-1.2, BH69 0.8-1.2, BH64 0.4-0.6, BH65 0.4-0.6 | 25-OCT-2013 | 10-DEC-2013 | 25-OCT-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |
| Pulp Bag (EA029) BH62 0.2-0.3, BH67 0.05-0.3, BH62 0.7-0.8, BH67 0.6-0.9 | 20-NOV-2013 | 10-DEC-2013 | 20-NOV-2014 | ✓ | 12-DEC-2013 | 10-MAR-2014 | ✓ |



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

| Quality Control Sample Type | | Count | | Rate (%) | | | Quality Control Specification |
|---|--------|-------|---------|----------|----------|------------|--|
| Analytical Methods | Method | QC | Regular | Actual | Expected | Evaluation | |
| Laboratory Duplicates (DUP) | | | | | | | |
| Suspension Peroxide Oxidation-Combined Acidity and Sulphate | EA029 | 5 | 48 | 10.4 | 10.0 | ✔ | NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Laboratory Control Samples (LCS) | | | | | | | |
| Suspension Peroxide Oxidation-Combined Acidity and Sulphate | EA029 | 3 | 48 | 6.3 | 5.0 | ✔ | NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Method Blanks (MB) | | | | | | | |
| Suspension Peroxide Oxidation-Combined Acidity and Sulphate | EA029 | 3 | 48 | 6.3 | 5.0 | ✔ | NEPM 2013 Schedule B(3) and ALS QCS3 requirement |



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| <i>Analytical Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
|---|---------------|---------------|--|
| Suspension Peroxide Oxidation-Combined Acidity and Sulphate | EA029 | SOIL | Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5. |

| <i>Preparation Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
|---|---------------|---------------|----------------------------|
| Drying at 85 degrees, bagging and labelling (ASS) | EN020PR | SOIL | In house |



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.
-

CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
Melbourne VIC 3000 Australia
Telephone: +61 3 8676 3500
Facsimile: +61 3 8676 3505
Web: www.worley.com.au
Worley Infrastructure Pty Ltd
ABN 30 009 265 927

ALC S
2 - 4 Westall
Spongrvale

LAB QUOTE: 401010-01002 WBS 3G2003A
PURCHASE ORDER: 401010-01002 WBS 3G2003A

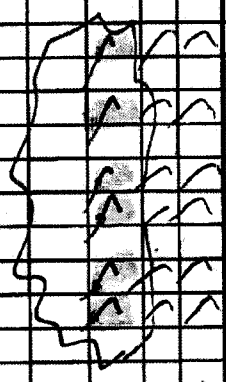
CLIENT: ESSO
PROJECT NAME: LOLLIP
COLLECTOR'S NAME: LUCIE MISSON
PROJECT #: 401010-01002

LAB REF: SAMPLE ID

| LAB # | SAMPLE ID | MATRIX | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | SAMPLING DATE | No of CONTAINERS | REMARKS |
|-------|-----------|---------|------|-------|------|-----|-------|-----|-----------|----------|------|---------------|------------------|---------|
| | | WATER | SOIL | | | | | | | | | | | |
| 1 | BIT 48 | 0.1-0.2 | | ✓ | | | | | | | | 24/10/13 | 1 | |
| 2 | 04-06 | | | ✓ | | | | | | | | | 1 | |
| 3 | 08-12 | | | ✓ | | | | | | | | | 1 | |
| 3 | BIT 49 | 0.1-0.2 | | ✓ | | | | | | | | | 1 | |
| 4 | 04-06 | | | ✓ | | | | | | | | | 1 | |
| 4 | 08-12 | | | ✓ | | | | | | | | | 1 | |
| 5 | BIT 45 | 0.1-0.2 | | ✓ | | | | | | | | | 1 | |
| 5 | BIT 45 | 0.1-0.2 | | ✓ | | | | | | | | | 1 | |
| 6 | 04-06 | | | ✓ | | | | | | | | | 1 | |
| 6 | 08-12 | | | ✓ | | | | | | | | | 1 | |

| | | | | | |
|------------------------------------|----------------|--------------|---------------------------|-------------|-------------|
| Reinquished by: <i>STEVEN T MC</i> | Date: 24/10/12 | Time: 5:45pm | Received by: <i>Chris</i> | Date: 24/10 | Time: 14:45 |
| Reinquished by: | Date: | Time: | Received by: | Date: | Time: |
| Temperature: Ambient / Chilled | | | | | |
| Sealed: Yes / No | | | | | |
| Condition of cooler: | | | | | |

Environmental Division
Brisbane
Work Order *Monique*
EB1330241
Barcode
Telephone: +61-7-3243 7222



1
2
3
4
5
6



WorleyParsons

CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
 Melbourne VIC 3000 Australia
 Telephone: +61 3 8676 3500
 Facsimile: +61 3 8676 3505
 Web: www.worley.com.au
 Worley Infrastructure Pty Ltd
 ABN 30 009 265 927

LAB. QUOTE: 401010-01002 WBS 3G2003A
 PURCHASE ORDER:
 CLIENT: ESSO
 PROJECT NAME: LOLIPP
 PROJECT #: 401010-01002
 COLLECTOR'S NAME: Lucie Missen
 LAB. REF: 401010-01002

| LAB # | SAMPLE ID | MATRIX | | PRESERVATION | | | | | | | No of CONTAINERS | SAMPLING DATE | REMARKS |
|-------|-----------|--------|------|--------------|-------|-----|-----------|----------|------|--|------------------|---------------|---------|
| | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | | | | |
| | BH4 01-02 | ✓ | | | | | | | | | 29/10/13 | | |
| | 04-06 | ✓ | | | | | | | | | | | |
| 812 | 08-12 | ✓ | | | | | | | | | | | |
| 912 | 01-02 | ✓ | | | | | | | | | | | |
| 14 | BH6 01-02 | ✓ | | | | | | | | | | | |
| 105 | 04-06 | ✓ | | | | | | | | | | | |
| 110 | BH7 01-02 | ✓ | | | | | | | | | | | |
| 121 | 04-06 | ✓ | | | | | | | | | | | |
| 18 | 08-12 | ✓ | | | | | | | | | | | |

Condition of cooler: Sealed: Yes/No
 Temperature: Ambient / Chilled
 Received by: [Signature] Date: 24/10 Time: 17:45
 Received by: [Signature] Date: 24/10 Time: 17:45

PHOX
 PHENOL
 SPOCAS

REPORTS PRELIMINARY BY: / /
 FINAL REPORT BY: 31/10/13
 EMAIL REPORT (YES/NO)

CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
Melbourne VIC 3000 Australia
Telephone: +61 3 8676 3500
Facsimile: +61 3 8676 3505
Web: www.worley.com.au
Worley Infrastructure Pty Ltd
ABN 30 009 265 927

EXAMINED

LAB QUOTE:

PURCHASE ORDER: 401010-01002 WBS 3G203A

CLIENT:

ESSO

PROJECT NAME:

LOLIPP

PROJECT #:

401010-002

COLLECTOR'S NAME

Loce Missen

LAB REF

SAMPLE ID

PREPARATION (METHODS)

13
14
15
16
17
18

BH50 0.1-0.2
0.4-0.6
0.8-1.2
BH53 0.1-0.2
0.4-0.6
0.8-1.2
BH66 0.1-0.2
0.4-0.6
0.8-1.2
0.4-0.6
0.8-1.2

| | |
|-----------|-------------------------------------|
| WATER | <input checked="" type="checkbox"/> |
| SOIL | <input checked="" type="checkbox"/> |
| AIR | <input checked="" type="checkbox"/> |
| OTHER | <input checked="" type="checkbox"/> |
| ICE | <input checked="" type="checkbox"/> |
| ACIDIFIED | <input checked="" type="checkbox"/> |
| ALKALINE | <input checked="" type="checkbox"/> |
| NONE | <input checked="" type="checkbox"/> |

SAMPLING DATE

25/10/13

NO OF CONTAINERS

PH FOR
PH FIELD
SPOCARS

(Handwritten notes and signatures in a large box)

Relinquished by:

STEVEN MC

Date:

25/10/13 5:15pm

Time:

Received by:

Worley (Miss)

Date:

25/10/13

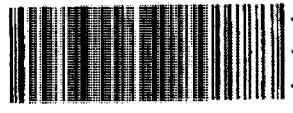
Time:

Temperature: Ambient / Chilled

4-2-60

Condition of cooler: Sealed: Yes / No

Telephone: +61-3-8549 9600



EM1311321xk

Environmental Division
C/M Melbourne 8:50
Work Order 28110
25/10

REMARKS

EMAIL REPORT (YES/NO)

FINAL REPORT BY: 1/11/13

PRELIMINARY BY: / /

REPORTS loc. Missen @ worley Parsons



CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
 Melbourne VIC 3000 Australia
 Telephone: +61 3 8678 3500
 Facsimile: +61 3 8678 3505
 Web: www.worley.com.au
 Worley Infrastructure Pty Ltd
 ABN 30 009 265 927

LAB QUOTE: 401010-01002 WBS 3G2003A
 PURCHASE ORDER: 401010-01002 WBS 3G2003A

CLIENT: PROJECT NAME: LOLLIPP

COLLECTOR'S NAME: Luce Mussen
 PROJECT #: 401010-01002

ANALYSIS REQUIRED

REPORTS to: lusse@worleyparsons.com
 PRELIMINARY BY: / / / / /
 FINAL REPORT BY: / / / / /
 EMAIL REPORT (YES/NO)

| LAB REF | SAMPLE ID | LAB # | PRESERVATION | | | | | | | | | | REMARKS | |
|---------|------------|-------|--------------|------|-----|-------|-----|-----------|----------|------|---------------|------------------|---------|--|
| | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | SAMPLING DATE | Ng of CONTAINERS | | |
| 19 | BH69 01-02 | | ✓ | | | | | | | | | 25/10/13 | 1 | |
| 11 | 04-0.6 | | ✓ | | | | | | | | | | | |
| 20 | 08-1.2 | | ✓ | | | | | | | | | | | |
| 21 | BH68 01-02 | | ✓ | | | | | | | | | | | |
| 22 | 04-0.6 | | ✓ | | | | | | | | | | | |
| 15 | 08-1.2 | | ✓ | | | | | | | | | | | |
| 23 | BH65 01-02 | | ✓ | | | | | | | | | | | |
| 24 | 04-0.6 | | ✓ | | | | | | | | | | | |
| 18 | 08-1.2 | | ✓ | | | | | | | | | | | |

Relinquished by: [Signature] Date: 25/10/13 Time: 5:15pm
 Received by: [Signature] Date: 25/10/13 Time: 5:15pm
 Condition of spoler: [Signature] Date: 25/10/13 Time: 5:15pm
 Sealed: (Yes/No) [Signature]
 Temperature: Ambient / Chilled (Please circle as appropriate) [Signature]



WorleyParsons

CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
Melbourne VIC 3000 Australia
Telephone: +61 3 8676 3500
Facsimile: +61 3 8676 3505
Web: www.worley.com.au
Worley Infrastructure Pty Ltd
ABN 30 009 285 827

COC rec'd 25/10/13 @ 9.32 a - BN - Paul W. [Signature]

LAB QUOTE: 401010-01002 WBS 3G2003A

PURCHASE ORDER: 401010-01002 WBS 3G2003A

CLIENT: ESSO

PROJECT NAME: LOLLIP

COLLECTORS NAME: L. Hiscox

PROJECT #: 401010-01002

LAB REF: MATRIX PRESERVATION

| LAB ID | LAB # | PRESERVATION | | | | | | | |
|--------|-------|--------------|------|-----|-------|-----|-----------|----------|------|
| | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE |
| BH12 | 01-02 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 26 | 04-06 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 25 | 01-02 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 27 | 08-12 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 27 | 01-02 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 28 | 04-06 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 28 | 08-12 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 29 | BH11 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 29 | 01-02 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 30 | 04-06 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 30 | 08-12 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

RECEIVED BY: [Signature] DATE: 27/10/13 TIME: 1650

RECEIVED BY: [Signature] DATE: 27/10/13 TIME: 1630

RECEIVED BY: [Signature] DATE: 25/10/13 TIME: 8.45

Sealed: Yes/No Yes No

Temperature: Ambient / Chilled Chilled Ambient

Condition of cooler:

SAMPLE ID

LAB #

SAMPLING DATE

PHFOX

PHEPOL

SPOCAS

No of CONTAINERS

10-42
12-10
10-42
12-10

Environmental Division

Melbourne

Work Order

EM1311275

Barcode

Telephone: +61-3-8549 9600

REPORTS lcc.wb527@wpc.your.com

PRELIMINARY BY: 29/10/13

FINAL REPORT BY: 29/10/13

EMAIL REPORT (YES/NO)

REMARKS



WorleyParsons

CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
 Melbourne VIC 3000 Australia
 Telephone: +61 3 8678 3500
 Facsimile: +61 3 8678 3505
 Web: www.worley.com.au
 Worley Infrastructure Pty Ltd
 ABN 30 008 265 927

coc rec'd 25/10/13 @ 9.32am - BN

LAB QUOTE: 401010-01002 WBS 3G2003A

PURCHASE ORDER: 401010-01002 WBS 3G2003A

CLIENT: ESSO
 PROJECT NAME: LOLLIP
 PROJECT #: 401010-01002

COLLECTOR'S NAME: L. H. SSEN
 LAB REF: 401010-01002

| LAB # | SAMPLE ID | LAB # | MATRIX | | PRESERVATION | | | | | | SAMPLING DATE | No of CONTAINERS | REMARKS | |
|-------|---------------|-------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------|------------------------------|--|
| | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | | | | |
| 31 | BH 7 0.1-0.2 | 10 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 27/10/13 | PH FOX PH FIELD SPOCAS | |
| 32 | 0.4-0.6 | 11 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | |
| 32 | 0.8-1.2 | 12 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | |
| 33 | BH 16 0.1-0.2 | 13 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | |
| 34 | 6.4-0.6 | 14 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | |
| 35 | BH 23 0.1-0.2 | 16 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | |
| 36 | 0.4-0.6 | 17 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | |
| | 0.8-1.2 | 18 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | |

Requisitioned by: L. H. SSEN
 Date: 22/10/13
 Time: 16:30

Requisitioned by: B. H. SSEN
 Date: 22/10/13
 Time: 16:30

Received by: B. H. SSEN
 Date: 25/10/13
 Time: 8:45am

Condition of cooler: Scalded: Yes/No
 Temperature: Ambient / Chilled (Please circle as appropriate)

REPORTS: PRELIMINARY BY: 1/1
 FINAL REPORT BY: 27/10/13
 EMAIL REPORT (YES/NO):

ANALYSIS REQUIRED

Coc rec'd 25/10/13 @ 9.32 a

WorleyParsons



CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
 Melbourne VIC 3000 Australia
 Telephone: +61 3 8676 3500
 Facsimile: +61 3 8676 3505
 Web: www.worley.com.au
 Worley Infrastructure Pty Ltd
 ABN 30 009 265 927

LAB. QUOTE: 401010-01002 WBS 3G2003A
 PURCHASE ORDER: 401010-01002 WBS 3G2003A
 CLIENT: FSSO
 COLLECTOR'S NAME: Lorie Mississ
 PROJECT #: 401010-01002
 PROJECT NAME: LOLPIP

LAB REF: ANALYSIS REQUIRED

REPORTS: PRELIMINARY BY: 11
 FINAL REPORT BY: 30/10/13
 EMAIL REPORT (YES/NO)

| LAB # | SAMPLE ID | PERFORMED IN (PREVIOUS) | | PRESERVATION | | MATRIX | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | SAMPLING DATE | No of CONTAINERS | pH For | PH FIELD | SPOCAS | REMARKS | |
|-------|-----------|-------------------------|--------|--------------|--------|--------|---|-------|------|-----|-------|-----|-----------|----------|------|---------------|------------------|--------|----------|--------|---------|--|
| | | PH | SPOCAS | PH | SPOCAS | | | | | | | | | | | | | | | | | |
| 37 | 8174 | 0.1-0.2 | 19 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 23/10/13 | | | | | | |
| 38 | 11 | 0.4-0.6 | 20 | | | | | | | | | | | | | | | | | | | |
| 39 | 11 | 0.8-1.2 | 21 | | | | | | | | | | | | | | | | | | | |

LAB REF: SAMPLE ID - LAB #

PERFORMED IN (PREVIOUS)

PH

SPOCAS

REMARKS

LAB REF: MATRIX

WATER

SOIL

AIR

OTHER

ICE

ACIDIFIED

ALKALINE

NONE

SAMPLING DATE

No of CONTAINERS

pH For

PH FIELD

SPOCAS

REMARKS

LAB REF: PROJECT NAME: FSSO

LAB REF: PROJECT #: 401010-01002

LAB REF: COLLECTOR'S NAME: Lorie Mississ

LAB REF: CLIENT: FSSO

LAB REF: PURCHASE ORDER: 401010-01002 WBS 3G2003A

LAB REF: LAB. QUOTE: 401010-01002 WBS 3G2003A

LAB REF: REPORTS: PRELIMINARY BY: 11

LAB REF: FINAL REPORT BY: 30/10/13

LAB REF: EMAIL REPORT (YES/NO)

LAB REF: ANALYSIS REQUIRED

LAB REF: CHAIN OF CUSTODY and ANALYSIS REQUEST

LAB REF: Level 12, 333 Collins St

LAB REF: Melbourne VIC 3000 Australia

LAB REF: Telephone: +61 3 8676 3500

LAB REF: Facsimile: +61 3 8676 3505

LAB REF: Web: www.worley.com.au

LAB REF: Worley Infrastructure Pty Ltd

LAB REF: ABN 30 009 265 927



WorleyParsons

CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
 Melbourne VIC 3000 Australia
 Telephone: +61 3 8676 3500
 Facsimile: +61 3 8676 3505
 Web: www.worley.com.au
 Worley Infrastructure Pty Ltd
 ABN 30 009 265 927

LAB QUOTE: 401010-01002 WBS 302003A
 PURCHASE ORDER:
 CLIENT: ESSO
 PROJECT NAME: LOLLIPP
 PROJECT #: 401010-01002
 COLLECTOR'S NAME: Lucie Missen

REPORTS TO: Lucie.Missen@WORLEYPARSONS
 PRELIMINARY BY: [Signature]
 FINAL REPORT BY: 30/11/13
 EMAIL REPORT (YES/NO)

ANALYSIS REQUIRED

| LAB REF | SAMPLE ID | LAB # | MATRIX | PRESERVATION | ANALYSIS | | | | | | | | | | REMARKS | | | | | | |
|---------|------------|-------|--------|--------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---------|--------|--|--|--|
| | | | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | SAMPLING DATE | Nº of CONTAINERS | | PH For | PH/EURO | SP/CAS | | | |
| 39 | BH25 01-02 | | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | |
| 40 | 04-06 | | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |
| 41 | 04-06 | | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |
| 42 | 04-12 | | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |
| 43 | 01-02 | BH27 | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |
| 44 | 04-06 | | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |
| | 08-12 | 30 | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |

Received by: [Signature]
 Date: 23/10/13 Time: 16:10
 Received by: [Signature]
 Date: 25/10/13 Time: 8:45
 Condition of cooling: Sealed: Yes/NO
 Temperature: Ambient/Cooled (Please circle as appropriate)

COC rec'd 25/10/13 @ 9:32am



WorleyParsons

Lab Test Request Form

and Chain of custody

Level 12, 333 Collins St
Melbourne VIC 3000 Australia
Telephone: +61 3 8676 3500
Facsimile: +61 3 8676 3505
Web: www.worley.com.au
Worley Infrastructure Pty Ltd
ABN 30 009 265 927

Page 1 of 1

Requested by L. Missen

Date 27/11/30

loc.c.missen@worleyparsons.com

Client ESSO

Location GPPS, AD

Project Name LOLPIP

Project Number 401010-01002

Project CTR 3G2003A

45 48 42 3 6

Borehole or Test Pit No. BH62, BH62, BH62, BH67, BH67, BH67

Field Sample No.

Sample Depth (m) 0.2-0.3, 0.7-0.8, 1.2-1.3, 0.05-0.3, 0.6-0.9, 1.2-1.35

Laboratory No.

Tests Required

PITFOX
PITFIRO
SPCCAS

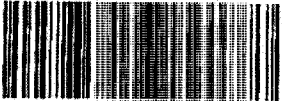
| Field Sample No. | Sample Depth (m) | Laboratory No. |
|------------------|------------------|----------------|
| BH62 | 0.2-0.3 | |
| BH62 | 0.7-0.8 | |
| BH62 | 1.2-1.3 | |
| BH67 | 0.05-0.3 | |
| BH67 | 0.6-0.9 | |
| BH67 | 1.2-1.35 | |
| Total | | |

Environmental Division

Melbourne

Work Order

EM1312266



Telephone: +61-3-8549 9600

Other tests & remounting instructions

Sampled 20/11 9pm-5pm
stored in cool box

Relinquished

Received

Please mark tests required with a diagonal stroke

18:30
20-11-17

20/11 (8:26)

QUALITY CONTROL REPORT

| | | | |
|---------------------|---|--------------------------------|--|
| Work Order | : EM1311266 | Page | : 1 of 4 |
| Client | : WORLEY PARSONS - INFRASTRUCTURE MWE | Laboratory | : Environmental Division Melbourne |
| Contact | : LUCIE MISSEN | Contact | : Steven McGrath |
| Address | : LEVEL 12, 333 COLLINS STREET MELBOURNE VIC, AUSTRALIA 3000 | Address | : 4 Westall Rd Springvale VIC Australia 3171 |
| E-mail | : lucie.missen@worleyparsons.com | E-mail | : steven.mcgrath@alsenviro.com |
| Telephone | : +61 03 86763700 | Telephone | : +61-3-8549 9600 |
| Facsimile | : +61 03 86763770 | Facsimile | : +61-3-8549 9601 |
| Project | : 401010-01002 LOLIPIP | QC Level | : NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Site | : ---- | Date Samples Received | : 24-OCT-2013 |
| C-O-C number | : ---- | Issue Date | : 04-NOV-2013 |
| Sampler | : LM | No. of samples received | : 18 |
| Order number | : 401010-01002 WBS 3G2003A | No. of samples analysed | : 12 |
| Quote number | : ME/507/13 | | |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

| Signatories | Position | Accreditation Category |
|----------------|------------------------------------|------------------------------|
| SATISH.TRIVEDI | 2 IC Acid Sulfate Soils Supervisor | Brisbane Acid Sulphate Soils |



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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 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
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|--|------------------|----------------------|------------|-----------------------------------|---------|-----------------|------------------|---------|---------------------|
| Laboratory sample ID | Client sample ID | Method: Compound | CAS Number | LOR | Unit | Original Result | Duplicate Result | RPD (%) | Recovery Limits (%) |
| EA003 :pH (field/fox) (QC Lot: 3133273) | | | | | | | | | |
| EM1311266-001 | BH48 0.1-0.2 | EA003: Reaction Rate | ---- | 1 | -- | 3 | 3 | 0.0 | No Limit |
| | | EA003: pH (F) | ---- | 0.1 | pH Unit | 5.6 | 5.6 | 0.0 | 0% - 20% |
| | | EA003: pH (Fox) | ---- | 0.1 | pH Unit | 2.5 | 2.6 | 3.9 | 0% - 20% |
| EM1311266-015 | BH46 0.8-1.2 | EA003: Reaction Rate | ---- | 1 | -- | 2 | 2 | 0.0 | No Limit |
| | | EA003: pH (F) | ---- | 0.1 | pH Unit | 5.4 | 5.2 | 3.8 | 0% - 20% |
| | | EA003: pH (Fox) | ---- | 0.1 | pH Unit | 2.8 | 2.9 | 3.5 | 0% - 20% |



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**



Environmental

INTERPRETIVE QUALITY CONTROL REPORT

| | | | |
|--------------|---|-------------------------|--|
| Work Order | : EM1311266 | Page | : 1 of 5 |
| Client | : WORLEY PARSONS - INFRASTRUCTURE MWE | Laboratory | : Environmental Division Melbourne |
| Contact | : LUCIE MISSEN | Contact | : Steven McGrath |
| Address | : LEVEL 12, 333 COLLINS STREET MELBOURNE VIC, AUSTRALIA 3000 | Address | : 4 Westall Rd Springvale VIC Australia 3171 |
| E-mail | : lucie.missen@worleyparsons.com | E-mail | : steven.mcgrath@alsenviro.com |
| Telephone | : +61 03 86763700 | Telephone | : +61-3-8549 9600 |
| Facsimile | : +61 03 86763770 | Facsimile | : +61-3-8549 9601 |
| Project | : 401010-01002 LOLIPIP | QC Level | : NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Site | : ---- | Date Samples Received | : 24-OCT-2013 |
| C-O-C number | : ---- | Issue Date | : 04-NOV-2013 |
| Sampler | : LM | No. of samples received | : 18 |
| Order number | : 401010-01002 WBS 3G2003A | No. of samples analysed | : 12 |
| Quote number | : ME/507/13 | | |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | | |
|---|---------------|--------------------------|--------------------|-------------|---------------|------------------|-------------|---|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation | |
| EA003 :pH (field/fox) | | | | | | | | |
| Snap Lock Bag - frozen on receipt at ALS (EA003) | | | | | | | | |
| BH48 0.1-0.2, | BH48 0.4-0.6, | 24-OCT-2013 | 30-OCT-2013 | 24-OCT-2014 | ✓ | 01-NOV-2013 | 28-JAN-2014 | ✓ |
| BH49 0.1-0.2, | BH49 0.4-0.6, | | | | | | | |
| BH45 0.1-0.2, | BH45 0.8-1.2, | | | | | | | |
| BH44 0.1-0.2, | BH44 0.8-1.2, | | | | | | | |
| BH46 0.1-0.2, | BH46 0.8-1.2, | | | | | | | |
| BH47 0.1-0.2, | BH47 0.4-0.6 | | | | | | | |



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(when) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

| Quality Control Sample Type | | Count | | Rate (%) | | | Quality Control Specification |
|------------------------------------|--------|-------|---------|----------|----------|------------|--|
| Analytical Methods | Method | QC | Regular | Actual | Expected | Evaluation | |
| Laboratory Duplicates (DUP) | | | | | | | |
| pH field/fox | EA003 | 2 | 20 | 10.0 | 10.0 | ✔ | NEPM 2013 Schedule B(3) and ALS QCS3 requirement |



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| <i>Analytical Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
|---------------------------|---------------|---------------|--|
| pH field/fox | EA003 | SOIL | Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide. |



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.
-

ALS #2-4 Westall Road Springvale

Level 12, 333 Collins St
Melbourne VIC 3000 Australia
Telephone: +61 3 8676 3500
Facsimile: +61 3 8676 3505
Web: www.worley.com.au
Worley Infrastructure Pty Ltd
ABN 30 009 265 927

LAB. QUOTE:

PURCHASE ORDER: 401010-01002 WBS 3G2003A

| | | | |
|---------------------------------------|--------------------------------|-------------------|--|
| CLIENT: ESSO | PROJECT NAME: LOLIPIP | ANALYSIS REQUIRED | REPORTS <i>Lucie.Missen@worlpar.com.au</i> |
| COLLECTOR'S NAME: <i>Lucie Missen</i> | PROJECT #: <i>401010-01002</i> | | |
| | | | FINAL REPORT BY: <i>31/10/13</i> |
| | | | EMAIL REPORT <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO |

| LAB. REF. | SAMPLE ID | LAB # | MATRIX | | | | PRESERVATION | | | | SAMPLING DATE | No of CONTAINERS | PHFOA | PHFIELD | SPOCAS | REMARKS |
|--------------------|-----------|---------|--------|------|-----|-------|--------------|-----------|----------|------|---------------|------------------|-------|---------|--------|---------|
| | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | | | | | | |
| PHFOA | | | | | | | | | | | | | | | | |
| PHFIELD | | | | | | | | | | | | | | | | |
| SPOCAS | | | | | | | | | | | | | | | | |
| 1 | BH48 | 0.1-0.2 | ✓ | | | | | ✓ | | | 29/10/13 | 1 | ✓ | ✓ | | |
| 2 | | 0.4-0.6 | ✓ | | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| 3 | | 0.8-1.2 | ✓ | | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| 4 | BH49 | 0.1-0.2 | ✓ | | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| 5 | | 0.4-0.6 | ✓ | | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| 6 | | 0.8-1.2 | ✓ | | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| 7 | BH45 | 0.1-0.2 | ✓ | | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| 8 | | 0.4-0.6 | ✓ | | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| 9 | | 0.8-1.2 | ✓ | | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |

Environmental Division
Melbourne
Work Order
EM1311266



Telephone : +61-3-8549 9600

| | | | | | | |
|-----------------------------------|-----------------------|--------------------|---------------------------------|--------------------|--------------------|--|
| Relinquished by: <i>JEREMY NE</i> | Date: <i>24/10/13</i> | Time: <i>5:45p</i> | Received by: <i>[Signature]</i> | Date: <i>24/10</i> | Time: <i>17:45</i> | Condition of cooler: Sealed: Yes / No Temperature: Ambient / Chilled (Please circle as appropriate) |
| Relinquished by: | Date: | Time: | Received by: | Date: | Time: | |



WorleyParsons

CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
 Melbourne VIC 3000 Australia
 Telephone: +61 3 8676 3500
 Facsimile: +61 3 8676 3505
 Web: www.worley.com.au
 Worley Infrastructure Pty Ltd
 ABN 30 009 265 927

LAB. QUOTE:
 PURCHASE ORDER: 401010-01002 WBS 3G2003A

CLIENT: ESSO PROJECT NAME: LOLIPIP ANALYSIS REQUIRED: REPORTS

COLLECTOR'S NAME: Luke Missen PROJECT #: 401010-01002 PRELIMINARY BY: FINAL REPORT BY: 31/10/13 EMAIL REPORT (YES/NO)

| LAB. REF: | SAMPLE ID | LAB # | MATRIX | | | | PRESERVATION | | | | SAMPLING DATE | No. of CONTAINERS | pH-FOX | pH-FIELD | SPOCAS | REMARKS |
|-----------|--------------------------------|---------|--------|------|-----|-------|--------------|-----------|----------|----------|---------------|-------------------|--------|----------|--------|---------|
| | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | | | | | | |
| | PEROXIDE pH (PHFOX) | | | | | | | | | | | | | | | |
| | PH (PH) | | | | | | | | | | | | | | | |
| | SPOCAS | | | | | | | | | | | | | | | |
| 10 | BH44 | 0.1-0.2 | | ✓ | | | | ✓ | | 29/10/13 | 1 | ✓ | ✓ | | | |
| 11 | | 0.4-0.6 | | ✓ | | | | ✓ | | " | 1 | ✓ | ✓ | | | |
| 12 | | 0.8-1.2 | | ✓ | | | | ✓ | | " | 1 | ✓ | ✓ | | | |
| 13 | BH46 | 0.1-0.2 | | ✓ | | | | ✓ | | " | 1 | ✓ | ✓ | | | |
| 14 | | 0.4-0.6 | | ✓ | | | | ✓ | | " | 1 | ✓ | ✓ | | | |
| 15 | | 0.8-1.2 | | ✓ | | | | ✓ | | " | 1 | ✓ | ✓ | | | |
| 16 | BH47 | 0.1-0.2 | | ✓ | | | | ✓ | | " | 1 | ✓ | ✓ | | | |
| 17 | | 0.4-0.6 | | ✓ | | | | ✓ | | " | 1 | ✓ | ✓ | | | |
| 18 | | 0.8-1.2 | | ✓ | | | | ✓ | | " | 1 | ✓ | ✓ | | | |

Relinquished by: Date: Time: Received by: Date: 24/10 Time: 17:45 Condition of cooler: Sealed: Yes / No Temperature: Ambient / Chilled (Please circle as appropriate)

QUALITY CONTROL REPORT

| | | | |
|---------------------|---|--------------------------------|--|
| Work Order | : EM1311275 | Page | : 1 of 4 |
| Client | : WORLEY PARSONS - INFRASTRUCTURE MWE | Laboratory | : Environmental Division Melbourne |
| Contact | : LUCIE MISSEN | Contact | : Steven McGrath |
| Address | : LEVEL 12, 333 COLLINS STREET MELBOURNE VIC, AUSTRALIA 3000 | Address | : 4 Westall Rd Springvale VIC Australia 3171 |
| E-mail | : lucie.missen@worleyparsons.com | E-mail | : steven.mcgrath@alsenviro.com |
| Telephone | : +61 03 86763700 | Telephone | : +61-3-8549 9600 |
| Facsimile | : +61 03 86763770 | Facsimile | : +61-3-8549 9601 |
| Project | : 401010-01002 LOLIPIP | QC Level | : NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Site | : ---- | Date Samples Received | : 25-OCT-2013 |
| C-O-C number | : ---- | Issue Date | : 04-NOV-2013 |
| Sampler | : LM | No. of samples received | : 30 |
| Order number | : 401010-01002 WBS 3G2003A | No. of samples analysed | : 20 |
| Quote number | : ME/507/13 | | |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

| Signatories | Position | Accreditation Category |
|----------------|------------------------------------|------------------------------|
| SATISH.TRIVEDI | 2 IC Acid Sulfate Soils Supervisor | Brisbane Acid Sulphate Soils |



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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 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
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|--|------------------|----------------------|------------|-----------------------------------|---------|-----------------|------------------|---------|---------------------|
| Laboratory sample ID | Client sample ID | Method: Compound | CAS Number | LOR | Unit | Original Result | Duplicate Result | RPD (%) | Recovery Limits (%) |
| EA003 :pH (field/fox) (QC Lot: 3133273) | | | | | | | | | |
| EM1311266-001 | Anonymous | EA003: Reaction Rate | ---- | 1 | -- | 3 | 3 | 0.0 | No Limit |
| | | EA003: pH (F) | ---- | 0.1 | pH Unit | 5.6 | 5.6 | 0.0 | 0% - 20% |
| | | EA003: pH (Fox) | ---- | 0.1 | pH Unit | 2.5 | 2.6 | 3.9 | 0% - 20% |
| EM1311266-015 | Anonymous | EA003: Reaction Rate | ---- | 1 | -- | 2 | 2 | 0.0 | No Limit |
| | | EA003: pH (F) | ---- | 0.1 | pH Unit | 5.4 | 5.2 | 3.8 | 0% - 20% |
| | | EA003: pH (Fox) | ---- | 0.1 | pH Unit | 2.8 | 2.9 | 3.5 | 0% - 20% |
| EA003 :pH (field/fox) (QC Lot: 3133274) | | | | | | | | | |
| EM1311275-013 | BH16 0.1-0.2 | EA003: Reaction Rate | ---- | 1 | -- | 3 | 3 | 0.0 | No Limit |
| | | EA003: pH (F) | ---- | 0.1 | pH Unit | 6.4 | 6.4 | 0.0 | 0% - 20% |
| | | EA003: pH (Fox) | ---- | 0.1 | pH Unit | 2.6 | 2.6 | 0.0 | 0% - 20% |
| EM1311275-027 | BH26 0.8-1.2 | EA003: Reaction Rate | ---- | 1 | -- | 2 | 2 | 0.0 | No Limit |
| | | EA003: pH (F) | ---- | 0.1 | pH Unit | 5.6 | 5.7 | 1.8 | 0% - 20% |
| | | EA003: pH (Fox) | ---- | 0.1 | pH Unit | 2.5 | 2.3 | 8.3 | 0% - 20% |



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**



INTERPRETIVE QUALITY CONTROL REPORT

| | | | |
|--------------|---|-------------------------|--|
| Work Order | : EM1311275 | Page | : 1 of 5 |
| Client | : WORLEY PARSONS - INFRASTRUCTURE MWE | Laboratory | : Environmental Division Melbourne |
| Contact | : LUCIE MISSEN | Contact | : Steven McGrath |
| Address | : LEVEL 12, 333 COLLINS STREET MELBOURNE VIC, AUSTRALIA 3000 | Address | : 4 Westall Rd Springvale VIC Australia 3171 |
| E-mail | : lucie.missen@worleyparsons.com | E-mail | : steven.mcgrath@alsenviro.com |
| Telephone | : +61 03 86763700 | Telephone | : +61-3-8549 9600 |
| Facsimile | : +61 03 86763770 | Facsimile | : +61-3-8549 9601 |
| Project | : 401010-01002 LOLIPIP | QC Level | : NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Site | : ---- | Date Samples Received | : 25-OCT-2013 |
| C-O-C number | : ---- | Issue Date | : 04-NOV-2013 |
| Sampler | : LM | No. of samples received | : 30 |
| Order number | : 401010-01002 WBS 3G2003A | No. of samples analysed | : 20 |
| Quote number | : ME/507/13 | | |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | | |
|---|--|--------------------------|--------------------|-------------|---------------|------------------|-------------|---|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation | |
| EA003 :pH (field/fox) | | | | | | | | |
| Snap Lock Bag - frozen (EA003) | | | | | | | | |
| BH12 0.1-0.2, BH14 0.1-0.2, BH11 0.1-0.2, BH7 0.1-0.2, BH16 0.1-0.2, BH23 0.1-0.2, | BH12 0.4-0.6, BH14 0.8-1.2, BH11 0.4-0.6, BH7 0.4-0.6, BH16 0.4-0.6, BH23 0.4-0.6 | 22-OCT-2013 | 30-OCT-2013 | 22-OCT-2014 | ✓ | 01-NOV-2013 | 28-JAN-2014 | ✓ |
| Snap Lock Bag - frozen (EA003) | | | | | | | | |
| BH24 0.1-0.2, BH25 0.1-0.2, BH26 0.4-0.6, BH27 0.1-0.2, | BH24 0.4-0.6, BH25 0.4-0.6, BH26 0.8-1.2, BH27 0.4-0.6 | 23-OCT-2013 | 30-OCT-2013 | 23-OCT-2014 | ✓ | 01-NOV-2013 | 28-JAN-2014 | ✓ |



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

| Quality Control Sample Type | Method | Count | | Rate (%) | | | Quality Control Specification |
|------------------------------------|--------|-------|---------|----------|----------|------------|--|
| | | QC | Regular | Actual | Expected | Evaluation | |
| <i>Analytical Methods</i> | | | | | | | |
| Laboratory Duplicates (DUP) | | | | | | | |
| pH field/fox | EA003 | 4 | 40 | 10.0 | 10.0 | ✔ | NEPM 2013 Schedule B(3) and ALS QCS3 requirement |



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| <i>Analytical Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
|---------------------------|---------------|---------------|--|
| pH field/fox | EA003 | SOIL | Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide. |



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.
-

COC rec'd 25/10/13 @ 9.32 a - BN Paul W. *[Signature]*



WorleyParsons

CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
 Melbourne VIC 3000 Australia
 Telephone: +61 3 8876 3500
 Facsimile: +61 3 8876 3505
 Web: www.worley.com.au
 Worley Infrastructure Pty Ltd
 ABN 30 009 265 927

LAB. QUOTE:
 PURCHASE ORDER: 401010-01002 WBS 3G2003A

CLIENT: ESSO PROJECT NAME: LOLIPIP ANALYSIS REQUIRED
 COLLECTOR'S NAME: L. Missen PROJECT #: 401010-01002
 REPORTS *luce.missen@worleyparsons.com*
 PRELIMINARY BY: 11
 FINAL REPORT BY: 29/10/13
 EMAIL REPORT (YES/NO)

| LAB REF. | SAMPLE ID | LAB # | MATRIX | | | | PRESERVATION | | | | SAMPLING DATE | No of CONTAINERS | pH FOX | pH Field | SPOCAS | REMARKS |
|----------|-----------------------|---------|--------|------|-----|-------|--------------|-----------|----------|----------|---------------|------------------|--------|----------|--------|---------|
| | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | | | | | | |
| | XXXXXXXXXX | | | | | | | | | | | | | | | |
| | XXXXXXXXXX | | | | | | | | | | | | | | | |
| | XXXXXXXXXX | | | | | | | | | | | | | | | |
| | BH12 | 0.1-0.2 | 1 | ✓ | | ✓ | | | | 22/10/13 | 1 | ✓ | ✓ | | | |
| | ✓ | 0.4-0.6 | 2 | ✓ | | ✓ | | | | ✓ | 1 | ✓ | ✓ | | | |
| | ✓ | 0.8-1.2 | 3 | ✓ | | ✓ | | | | ✓ | 1 | ✓ | ✓ | | | |
| | BH14 | 0.1-0.2 | 4 | ✓ | | ✓ | | | | ✓ | 1 | ✓ | ✓ | | | |
| | ✓ | 0.4-0.6 | 5 | ✓ | | ✓ | | | | ✓ | 1 | ✓ | ✓ | | | |
| | ✓ | 0.8-1.2 | 6 | ✓ | | ✓ | | | | ✓ | 1 | ✓ | ✓ | | | |
| | BH11 | 0.1-0.2 | 7 | ✓ | | ✓ | | | | ✓ | 1 | ✓ | ✓ | | | |
| | ✓ | 0.4-0.6 | 8 | ✓ | | ✓ | | | | ✓ | 1 | ✓ | ✓ | | | |
| | ✓ | 0.8-1.2 | 9 | ✓ | | ✓ | | | | ✓ | 1 | ✓ | ✓ | | | |

Environmental Division
 Melbourne
 Work Order
 10.42
 BN
 25/10
EM1311275
 Telephone: +61-3-8549 9600

Relinquished by: L. Missen Date: 27/10/13 Time: 1630
 Received by: Bharathi Date: 25/10/13 Time: 8.45 a
 Condition of cooler:
 Sealed: Yes / No
 Temperature: Ambient / Chilled
 (Please circle as appropriate)

COC rec'd 25/10/13 @ 9.32 am - BN



WorleyParsons

CHAIN OF CUSTODY and
ANALYSIS REQUEST

Level 12, 333 Collins St
Melbourne VIC 3000 Australia
Telephone: +61 3 8676 3500
Facsimile: +61 3 8676 3505
Web: www.worley.com.au
Worley Infrastructure Pty Ltd
ABN 30 009 285 927

LAB. QUOTE:

PURCHASE ORDER: 401010-01002 WBS 3G2003A

CLIENT: ESSO

PROJECT NAME: LOLIPIP

ANALYSIS REQUIRED

REPORTS

COLLECTOR'S NAME: L. Missen

PROJECT #: 401010-01002

PRELIMINARY BY: 1/1
FINAL REPORT BY: 21/10/13
EMAIL REPORT (YES/NO)

| LAB REF: | SAMPLE ID | LAB # | MATRIX | | | | PRESERVATION | | | | SAMPLING DATE | No of CONTAINERS | pH FOX | pH FIELD | SPOCAs | REMARKS |
|----------|------------------|-------|--------|------|-----|-------|--------------|-----------|----------|------|---------------|------------------|--------|----------|--------|---------|
| | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | | | | | | |
| | PERFORMED (HFOX) | | | | | | | | | | | | | | | |
| | FIELD (PH) | | | | | | | | | | | | | | | |
| | SPOCAs | | | | | | | | | | | | | | | |
| | BH 7 0.1-0.2 | 10 | | ✓ | | | | ✓ | | | 22/10/13 | 1 | ✓ | ✓ | | |
| | 0.4-0.6 | 11 | | ✓ | | | | ✓ | | | 1/1 | 1 | ✓ | ✓ | | |
| | 0.8-1.2 | 12 | | ✓ | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| | BH 16 0.1-0.2 | 13 | | ✓ | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| | 0.4-0.6 | 14 | | ✓ | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| | 0.8-1.2 | 15 | | ✓ | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| | BH 23 0.1-0.2 | 16 | | ✓ | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| | 0.4-0.6 | 17 | | ✓ | | | | ✓ | | | ✓ | 1 | ✓ | ✓ | | |
| | 0.8-1.2 | 18 | | ✓ | | | | ✓ | | | ✓ | 1 | | | | |

Relinquished by: L. Missen
Date: 22/10/13
Time: 1630
Received by: [Signature]
Date: 22/10/13
Time: 1630

Relinquished by: [Signature]
Date: [Blank]
Time: [Blank]
Received by: Bharathi
Date: 25/10/13
Time: 8.45a

Condition of cooler:
Sealed: Yes/No
Temperature: Ambient / Chilled
(Please circle as appropriate)

COC rec'd 25/10/13 @ 9:32 a



WorleyParsons

CHAIN OF CUSTODY and
ANALYSIS REQUEST

Level 12, 333 Collins St
Melbourne VIC 3000 Australia
Telephone: +61 3 8876 3500
Facsimile: +61 3 8876 3505
Web: www.worley.com.au
Worley Infrastructure Pty Ltd
ABN 30 009 265 927

LAB. QUOTE:

PURCHASE ORDER: 401010-01002 WBS 3G2003A

CLIENT: ESSO

PROJECT NAME: LOLIPIP

COLLECTOR'S NAME: Lucie Missen

PROJECT #: 401010-01002

ANALYSIS REQUIRED

REPORTS

PRELIMINARY BY:
FINAL REPORT BY: 30/10/13
EMAIL REPORT (YES/NO)

| LAB. REF. | SAMPLE ID | LAB # | MATRIX | | | | PRESERVATION | | | | SAMPLING DATE | No. of CONTAINERS | pH FOX | pH FIELD | REMARKS |
|-----------|---------------------|-------|--------|------|-----|-------|--------------|-----------|----------|------|---------------|-------------------|--------|----------|---------|
| | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | | | | | |
| | PEROXIDE pH (PHFOX) | | | | | | | | | | | | | | |
| | FIELD pH (PH) | | | | | | | | | | | | | | |
| | SPOCAS | | | | | | | | | | | | | | |
| | BH24 0.1-0.2 | 19 | | ✓ | | | | ✓ | | | 23/10/13 | | ✓ | ✓ | |
| | 11 0.4-0.6 | 20 | | ✓ | | | | ✓ | | | | | ✓ | ✓ | |
| | 11 0.8-1.2 | 21 | | ✓ | | | | ✓ | | | | | | | |

Relinquished by: L. Missen
Date: 23/10/13 Time: 16:10
Received by: [Signature]
Date: 23/10/13 Time: 14:15

Relinquished by:
Date: Time:
Received by: Bharathi
Date: 25/10/13 Time: 8:45 a

Condition of cooler:
Sealed: Yes / No
Temperature: Ambient / Chilled
(Please circle as appropriate)

COC rec'd 25/10/13 @ 9.32a



WorleyParsons

CHAIN OF CUSTODY and
ANALYSIS REQUEST

Level 12, 333 Collins St
Melbourne VIC 3000 Australia
Telephone: +61 3 8676 3500
Facsimile: +61 3 8676 3505
Web: www.worley.com.au
Worley Infrastructure Pty Ltd
ABN 30 009 265 927

LAB. QUOTE:

PURCHASE ORDER: 401010-01002 WBS 3G2003A

CLIENT: ESSO

PROJECT NAME: LOLIPIP

COLLECTOR'S NAME: Lucie Missen

PROJECT #: 401010-01002

ANALYSIS REQUIRED

REPORTS *Lucie.Missen@worley.com.au*
PRELIMINARY BY: *30/10/13*
FINAL REPORT BY: *30/10/13*
EMAIL REPORT (YES/NO)

| LAB. REF. | SAMPLE ID | LAB # | MATRIX | | | | PRESERVATION | | | | SAMPLING DATE | No of CONTAINERS | PH FOR | PH FIELD | REMARKS |
|-----------|------------------------------|------------|--------|------|-----|-------|--------------|-----------|----------|------|---------------|------------------|--------|----------|---------|
| | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | | | | | |
| | DESOXIDANT (PHOX) | | | | | | | | | | | | | | |
| | FIELD PH (PH) | | | | | | | | | | | | | | |
| | SPECIES | | | | | | | | | | | | | | |
| | BH25 | 01-02 22 | | ✓ | | | ✓ | | | | 23/10/13 | ✓ | ✓ | | |
| | 11 | 0.4-0.6 23 | | ✓ | | | ✓ | | | | | ✓ | ✓ | | |
| | 11 | 0.8-1.2 24 | | ✓ | | | ✓ | | | | | | | | |
| | BH26 | 0.1-0.2 25 | | ✓ | | | ✓ | | | | | | | | |
| | | 0.4-0.6 26 | | ✓ | | | ✓ | | | | | ✓ | ✓ | | |
| | | 0.8-1.2 27 | | ✓ | | | ✓ | | | | | ✓ | ✓ | | |
| | BH27 | 0.1-0.2 28 | | ✓ | | | ✓ | | | | | ✓ | ✓ | | |
| | | 0.4-0.6 29 | | ✓ | | | ✓ | | | | | ✓ | ✓ | | |
| | | 0.8-1.2 30 | | ✓ | | | ✓ | | | | | | | | |

Relinquished by: *L. Missen* Date: *23/10/13* Time: *16.10* Received by: *ANTHONY* Date: *23/10/13* Time: *14.15*

Relinquished by: Date: Time: Received by: *Bharathi* Date: *25/10/13* Time: *8.45a*

Condition of cooler:
Sealed: Yes / No
Temperature: Ambient / Chilled
(Please circle as appropriate)

Raymond Thai

From: Steven McGrath
Sent: Friday, 25 October 2013 9:44 AM
To: Samples Melbourne
Subject: FW: Worley Parsons SPOCAS samples
Attachments: sharpscanner@ecowise.com.au_20131025_075339.pdf
Importance: High

COC for samples that arrived this morning. Please place in Freezer as these are for ASS.

Steven McGrath

Technical Manager - Client Services
ALS | Environmental Division

4 Westall Road
Springvale, Victoria 3171

How was your customer experience? Please send us your feedback

[EnviroMail 68 - Sampling and Analysis Implications of the new NEPM - July 2013](#)

[EnviroMail 69 - Testing Requirements of the new NEPM - July 2013](#)

[EnviroMail 70 - Variation of Naphthalene by SVOC and VOC Methods in Water - July 2013](#)

T +61 3 8549 9600
F +61 3 8549 9626
www.alsglobal.com

Winner of the inaugural CARE Award 2011 - Sustainable Technology & Innovation:
Reduction in Sample Volumes - Improving quality, safety, efficiency and sustainability in environmental practices



From: Paul Whiffen
Sent: Friday, 25 October 2013 9:32 AM
To: Steven McGrath
Subject: RE: Worley Parsons SPOCAS samples

Hi Steven,

Apologies, please see attached. I remembered last night that I didn't tape to the lid and that I would email them to you first thing this morning but I forgot.
Do you need the originals sent to you?

Regards,

Paul Whiffen

Manager, Traralgon Laboratory
ALS Life Sciences Division | Environmental
Water Resources Group

Tel: +61 3 5176 4170
Fax: +61 3 5176 4473
Mobile: +61 (0) 427 070 932

Please consider the environment before printing this email.

From: Steven McGrath
Sent: Friday, 25 October 2013 9:25 AM
To: Paul Whiffen
Subject: RE: Worley Parsons SPOCAS samples
Importance: High

Hi Paul – also I couldn't locate the COC in the eskies we received? I confirmed with Luci that she handed over the COC to you with the samples.

Have you got a copy of this? Are you able to scan and e-mail me a copy?

Regards,

Steven McGrath

Technical Manager - Client Services
ALS | Environmental Division

4 Westall Road
Springvale, Victoria 3171

How was your customer experience? Please send us your feedback

[EnviroMail 68 - Sampling and Analysis Implications of the new NEPM - July 2013](#)

[EnviroMail 69 - Testing Requirements of the new NEPM - July 2013](#)

[EnviroMail 70 - Variation of Naphthalene by SVOC and VOC Methods in Water - July 2013](#)

T +61 3 8549 9600
F +61 3 8549 9626

www.alsglobal.com

Winner of the inaugural CARE Award 2011 – Sustainable Technology & Innovation:
Reduction in Sample Volumes – Improving quality, safety, efficiency and sustainability in environmental practices



From: Steven McGrath
Sent: Friday, 25 October 2013 9:22 AM
To: Paul Whiffen
Subject: FW: Worley Parsons SPOCAS samples

Hi Paul – we received the samples this morning – thanks for your assistance. My understanding is that there should not be any more samples being handed over to you. I believe they finished sampling yesterday and dropped off these samples in person here in Springvale.

Thanks again for your assistance.

Regards,

Steven McGrath

Technical Manager - Client Services
ALS | Environmental Division

4 Westall Road
Springvale, Victoria 3171

How was your customer experience? Please send us your feedback

EnviroMail 68 - Sampling and Analysis Implications of the new NEPM - July 2013

EnviroMail 69 - Testing Requirements of the new NEPM - July 2013

EnviroMail 70 - Variation of Naphthalene by SVOC and VOC Methods in Water - July 2013

T +61 3 8549 9600
F +61 3 8549 9626

www.alsglobal.com

Winner of the inaugural CARE Award 2011 - Sustainable Technology & Innovation:
Reduction in Sample Volumes – Improving quality, safety, efficiency and sustainability in environmental practices



From: Steven McGrath

Sent: Tuesday, 22 October 2013 11:21 AM

To: Paul Whiffen

Subject: RE: Worley Parsons SPOCAS samples

Thanks Paul.

Every second day should be sufficient – so you could send today's and tomorrow's on Thursday, and then Thursday's and Friday's on Monday, and then Monday's and Tuesday's on the Wednesday.

Regards,

Steven McGrath

Technical Manager - Client Services
ALS | Environmental Division

4 Westall Road
Springvale, Victoria 3171

How was your customer experience? Please send us your feedback

EnviroMail 68 - Sampling and Analysis Implications of the new NEPM - July 2013

EnviroMail 69 - Testing Requirements of the new NEPM - July 2013

EnviroMail 70 - Variation of Naphthalene by SVOC and VOC Methods in Water - July 2013

T +61 3 8549 9600

F +61 3 8549 9626

www.alsglobal.com

Winner of the inaugural CARE Award 2011 - Sustainable Technology & Innovation:
Reduction in Sample Volumes - Improving quality, safety, efficiency and sustainability in environmental practices



From: Paul Whiffen

Sent: Tuesday, 22 October 2013 11:18 AM

To: Steven McGrath

Subject: RE: Worley Parsons SPOCAS samples

Hi Steven,

We have a big freezer room so space is not an issue. I am happy to send them on whenever you or the client needs. Will keep in touch.

Regards,

Paul Whiffen

Manager, Traralgon Laboratory
ALS Life Sciences Division | Environmental
Water Resources Group

Tel: +61 3 5176 4170

Fax: +61 3 5176 4473

Mobile: +61 (0) 427 070 932

Please consider the environment before printing this email.

From: Steven McGrath

Sent: Tuesday, 22 October 2013 11:06 AM

To: Paul Whiffen

Subject: Worley Parsons SPOCAS samples

Hi Paul,

Thanks for offering to assist us with sample logistics.

Luci from Worley Parsons plans to drop off one small esky of sample (~8 samples) per day, starting today until next Tuesday (not including the weekend).

It is unlikely that Luci will be able to get these to you before 3pm so we would ask you to freeze the samples and send them off to ALS Springvale the following day: 4 Westall Road, Springvale 3171.

As freezing the samples extends the holding time indefinitely, you could send off every second day (assuming you have the capacity to store these frozen for two days) – it's up to you.

If at any time you need to contact myself or the client directly, please use the following numbers:

Me (direct) – 03 8549 9644
Client (Luci) - 0414 568 510

Regards,

Steven McGrath

Technical Manager - Client Services
ALS | Environmental Division

4 Westall Road
Springvale, Victoria 3171

How was your customer experience? Please send us your feedback

EnvironMail 68 - Sampling and Analysis Implications of the new NEPM - July 2013

EnvironMail 69 - Testing Requirements of the new NEPM - July 2013

EnvironMail 70 - Variation of Naphthalene by SVOC and VOC Methods in Water - July 2013

T +61 3 8549 9600
F +61 3 8549 9626

www.alsglobal.com

Winner of the inaugural CARE Award 2011 - Sustainable Technology & Innovation:
Reduction in Sample Volumes – Improving quality, safety, efficiency and sustainability in environmental practices



QUALITY CONTROL REPORT

| | | | |
|---------------------|---|--------------------------------|--|
| Work Order | : EM1311321 | Page | : 1 of 4 |
| Client | : WORLEY PARSONS - INFRASTRUCTURE MWE | Laboratory | : Environmental Division Melbourne |
| Contact | : LUCIE MISSEN | Contact | : Steven McGrath |
| Address | : LEVEL 12, 333 COLLINS STREET MELBOURNE VIC, AUSTRALIA 3000 | Address | : 4 Westall Rd Springvale VIC Australia 3171 |
| E-mail | : lucie.missen@worleyparsons.com | E-mail | : steven.mcgrath@alsenviro.com |
| Telephone | : +61 03 86763700 | Telephone | : +61-3-8549 9600 |
| Facsimile | : +61 03 86763770 | Facsimile | : +61-3-8549 9601 |
| Project | : 401010-01002 LOLIPIP | QC Level | : NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Site | : ---- | Date Samples Received | : 25-OCT-2013 |
| C-O-C number | : ---- | Issue Date | : 04-NOV-2013 |
| Sampler | : LM | No. of samples received | : 18 |
| Order number | : 401010-01002 WBS 3G2003A | No. of samples analysed | : 12 |
| Quote number | : ME/507/13 | | |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

| <i>Signatories</i> | <i>Position</i> | <i>Accreditation Category</i> |
|--------------------|------------------------------------|-------------------------------|
| SATISH.TRIVEDI | 2 IC Acid Sulfate Soils Supervisor | Brisbane Acid Sulphate Soils |



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.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|--|------------------|----------------------|------------|-----------------------------------|---------|-----------------|------------------|---------|---------------------|
| Laboratory sample ID | Client sample ID | Method: Compound | CAS Number | LOR | Unit | Original Result | Duplicate Result | RPD (%) | Recovery Limits (%) |
| EA003 :pH (field/fox) (QC Lot: 3133274) | | | | | | | | | |
| EM1311275-013 | Anonymous | EA003: Reaction Rate | ---- | 1 | -- | 3 | 3 | 0.0 | No Limit |
| | | EA003: pH (F) | ---- | 0.1 | pH Unit | 6.4 | 6.4 | 0.0 | 0% - 20% |
| | | EA003: pH (Fox) | ---- | 0.1 | pH Unit | 2.6 | 2.6 | 0.0 | 0% - 20% |
| EM1311275-027 | Anonymous | EA003: Reaction Rate | ---- | 1 | -- | 2 | 2 | 0.0 | No Limit |
| | | EA003: pH (F) | ---- | 0.1 | pH Unit | 5.6 | 5.7 | 1.8 | 0% - 20% |
| | | EA003: pH (Fox) | ---- | 0.1 | pH Unit | 2.5 | 2.3 | 8.3 | 0% - 20% |
| EA003 :pH (field/fox) (QC Lot: 3133275) | | | | | | | | | |
| EM1311321-013 | BH64 0.1-0.2 | EA003: Reaction Rate | ---- | 1 | -- | 3 | 3 | 0.0 | No Limit |
| | | EA003: pH (F) | ---- | 0.1 | pH Unit | 6.5 | 6.4 | 1.6 | 0% - 20% |
| | | EA003: pH (Fox) | ---- | 0.1 | pH Unit | 2.6 | 2.6 | 0.0 | 0% - 20% |



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**



INTERPRETIVE QUALITY CONTROL REPORT

| | | | |
|--------------|---|-------------------------|--|
| Work Order | : EM1311321 | Page | : 1 of 5 |
| Client | : WORLEY PARSONS - INFRASTRUCTURE MWE | Laboratory | : Environmental Division Melbourne |
| Contact | : LUCIE MISSEN | Contact | : Steven McGrath |
| Address | : LEVEL 12, 333 COLLINS STREET MELBOURNE VIC, AUSTRALIA 3000 | Address | : 4 Westall Rd Springvale VIC Australia 3171 |
| E-mail | : lucie.missen@worleyparsons.com | E-mail | : steven.mcgrath@alsenviro.com |
| Telephone | : +61 03 86763700 | Telephone | : +61-3-8549 9600 |
| Facsimile | : +61 03 86763770 | Facsimile | : +61-3-8549 9601 |
| Project | : 401010-01002 LOLIPIP | QC Level | : NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Site | : ---- | Date Samples Received | : 25-OCT-2013 |
| C-O-C number | : ---- | Issue Date | : 04-NOV-2013 |
| Sampler | : LM | No. of samples received | : 18 |
| Order number | : 401010-01002 WBS 3G2003A | No. of samples analysed | : 12 |
| Quote number | : ME/507/13 | | |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | | |
|--|---|--------------------------|--------------------|-------------|---------------|------------------|-------------|---|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation | |
| EA003 :pH (field/fox) | | | | | | | | |
| Snap Lock Bag - frozen on receipt at ALS (EA003) | | | | | | | | |
| BH50 0.1-0.2, BH53 0.1-0.2, BH66 0.1-0.2, BH69 0.1-0.2, BH64 0.1-0.2, BH65 0.1-0.2, | BH50 0.4-0.6, BH53 0.4-0.6, BH66 0.8-1.2, BH69 0.8-1.2, BH64 0.4-0.6, BH65 0.4-0.6 | 25-OCT-2013 | 30-OCT-2013 | 25-OCT-2014 | ✓ | 01-NOV-2013 | 28-JAN-2014 | ✓ |



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(when) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

| Quality Control Sample Type | | Count | | Rate (%) | | | Quality Control Specification |
|------------------------------------|--------|-------|---------|----------|----------|------------|--|
| Analytical Methods | Method | QC | Regular | Actual | Expected | Evaluation | |
| Laboratory Duplicates (DUP) | | | | | | | |
| pH field/fox | EA003 | 3 | 24 | 12.5 | 10.0 | ✔ | NEPM 2013 Schedule B(3) and ALS QCS3 requirement |



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| <i>Analytical Methods</i> | <i>Method</i> | <i>Matrix</i> | <i>Method Descriptions</i> |
|---------------------------|---------------|---------------|--|
| pH field/fox | EA003 | SOIL | Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide. |



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.
-


LAB. QUOTE:

PURCHASE ORDER: 401010-01002 WBS 3G2003A

| | | | |
|--|-----------------------------------|-------------------|---|
| CLIENT: ESSO | PROJECT NAME: LOLIPIP | ANALYSIS REQUIRED | REPORTS <i>Lucie.Missen@worleyparsons.com</i> |
| COLLECTOR'S NAME: <i>Lucie Missen</i> | PROJECT #: <i>401010-01002</i> | | |

| LAB. REF. | SAMPLE ID | LAB # | MATRIX | | | | PRESERVATION | | | | SAMPLING DATE | No of CONTAINERS | pH FOX | pH FIELD | SPOCAS | REMARKS |
|-----------|---------------------|-------|--------|------|-----|-------|--------------|-----------|----------|----------|---------------|------------------|--------|----------|--------|---------|
| | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | NONE | | | | | | |
| | PH FOX | | | | | | | | | | | | | | | |
| | PH FIELD | | | | | | | | | | | | | | | |
| | SPOCAS | | | | | | | | | | | | | | | |
| 1 | BH50 0.1-0.2 | | ✓ | | | | | ✓ | | 25/10/13 | 1 | ✓ | ✓ | | | |
| 2 | 11 0.4-0.6 | | ✓ | | | | | ✓ | | 11 | 1 | ✓ | ✓ | | | |
| 3 | 11 0.8-1.2 | | ✓ | | | | | ✓ | | 11 | 1 | ✓ | ✓ | | | |
| 4 | BH53 0.1-0.2 | | ✓ | | | | | ✓ | | 11 | 1 | ✓ | ✓ | | | |
| 5 | 11 0.4-0.6 | | ✓ | | | | | ✓ | | 11 | 1 | ✓ | ✓ | | | |
| 6 | 11 0.8-1.2 | | ✓ | | | | | ✓ | | 11 | 1 | ✓ | ✓ | | | |
| 7 | BH66 0.1-0.2 | | ✓ | | | | | ✓ | | 11 | 1 | ✓ | ✓ | | | |
| 8 | 11 0.4-0.6 | | ✓ | | | | | ✓ | | 11 | 1 | ✓ | ✓ | | | |
| 9 | 11 0.8-1.2 | | ✓ | | | | | ✓ | | 11 | 1 | ✓ | ✓ | | | |

Environmental Division
CLM Melbourne 8:50.
 25/10 Work Order 28/10
EM13113210K



Telephone : +61-3-8549 9600

| | | | | | | |
|-----------------------------------|-----------------------|---------------------|--|--------------------|--------------------|---|
| Relinquished by: JEREMY NC | Date: 25/10/13 | Time: 5:15pm | Received by: Lucie Missen (LMS) | Date: 25/10 | Time: 12:45 | Condition of cooler: Sealed: <input checked="" type="checkbox"/> Yes / No Temperature: Ambient / Chilled 4-2-6-0 (Please circle as appropriate) |
| Relinquished by: | Date: | Time: | Received by: | Date: | Time: | |



CHAIN OF CUSTODY and ANALYSIS REQUEST

Level 12, 333 Collins St
 Melbourne VIC 3000 Australia
 Telephone: +61 3 8676 3500
 Facsimile: +61 3 8676 3505
 Web: www.worley.com.au
 Worley Infrastructure Pty Ltd
 ABN 30 009 265 927

LAB. QUOTE:

PURCHASE ORDER: 401010-01002 WBS 3G2003A

CLIENT: ESSO

PROJECT NAME: LOLIPIP

COLLECTOR'S NAME: Lucie Missen

PROJECT #: 401010-01002

ANALYSIS REQUIRED

REPORTS to: *lucie.missen@worleyparsons.com*

PRELIMINARY BY: *1/1/13*

FINAL REPORT BY: *1/11/13*

EMAIL REPORT (YES/NO)

| LAB. REF. | SAMPLE ID | LAB # | MATRIX | | | | PRESERVATION | | | SAMPLING DATE | No. of CONTAINERS | pH FOX | pH FIELD | SPOCAS | REMARKS |
|-----------|------------------------------|---------|--------|------|-----|-------|--------------|-----------|----------|---------------|-------------------|--------|----------|--------|---------|
| | | | WATER | SOIL | AIR | OTHER | ICE | ACIDIFIED | ALKALINE | | | | | | |
| | PROVIDE pH (HFOX) | | | | | | | | | | | | | | |
| | FIELD pH (PHF) | | | | | | | | | | | | | | |
| | SPOCAS | | | | | | | | | | | | | | |
| 10 | BH69 | 0.1-0.2 | | ✓ | | | ✓ | | | 25/10/13 | 1 | ✓ | ✓ | | |
| 11 | 11 | 0.4-0.6 | | ✓ | | | ✓ | | | 11 | 1 | ✓ | ✓ | | |
| 12 | 11 | 0.8-1.2 | | ✓ | | | ✓ | | | 11 | 1 | ✓ | ✓ | | |
| 13 | BH64 | 0.1-0.2 | | ✓ | | | ✓ | | | 11 | 1 | ✓ | ✓ | | |
| 14 | 11 | 0.4-0.6 | | ✓ | | | ✓ | | | 11 | 1 | ✓ | ✓ | | |
| 15 | 11 | 0.8-1.2 | | ✓ | | | ✓ | | | 11 | 1 | ✓ | ✓ | | |
| 16 | BH65 | 0.1-0.2 | | ✓ | | | ✓ | | | 11 | 1 | ✓ | ✓ | | |
| 17 | 11 | 0.4-0.6 | | ✓ | | | ✓ | | | 11 | 1 | ✓ | ✓ | | |
| 18 | 11 | 0.8-1.2 | | ✓ | | | ✓ | | | 11 | 1 | ✓ | ✓ | | |

| | | | | | | |
|----------------------------------|-----------------------|---------------------|--------------------------------|-----------------------|--------------------|---|
| Relinquished by: <i>JOHNT NZ</i> | Date: <i>25/10/13</i> | Time: <i>5:15pm</i> | Received by: <i>John (A41)</i> | Date: <i>25/10/13</i> | Time: <i>12:15</i> | Condition of cooler: Sealed: <input checked="" type="checkbox"/> Yes / No |
| Relinquished by: | Date: | Time: | Received by: | Date: | Time: | Temperature: Ambient / Chilled <i>6-6°C</i> (Please circle as appropriate) |

QUALITY CONTROL REPORT

| | | | |
|---------------------|---|--------------------------------|--|
| Work Order | : EM1312266 | Page | : 1 of 4 |
| Client | : WORLEY PARSONS - INFRASTRUCTURE MWE | Laboratory | : Environmental Division Melbourne |
| Contact | : LUCIE MISSEN | Contact | : Steven McGrath |
| Address | : LEVEL 12, 333 COLLINS STREET MELBOURNE VIC, AUSTRALIA 3000 | Address | : 4 Westall Rd Springvale VIC Australia 3171 |
| E-mail | : lucie.missen@worleyparsons.com | E-mail | : steven.mcgrath@alsenviro.com |
| Telephone | : +61 03 86763700 | Telephone | : +61-3-8549 9600 |
| Facsimile | : +61 03 86763770 | Facsimile | : +61-3-8549 9601 |
| Project | : 401010-01002 LOLIPIP | QC Level | : NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Site | : GIPPSLAND | Date Samples Received | : 20-NOV-2013 |
| C-O-C number | : ---- | Issue Date | : 28-NOV-2013 |
| Sampler | : ---- | No. of samples received | : 6 |
| Order number | : 401010-01002 WBS 3G2003A | No. of samples analysed | : 4 |
| Quote number | : ME/507/13 | | |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

| Signatories | Position | Accreditation Category |
|----------------|------------------------------------|------------------------------|
| SATISH.TRIVEDI | 2 IC Acid Sulfate Soils Supervisor | Brisbane Acid Sulphate Soils |



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.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|--|------------------|----------------------|------------|-----------------------------------|---------|-----------------|------------------|---------|---------------------|
| Laboratory sample ID | Client sample ID | Method: Compound | CAS Number | LOR | Unit | Original Result | Duplicate Result | RPD (%) | Recovery Limits (%) |
| EA003 :pH (field/fox) (QC Lot: 3179331) | | | | | | | | | |
| EM1312266-001 | BH62 0.2-0.3 | EA003: Reaction Rate | ---- | 1 | -- | 3 | 3 | 0.0 | No Limit |
| | | EA003: pH (F) | ---- | 0.1 | pH Unit | 5.1 | 5.1 | 0.0 | 0% - 20% |
| | | EA003: pH (Fox) | ---- | 0.1 | pH Unit | 2.3 | 2.2 | 4.4 | 0% - 20% |



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**



Environmental

INTERPRETIVE QUALITY CONTROL REPORT

| | | | |
|--------------|---|-------------------------|--|
| Work Order | : EM1312266 | Page | : 1 of 5 |
| Client | : WORLEY PARSONS - INFRASTRUCTURE MWE | Laboratory | : Environmental Division Melbourne |
| Contact | : LUCIE MISSEN | Contact | : Steven McGrath |
| Address | : LEVEL 12, 333 COLLINS STREET MELBOURNE VIC, AUSTRALIA 3000 | Address | : 4 Westall Rd Springvale VIC Australia 3171 |
| E-mail | : lucie.missen@worleyparsons.com | E-mail | : steven.mcgrath@alsenviro.com |
| Telephone | : +61 03 86763700 | Telephone | : +61-3-8549 9600 |
| Facsimile | : +61 03 86763770 | Facsimile | : +61-3-8549 9601 |
| Project | : 401010-01002 LOLIPIP | QC Level | : NEPM 2013 Schedule B(3) and ALS QCS3 requirement |
| Site | : GIPPSLAND | Date Samples Received | : 20-NOV-2013 |
| C-O-C number | : ---- | Issue Date | : 28-NOV-2013 |
| Sampler | : ---- | No. of samples received | : 6 |
| Order number | : 401010-01002 WBS 3G2003A | No. of samples analysed | : 4 |
| Quote number | : ME/507/13 | | |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

| Method Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | | |
|---|-------------------------------|--------------------------|--------------------|-------------|---------------|------------------|-------------|---|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation | |
| EA003 :pH (field/fox) | | | | | | | | |
| Snap Lock Bag - frozen on receipt at ALS (EA003) | | | | | | | | |
| BH62 0.2-0.3, BH67 0.05--0.3, | BH62 0.7-0.8, BH67 0.6-0.9 | 20-NOV-2013 | 26-NOV-2013 | 20-NOV-2014 | ✓ | 28-NOV-2013 | 24-FEB-2014 | ✓ |



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

| Quality Control Sample Type | | Count | | Rate (%) | | | Quality Control Specification |
|------------------------------------|--------|-------|---------|----------|----------|------------|--|
| Analytical Methods | Method | QC | Regular | Actual | Expected | Evaluation | |
| Laboratory Duplicates (DUP) | | | | | | | |
| pH field/fox | EA003 | 1 | 4 | 25.0 | 10.0 | ✔ | NEPM 2013 Schedule B(3) and ALS QCS3 requirement |



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

| Analytical Methods | Method | Matrix | Method Descriptions |
|--------------------|--------|--------|--|
| pH field/fox | EA003 | SOIL | Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide. |



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.
-



Client ESSO
Location GIPPS LAD

Project Name LOLIPIP
Project Number 401010-01002
Project CTR 3G2003A

Requested by L. Missen
Date 27/11/30

email locie.missen@worleyparsons.com

| Borehole or Test Pit No. | 1 | 2 | 3 | 4 | 5 | 6 | | | | Total |
|--------------------------|-------------------|---------|---------|----------|---------|----------|--|--|--|-------|
| Field Sample No. | BH62 | BH62 | BH62 | BH67 | BH67 | BH67 | | | | |
| Sample Depth (m) | 0.2-0.3 | 0.7-0.8 | 1.2-1.3 | 0.05-0.3 | 0.6-0.9 | 1.2-1.35 | | | | |
| Laboratory No. | | | | | | | | | | |
| Tests Required | [Shaded area] | | | | | | | | | |
| PH FOX | [Diagonal stroke] | | | | | | | | | |
| PI FIELD | [Diagonal stroke] | | | | | | | | | |
| SPOCAS | [Diagonal stroke] | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Environmental Division
Melbourne
Work Order
EM1312266



Telephone : +61-3-8549 9600

Other tests & remoulding instructions
 Sampled 20/11 4pm-5pm Relinquished [Signature] Received [Signature]
 Stored in cooler bag 18:30 20-11-17 20/11 18:26

Please mark tests required with a diagonal stroke

Special Instructions Freeze when delivered