

Job No: 338559

Date Received: 23/11

Time Received: 16:40

Received By: HBS

Temp: Cool/Ambient

Cooling: Icepack

Security: Intact/Broken/None

CHAIN OF CUSTODY FORM

| Water Testing | | | | | | | | | | | | |
|---------------------------|-------------------------------|------------------|------------|--|---------------|---------------------|-------------------------|---|----------|-------|---------|---|
| Name | P2007619 Clarence Sand Quarry | | | | | | | | | | | |
| Martens Contact Officer | Dean Shi | | | | | Contact Email | dshi@martens.com.au | | | | | |
| Sampling and Shipping | Sample Date | 22/11/2023 | | | Dispatch Date | 23/11/2023 | | Turnaround Time | Standard | | | |
| | Our Reference | P2007619COC07V01 | | | | Shipping Method (X) | Hand | | Post | | Courier | X |
| | On Ice (X) | X | No Ice (X) | | Other (X) | | | | | | | |
| Laboratory | | | | | | | | | | | | |
| Name | EnviroLab | | | | | | | | | | | |
| Sample Delivery Address | 12 Ashley Street, Chatswood | | | | | | | | | | | |
| Delivery Contact | Name | Aileen / Nancy | | | Phone | 9910 6200 | | Fax | | Email | | |
| Please Send Report By (X) | Post | | Fax | | Email | X | Reporting Email Address | dshi@martens.com.au; anorris@martens.com.au | | | | |

| Sample ID | Reporting ID | TRH | 8 Heavy Metals * | Ionic Balance Suite | BOD | Dissolved oxygen | Electrical conductivity | pH | TSS | Turbidity |
|--------------|---------------|-----|------------------|---------------------|-----|------------------|-------------------------|----|-----|-----------|
| 1 EPL1/SW01 | 7619 / EPL 1 | X | X | X | X | X | X | X | X | X |
| 2 EPL2/SW02 | 7619 / EPL 2 | X | X | X | X | X | X | X | X | X |
| 3 EPL3/SW03 | 7619 / EPL 3 | X | X | X | X | X | X | X | X | X |
| 4 EPL4/SW04 | 7619 / EPL 4 | X | X | X | X | X | X | X | X | X |
| 5 EPL6/MW04 | 7619 / EPL 6 | X | X | X | X | | X | X | | |
| 6 EPL7/MW05 | 7619 / EPL 7 | X | X | X | X | | X | X | | |
| 7 EPL8/MW06 | 7619 / EPL 8 | X | X | X | X | | X | X | | |
| 8 EPL9/MW07 | 7619 / EPL 9 | X | X | X | X | | X | X | | |
| 9 EPL10/MW08 | 7619 / EPL 10 | X | X | X | X | | X | X | | |

* Please filter for heavy metals from non-preserved bottles



Envirolab Services Pty Ltd

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SAMPLE RECEIPT ADVICE

Client Details

| | |
|------------------|------------------------------|
| Client | Martens & Associates Pty Ltd |
| Attention | Dean Shi |

Sample Login Details

| | |
|---|-------------------------------|
| Your reference | P2007619 Clarence Sand Quarry |
| Envirolab Reference | 338559 |
| Date Sample Received | 23/11/2023 |
| Date Instructions Received | 23/11/2023 |
| Date Results Expected to be Reported | 30/11/2023 |

Sample Condition

| | |
|---|----------|
| Samples received in appropriate condition for analysis | Yes |
| No. of Samples Provided | 9 Water |
| Turnaround Time Requested | Standard |
| Temperature on Receipt (°C) | 13 |
| Cooling Method | Ice |
| Sampling Date Provided | YES |

Comments

Nil

Please direct any queries to:

| | |
|-------------------------------------|---------------------------------------|
| Aileen Hie | Jacinta Hurst |
| Phone: 02 9910 6200 | Phone: 02 9910 6200 |
| Fax: 02 9910 6201 | Fax: 02 9910 6201 |
| Email: ahie@envirolab.com.au | Email: jhurst@envirolab.com.au |

Analysis Underway, details on the following page:



| Sample ID | VTRH in Water (C6-C9) NEPM | svTRH (C10-C40) in Water | HM in water - dissolved | Calcium - Dissolved | Potassium - Dissolved | Sodium - Dissolved | Magnesium - Dissolved | Hardness | Hydroxide Alkalinity (OH-) as CaCO3 | Bicarbonate Alkalinity as CaCO3 | Carbonate Alkalinity as CaCO3 | Total Alkalinity as CaCO3 | Sulphate, SO4 | Chloride, Cl | Ionic Balance | pH | Electrical Conductivity | Total Suspended Solids | Turbidity | BOD | Dissolved Oxygen* |
|------------|----------------------------|--------------------------|-------------------------|---------------------|-----------------------|--------------------|-----------------------|----------|-------------------------------------|---------------------------------|-------------------------------|---------------------------|---------------|--------------|---------------|----|-------------------------|------------------------|-----------|-----|-------------------|
| 7619/EPL1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 7619/EPL2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 7619/EPL3 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 7619/EPL4 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 7619/EPL6 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| 7619/EPL7 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| 7619/EPL8 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| 7619/EPL9 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| 7619/EPL10 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

| Additional Info |
|---|
| Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt. Requests for longer term sample storage must be received in writing. |
| Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default. |
| TAT for Micro is dependent on incubation. This varies from 3 to 6 days. |



CERTIFICATE OF ANALYSIS 338559

Client Details

| | |
|------------------|---|
| Client | Martens & Associates Pty Ltd |
| Attention | Dean Shi |
| Address | Suite 201, 20 George St, Hornsby, NSW, 2077 |

Sample Details

| | |
|---|---|
| Your Reference | <u>P2007619 Clarence Sand Quarry</u> |
| Number of Samples | 9 Water |
| Date samples received | 23/11/2023 |
| Date completed instructions received | 23/11/2023 |

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details

| | |
|---|------------|
| Date results requested by | 30/11/2023 |
| Date of Issue | 30/11/2023 |
| NATA Accreditation Number 2901. This document shall not be reproduced except in full. | |
| Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with * | |

Results Approved By

Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Priya Samarawickrama, Senior Chemist
Tim Toll, Chemist (FAS)

Authorised By

Nancy Zhang, Laboratory Manager

Client Reference: P2007619 Clarence Sand Quarry

| vTRH in Water (C6-C9) NEPM | | | | | | |
|--------------------------------------|-------|------------|------------|------------|------------|------------|
| Our Reference | | 338559-1 | 338559-2 | 338559-3 | 338559-4 | 338559-5 |
| Your Reference | UNITS | 7619/EPL1 | 7619/EPL2 | 7619/EPL3 | 7619/EPL4 | 7619/EPL6 |
| Date Sampled | | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 |
| Type of sample | | Water | Water | Water | Water | Water |
| Date extracted | - | 28/11/2023 | 28/11/2023 | 28/11/2023 | 28/11/2023 | 28/11/2023 |
| Date analysed | - | 29/11/2023 | 29/11/2023 | 29/11/2023 | 29/11/2023 | 29/11/2023 |
| TRH C ₆ - C ₉ | µg/L | <10 | <10 | <10 | <10 | <10 |
| TRH C ₆ - C ₁₀ | µg/L | <10 | <10 | <10 | <10 | <10 |
| Surrogate Dibromofluoromethane | % | 105 | 105 | 106 | 105 | 105 |
| Surrogate Toluene-d8 | % | 99 | 99 | 99 | 99 | 99 |
| Surrogate 4-Bromofluorobenzene | % | 106 | 104 | 106 | 104 | 105 |

| vTRH in Water (C6-C9) NEPM | | | | | |
|--------------------------------------|-------|------------|------------|------------|------------|
| Our Reference | | 338559-6 | 338559-7 | 338559-8 | 338559-9 |
| Your Reference | UNITS | 7619/EPL7 | 7619/EPL8 | 7619/EPL9 | 7619/EPL10 |
| Date Sampled | | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 |
| Type of sample | | Water | Water | Water | Water |
| Date extracted | - | 28/11/2023 | 28/11/2023 | 28/11/2023 | 28/11/2023 |
| Date analysed | - | 29/11/2023 | 29/11/2023 | 29/11/2023 | 29/11/2023 |
| TRH C ₆ - C ₉ | µg/L | <10 | <10 | <10 | <10 |
| TRH C ₆ - C ₁₀ | µg/L | <10 | <10 | <10 | <10 |
| Surrogate Dibromofluoromethane | % | 104 | 104 | 105 | 105 |
| Surrogate Toluene-d8 | % | 99 | 99 | 99 | 99 |
| Surrogate 4-Bromofluorobenzene | % | 106 | 107 | 104 | 103 |

Client Reference: P2007619 Clarence Sand Quarry

| svTRH (C10-C40) in Water | | | | | | |
|--|-------|------------|------------|------------|------------|------------|
| Our Reference | | 338559-1 | 338559-2 | 338559-3 | 338559-4 | 338559-5 |
| Your Reference | UNITS | 7619/EPL1 | 7619/EPL2 | 7619/EPL3 | 7619/EPL4 | 7619/EPL6 |
| Date Sampled | | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 |
| Type of sample | | Water | Water | Water | Water | Water |
| Date extracted | - | 28/11/2023 | 28/11/2023 | 28/11/2023 | 28/11/2023 | 28/11/2023 |
| Date analysed | - | 28/11/2023 | 28/11/2023 | 28/11/2023 | 28/11/2023 | 28/11/2023 |
| TRH C ₁₀ - C ₁₄ | µg/L | <50 | <50 | <50 | <50 | <50 |
| TRH C ₁₅ - C ₂₈ | µg/L | <100 | <100 | <100 | <100 | <100 |
| TRH C ₂₉ - C ₃₆ | µg/L | <100 | <100 | <100 | <100 | <100 |
| Total +ve TRH (C10-C36) | µg/L | <50 | <50 | <50 | <50 | <50 |
| TRH >C ₁₀ - C ₁₆ | µg/L | <50 | <50 | <50 | <50 | <50 |
| TRH >C ₁₆ - C ₃₄ | µg/L | <100 | <100 | <100 | <100 | <100 |
| TRH >C ₃₄ - C ₄₀ | µg/L | <100 | <100 | <100 | <100 | <100 |
| Total +ve TRH (>C10-C40) | µg/L | <50 | <50 | <50 | <50 | <50 |
| Surrogate o-Terphenyl | % | 84 | 76 | 76 | 88 | 76 |

| svTRH (C10-C40) in Water | | | | | |
|--|-------|------------|------------|------------|------------|
| Our Reference | | 338559-6 | 338559-7 | 338559-8 | 338559-9 |
| Your Reference | UNITS | 7619/EPL7 | 7619/EPL8 | 7619/EPL9 | 7619/EPL10 |
| Date Sampled | | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 |
| Type of sample | | Water | Water | Water | Water |
| Date extracted | - | 28/11/2023 | 28/11/2023 | 28/11/2023 | 28/11/2023 |
| Date analysed | - | 28/11/2023 | 28/11/2023 | 28/11/2023 | 28/11/2023 |
| TRH C ₁₀ - C ₁₄ | µg/L | <50 | <50 | <50 | <50 |
| TRH C ₁₅ - C ₂₈ | µg/L | <100 | <100 | <100 | <100 |
| TRH C ₂₉ - C ₃₆ | µg/L | <100 | <100 | <100 | <100 |
| Total +ve TRH (C10-C36) | µg/L | <50 | <50 | <50 | <50 |
| TRH >C ₁₀ - C ₁₆ | µg/L | <50 | <50 | <50 | <50 |
| TRH >C ₁₆ - C ₃₄ | µg/L | <100 | <100 | <100 | <100 |
| TRH >C ₃₄ - C ₄₀ | µg/L | <100 | <100 | <100 | <100 |
| Total +ve TRH (>C10-C40) | µg/L | <50 | <50 | <50 | <50 |
| Surrogate o-Terphenyl | % | 83 | 79 | 64 | 84 |

Client Reference: P2007619 Clarence Sand Quarry

| HM in water - dissolved | | | | | | |
|--------------------------------|-------|------------|------------|------------|------------|------------|
| Our Reference | | 338559-1 | 338559-2 | 338559-3 | 338559-4 | 338559-5 |
| Your Reference | UNITS | 7619/EPL1 | 7619/EPL2 | 7619/EPL3 | 7619/EPL4 | 7619/EPL6 |
| Date Sampled | | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 |
| Type of sample | | Water | Water | Water | Water | Water |
| Date prepared | - | 27/11/2023 | 27/11/2023 | 27/11/2023 | 27/11/2023 | 27/11/2023 |
| Date analysed | - | 27/11/2023 | 27/11/2023 | 27/11/2023 | 27/11/2023 | 27/11/2023 |
| Arsenic-Dissolved | µg/L | <1 | <1 | <1 | <1 | <1 |
| Cadmium-Dissolved | µg/L | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium-Dissolved | µg/L | <1 | <1 | <1 | <1 | <1 |
| Copper-Dissolved | µg/L | 2 | 1 | 1 | 1 | 2 |
| Lead-Dissolved | µg/L | <1 | <1 | <1 | <1 | <1 |
| Mercury-Dissolved | µg/L | <0.05 | <0.05 | <0.05 | <0.05 | 0.2 |
| Nickel-Dissolved | µg/L | <1 | <1 | <1 | <1 | <1 |
| Zinc-Dissolved | µg/L | 13 | 3 | 11 | 15 | 6 |

| HM in water - dissolved | | | | | |
|--------------------------------|-------|------------|------------|------------|------------|
| Our Reference | | 338559-6 | 338559-7 | 338559-8 | 338559-9 |
| Your Reference | UNITS | 7619/EPL7 | 7619/EPL8 | 7619/EPL9 | 7619/EPL10 |
| Date Sampled | | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 |
| Type of sample | | Water | Water | Water | Water |
| Date prepared | - | 27/11/2023 | 27/11/2023 | 27/11/2023 | 27/11/2023 |
| Date analysed | - | 27/11/2023 | 27/11/2023 | 27/11/2023 | 27/11/2023 |
| Arsenic-Dissolved | µg/L | <1 | <1 | <1 | <1 |
| Cadmium-Dissolved | µg/L | <0.1 | <0.1 | <0.1 | <0.1 |
| Chromium-Dissolved | µg/L | <1 | <1 | <1 | <1 |
| Copper-Dissolved | µg/L | 6 | 9 | 4 | 1 |
| Lead-Dissolved | µg/L | <1 | <1 | <1 | <1 |
| Mercury-Dissolved | µg/L | <0.05 | <0.05 | <0.05 | <0.05 |
| Nickel-Dissolved | µg/L | 3 | <1 | <1 | <1 |
| Zinc-Dissolved | µg/L | 26 | 8 | 34 | 13 |

Client Reference: P2007619 Clarence Sand Quarry

| Ion Balance | | | | | | |
|--|------------------------|------------|------------|------------|------------|------------|
| Our Reference | | 338559-1 | 338559-2 | 338559-3 | 338559-4 | 338559-5 |
| Your Reference | UNITS | 7619/EPL1 | 7619/EPL2 | 7619/EPL3 | 7619/EPL4 | 7619/EPL6 |
| Date Sampled | | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 |
| Type of sample | | Water | Water | Water | Water | Water |
| Date prepared | - | 24/11/2023 | 24/11/2023 | 24/11/2023 | 24/11/2023 | 24/11/2023 |
| Date analysed | - | 24/11/2023 | 24/11/2023 | 24/11/2023 | 24/11/2023 | 24/11/2023 |
| Calcium - Dissolved | mg/L | 0.7 | <0.5 | <0.5 | <0.5 | <0.5 |
| Potassium - Dissolved | mg/L | 2 | <0.5 | 1 | 2 | <0.5 |
| Sodium - Dissolved | mg/L | 6.2 | 4 | 4 | 4 | 3 |
| Magnesium - Dissolved | mg/L | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 |
| Hardness | mgCaCO ₃ /L | <3 | <3 | <3 | <3 | 3.4 |
| Hydroxide Alkalinity (OH ⁻) as CaCO ₃ | mg/L | <5 | <5 | <5 | <5 | <5 |
| Bicarbonate Alkalinity as CaCO ₃ | mg/L | 7 | 6 | <5 | <5 | <5 |
| Carbonate Alkalinity as CaCO ₃ | mg/L | <5 | <5 | <5 | <5 | <5 |
| Total Alkalinity as CaCO ₃ | mg/L | 7 | 6 | <5 | <5 | <5 |
| Sulphate, SO ₄ | mg/L | 1 | <1 | <1 | <1 | <1 |
| Chloride, Cl | mg/L | 8 | 5 | 7 | 9 | 4 |
| Ionic Balance | % | -7.0 | -14 | 4.0 | -2.0 | 19 |

| Ion Balance | | | | | |
|--|------------------------|------------|------------|------------|------------|
| Our Reference | | 338559-6 | 338559-7 | 338559-8 | 338559-9 |
| Your Reference | UNITS | 7619/EPL7 | 7619/EPL8 | 7619/EPL9 | 7619/EPL10 |
| Date Sampled | | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 |
| Type of sample | | Water | Water | Water | Water |
| Date prepared | - | 24/11/2023 | 24/11/2023 | 24/11/2023 | 24/11/2023 |
| Date analysed | - | 24/11/2023 | 24/11/2023 | 24/11/2023 | 24/11/2023 |
| Calcium - Dissolved | mg/L | <0.5 | <0.5 | 2 | <0.5 |
| Potassium - Dissolved | mg/L | <0.5 | <0.5 | <0.5 | <0.5 |
| Sodium - Dissolved | mg/L | 3 | 5 | 5.4 | 3 |
| Magnesium - Dissolved | mg/L | <0.5 | <0.5 | <0.5 | 0.7 |
| Hardness | mgCaCO ₃ /L | <3 | <3 | 5.7 | 3.1 |
| Hydroxide Alkalinity (OH ⁻) as CaCO ₃ | mg/L | <5 | <5 | <5 | <5 |
| Bicarbonate Alkalinity as CaCO ₃ | mg/L | <5 | 5 | 12 | <5 |
| Carbonate Alkalinity as CaCO ₃ | mg/L | <5 | <5 | <5 | <5 |
| Total Alkalinity as CaCO ₃ | mg/L | <5 | 5 | 12 | <5 |
| Sulphate, SO ₄ | mg/L | <1 | <1 | <1 | <1 |
| Chloride, Cl | mg/L | 4 | 6 | 7 | 5 |
| Ionic Balance | % | 5.0 | -14 | -10 | 18 |

Client Reference: P2007619 Clarence Sand Quarry

| Miscellaneous Inorganics | | | | | | |
|--------------------------|----------|------------|------------|------------|------------|------------|
| Our Reference | | 338559-1 | 338559-2 | 338559-3 | 338559-4 | 338559-5 |
| Your Reference | UNITS | 7619/EPL1 | 7619/EPL2 | 7619/EPL3 | 7619/EPL4 | 7619/EPL6 |
| Date Sampled | | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 |
| Type of sample | | Water | Water | Water | Water | Water |
| Date prepared | - | 23/11/2023 | 23/11/2023 | 23/11/2023 | 23/11/2023 | 23/11/2023 |
| Date analysed | - | 23/11/2023 | 23/11/2023 | 23/11/2023 | 23/11/2023 | 23/11/2023 |
| pH | pH Units | 6.5 | 6.1 | 5.6 | 5.0 | 4.8 |
| Electrical Conductivity | µS/cm | 40 | 23 | 34 | 39 | 37 |
| Total Suspended Solids | mg/L | 25 | 60 | 11 | 6 | [NA] |
| Turbidity | NTU | 20 | 52 | 7.2 | 3.1 | [NA] |
| BOD | mg/L | <5 | 6 | 6 | 5 | <5 |
| Dissolved Oxygen* | mg/L | 8.6 | 8.4 | 8.4 | 8.1 | [NA] |

| Miscellaneous Inorganics | | | | | |
|--------------------------|----------|------------|------------|------------|------------|
| Our Reference | | 338559-6 | 338559-7 | 338559-8 | 338559-9 |
| Your Reference | UNITS | 7619/EPL7 | 7619/EPL8 | 7619/EPL9 | 7619/EPL10 |
| Date Sampled | | 22/11/2023 | 22/11/2023 | 22/11/2023 | 22/11/2023 |
| Type of sample | | Water | Water | Water | Water |
| Date prepared | - | 23/11/2023 | 23/11/2023 | 23/11/2023 | 23/11/2023 |
| Date analysed | - | 23/11/2023 | 23/11/2023 | 23/11/2023 | 23/11/2023 |
| pH | pH Units | 5.0 | 5.2 | 6.0 | 4.8 |
| Electrical Conductivity | µS/cm | 23 | 28 | 42 | 35 |
| BOD | mg/L | <5 | 8 | 8 | 8 |

Client Reference: P2007619 Clarence Sand Quarry

| Method ID | Methodology Summary |
|-------------------|---|
| Inorg-001 | pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times. |
| Inorg-002 | Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons. |
| Inorg-006 | Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B. |
| Inorg-019 | Suspended Solids - determined gravimetrically by filtration of the sample. The samples are dried at 104+/-5°C. |
| Inorg-022 | Turbidity - measured nephelometrically using a turbidimeter, in accordance with APHA latest edition, 2130-B. |
| Inorg-040 | The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% ie total anions = total cations +/-15%. |
| Inorg-081 | Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser. |
| Inorg-091 | BOD - Analysed in accordance with APHA latest edition 5210 D and in house INORG-091. |
| Inorg-112 | Dissolved Oxygen using membrane electrode. Note this analysis should ideally be carried out immediately after sampling. |
| Metals-020 | Determination of various metals by ICP-AES. |
| Metals-021 | Determination of Mercury by Cold Vapour AAS. |
| Metals-022 | Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Salt forms (e.g. FeO, PbO, ZnO) are determined stoichiometrically from the base metal concentration. |
| Org-020 | Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. |
| Org-023 | Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. |

Client Reference: P2007619 Clarence Sand Quarry

| QUALITY CONTROL: vTRH in Water (C6-C9) NEPM | | | | | | Duplicate | | Spike Recovery % | | |
|---|-------|-----|---------|------------|---|------------|------------|------------------|------------|------|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-W1 | [NT] |
| Date extracted | - | | | 28/11/2023 | 1 | 28/11/2023 | 28/11/2023 | | 28/11/2023 | [NT] |
| Date analysed | - | | | 29/11/2023 | 1 | 29/11/2023 | 30/11/2023 | | 29/11/2023 | [NT] |
| TRH C ₆ - C ₉ | µg/L | 10 | Org-023 | <10 | 1 | <10 | <10 | 0 | 107 | [NT] |
| TRH C ₆ - C ₁₀ | µg/L | 10 | Org-023 | <10 | 1 | <10 | <10 | 0 | 107 | [NT] |
| <i>Surrogate</i> Dibromofluoromethane | % | | Org-023 | 104 | 1 | 105 | 102 | 3 | 101 | [NT] |
| <i>Surrogate</i> Toluene-d8 | % | | Org-023 | 99 | 1 | 99 | 94 | 5 | 101 | [NT] |
| <i>Surrogate</i> 4-Bromofluorobenzene | % | | Org-023 | 104 | 1 | 106 | 95 | 11 | 100 | [NT] |

Client Reference: P2007619 Clarence Sand Quarry

| QUALITY CONTROL: svTRH (C10-C40) in Water | | | | | Duplicate | | | Spike Recovery % | | |
|---|-------|-----|---------|------------|-----------|------|------|------------------|------------|------|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-W1 | [NT] |
| Date extracted | - | | | 28/11/2023 | [NT] | [NT] | [NT] | [NT] | 28/11/2023 | [NT] |
| Date analysed | - | | | 28/11/2023 | [NT] | [NT] | [NT] | [NT] | 28/11/2023 | [NT] |
| TRH C ₁₀ - C ₁₄ | µg/L | 50 | Org-020 | <50 | [NT] | [NT] | [NT] | [NT] | 88 | [NT] |
| TRH C ₁₅ - C ₂₈ | µg/L | 100 | Org-020 | <100 | [NT] | [NT] | [NT] | [NT] | 91 | [NT] |
| TRH C ₂₉ - C ₃₆ | µg/L | 100 | Org-020 | <100 | [NT] | [NT] | [NT] | [NT] | 100 | [NT] |
| TRH >C ₁₀ - C ₁₆ | µg/L | 50 | Org-020 | <50 | [NT] | [NT] | [NT] | [NT] | 88 | [NT] |
| TRH >C ₁₆ - C ₃₄ | µg/L | 100 | Org-020 | <100 | [NT] | [NT] | [NT] | [NT] | 91 | [NT] |
| TRH >C ₃₄ - C ₄₀ | µg/L | 100 | Org-020 | <100 | [NT] | [NT] | [NT] | [NT] | 100 | [NT] |
| Surrogate o-Terphenyl | % | | Org-020 | 89 | [NT] | [NT] | [NT] | [NT] | 81 | [NT] |

Client Reference: P2007619 Clarence Sand Quarry

| QUALITY CONTROL: HM in water - dissolved | | | | Duplicate | | | | Spike Recovery % | | |
|--|-------|------|------------|------------|---|------------|------------|------------------|------------|------------|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-W5 | 338559-2 |
| Date prepared | - | | | 27/11/2023 | 1 | 27/11/2023 | 27/11/2023 | | 27/11/2023 | 27/11/2023 |
| Date analysed | - | | | 27/11/2023 | 1 | 27/11/2023 | 27/11/2023 | | 27/11/2023 | 27/11/2023 |
| Arsenic-Dissolved | µg/L | 1 | Metals-022 | <1 | 1 | <1 | <1 | 0 | 91 | 95 |
| Cadmium-Dissolved | µg/L | 0.1 | Metals-022 | <0.1 | 1 | <0.1 | <0.1 | 0 | 95 | 96 |
| Chromium-Dissolved | µg/L | 1 | Metals-022 | <1 | 1 | <1 | <1 | 0 | 96 | 93 |
| Copper-Dissolved | µg/L | 1 | Metals-022 | <1 | 1 | 2 | 1 | 67 | 96 | 95 |
| Lead-Dissolved | µg/L | 1 | Metals-022 | <1 | 1 | <1 | <1 | 0 | 97 | 88 |
| Mercury-Dissolved | µg/L | 0.05 | Metals-021 | <0.05 | 1 | <0.05 | <0.05 | 0 | 110 | [NT] |
| Nickel-Dissolved | µg/L | 1 | Metals-022 | <1 | 1 | <1 | <1 | 0 | 98 | 96 |
| Zinc-Dissolved | µg/L | 1 | Metals-022 | <1 | 1 | 13 | 14 | 7 | 105 | 101 |

| QUALITY CONTROL: HM in water - dissolved | | | | Duplicate | | | | Spike Recovery % | | |
|--|-------|------|------------|-----------|---|------------|------------|------------------|------|------|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 5 | 27/11/2023 | 27/11/2023 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 5 | 27/11/2023 | 27/11/2023 | | [NT] | [NT] |
| Arsenic-Dissolved | µg/L | 1 | Metals-022 | [NT] | 5 | <1 | [NT] | | [NT] | [NT] |
| Cadmium-Dissolved | µg/L | 0.1 | Metals-022 | [NT] | 5 | <0.1 | [NT] | | [NT] | [NT] |
| Chromium-Dissolved | µg/L | 1 | Metals-022 | [NT] | 5 | <1 | [NT] | | [NT] | [NT] |
| Copper-Dissolved | µg/L | 1 | Metals-022 | [NT] | 5 | 2 | [NT] | | [NT] | [NT] |
| Lead-Dissolved | µg/L | 1 | Metals-022 | [NT] | 5 | <1 | [NT] | | [NT] | [NT] |
| Mercury-Dissolved | µg/L | 0.05 | Metals-021 | [NT] | 5 | 0.2 | 0.3 | 40 | [NT] | [NT] |
| Nickel-Dissolved | µg/L | 1 | Metals-022 | [NT] | 5 | <1 | [NT] | | [NT] | [NT] |
| Zinc-Dissolved | µg/L | 1 | Metals-022 | [NT] | 5 | 6 | [NT] | | [NT] | [NT] |

Client Reference: P2007619 Clarence Sand Quarry

| QUALITY CONTROL: Ion Balance | | | | Duplicate | | | | Spike Recovery % | | |
|--|------------------------|-----|------------|------------|---|------------|------------|------------------|------------|------|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-W1 | [NT] |
| Date prepared | - | | | 24/11/2023 | 1 | 24/11/2023 | 24/11/2023 | | 24/11/2023 | [NT] |
| Date analysed | - | | | 24/11/2023 | 1 | 24/11/2023 | 24/11/2023 | | 24/11/2023 | [NT] |
| Calcium - Dissolved | mg/L | 0.5 | Metals-020 | <0.5 | 1 | 0.7 | 0.7 | 0 | 85 | [NT] |
| Potassium - Dissolved | mg/L | 0.5 | Metals-020 | <0.5 | 1 | 2 | 2 | 0 | 84 | [NT] |
| Sodium - Dissolved | mg/L | 0.5 | Metals-020 | <0.5 | 1 | 6.2 | 5.6 | 10 | 99 | [NT] |
| Magnesium - Dissolved | mg/L | 0.5 | Metals-020 | <0.5 | 1 | <0.5 | <0.5 | 0 | 85 | [NT] |
| Hardness | mgCaCO ₃ /L | 3 | Metals-020 | [NT] | 1 | <3 | <3 | 0 | [NT] | [NT] |
| Hydroxide Alkalinity (OH ⁻) as CaCO ₃ | mg/L | 5 | Inorg-006 | <5 | 1 | <5 | [NT] | | [NT] | [NT] |
| Bicarbonate Alkalinity as CaCO ₃ | mg/L | 5 | Inorg-006 | <5 | 1 | 7 | [NT] | | [NT] | [NT] |
| Carbonate Alkalinity as CaCO ₃ | mg/L | 5 | Inorg-006 | <5 | 1 | <5 | [NT] | | [NT] | [NT] |
| Total Alkalinity as CaCO ₃ | mg/L | 5 | Inorg-006 | <5 | 1 | 7 | [NT] | | 107 | [NT] |
| Sulphate, SO ₄ | mg/L | 1 | Inorg-081 | <1 | 1 | 1 | [NT] | | 118 | [NT] |
| Chloride, Cl | mg/L | 1 | Inorg-081 | <1 | 1 | 8 | [NT] | | 106 | [NT] |
| Ionic Balance | % | | Inorg-040 | [NT] | 1 | -7.0 | [NT] | | [NT] | [NT] |

| QUALITY CONTROL: Ion Balance | | | | Duplicate | | | | Spike Recovery % | | |
|--|------------------------|-----|------------|-----------|---|------------|------------|------------------|------|------|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 2 | 24/11/2023 | 24/11/2023 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 2 | 24/11/2023 | 24/11/2023 | | [NT] | [NT] |
| Calcium - Dissolved | mg/L | 0.5 | Metals-020 | [NT] | 2 | <0.5 | [NT] | | [NT] | [NT] |
| Potassium - Dissolved | mg/L | 0.5 | Metals-020 | [NT] | 2 | <0.5 | [NT] | | [NT] | [NT] |
| Sodium - Dissolved | mg/L | 0.5 | Metals-020 | [NT] | 2 | 4 | [NT] | | [NT] | [NT] |
| Magnesium - Dissolved | mg/L | 0.5 | Metals-020 | [NT] | 2 | <0.5 | [NT] | | [NT] | [NT] |
| Hardness | mgCaCO ₃ /L | 3 | Metals-020 | [NT] | 2 | <3 | [NT] | | [NT] | [NT] |
| Hydroxide Alkalinity (OH ⁻) as CaCO ₃ | mg/L | 5 | Inorg-006 | [NT] | 2 | <5 | <5 | 0 | [NT] | [NT] |
| Bicarbonate Alkalinity as CaCO ₃ | mg/L | 5 | Inorg-006 | [NT] | 2 | 6 | 5 | 18 | [NT] | [NT] |
| Carbonate Alkalinity as CaCO ₃ | mg/L | 5 | Inorg-006 | [NT] | 2 | <5 | <5 | 0 | [NT] | [NT] |
| Total Alkalinity as CaCO ₃ | mg/L | 5 | Inorg-006 | [NT] | 2 | 6 | 5 | 18 | [NT] | [NT] |
| Sulphate, SO ₄ | mg/L | 1 | Inorg-081 | [NT] | 2 | <1 | [NT] | | [NT] | [NT] |
| Chloride, Cl | mg/L | 1 | Inorg-081 | [NT] | 2 | 5 | [NT] | | [NT] | [NT] |
| Ionic Balance | % | | Inorg-040 | [NT] | 2 | -14 | [NT] | | [NT] | [NT] |

Client Reference: P2007619 Clarence Sand Quarry

| QUALITY CONTROL: Ion Balance | | | | Duplicate | | | | Spike Recovery % | | |
|--|------------------------|-----|------------|-----------|---|------------|------------|------------------|------|------|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 4 | 24/11/2023 | 24/11/2023 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 4 | 24/11/2023 | 24/11/2023 | | [NT] | [NT] |
| Calcium - Dissolved | mg/L | 0.5 | Metals-020 | [NT] | 4 | <0.5 | [NT] | | [NT] | [NT] |
| Potassium - Dissolved | mg/L | 0.5 | Metals-020 | [NT] | 4 | 2 | [NT] | | [NT] | [NT] |
| Sodium - Dissolved | mg/L | 0.5 | Metals-020 | [NT] | 4 | 4 | [NT] | | [NT] | [NT] |
| Magnesium - Dissolved | mg/L | 0.5 | Metals-020 | [NT] | 4 | <0.5 | [NT] | | [NT] | [NT] |
| Hardness | mgCaCO ₃ /L | 3 | Metals-020 | [NT] | 4 | <3 | [NT] | | [NT] | [NT] |
| Hydroxide Alkalinity (OH ⁻) as CaCO ₃ | mg/L | 5 | Inorg-006 | [NT] | 4 | <5 | [NT] | | [NT] | [NT] |
| Bicarbonate Alkalinity as CaCO ₃ | mg/L | 5 | Inorg-006 | [NT] | 4 | <5 | [NT] | | [NT] | [NT] |
| Carbonate Alkalinity as CaCO ₃ | mg/L | 5 | Inorg-006 | [NT] | 4 | <5 | [NT] | | [NT] | [NT] |
| Total Alkalinity as CaCO ₃ | mg/L | 5 | Inorg-006 | [NT] | 4 | <5 | [NT] | | [NT] | [NT] |
| Sulphate, SO ₄ | mg/L | 1 | Inorg-081 | [NT] | 4 | <1 | 1 | 0 | [NT] | [NT] |
| Chloride, Cl | mg/L | 1 | Inorg-081 | [NT] | 4 | 9 | 8 | 12 | [NT] | [NT] |
| Ionic Balance | % | | Inorg-040 | [NT] | 4 | -2.0 | [NT] | | [NT] | [NT] |

Client Reference: P2007619 Clarence Sand Quarry

| QUALITY CONTROL: Miscellaneous Inorganics | | | | Duplicate | | | | Spike Recovery % | | |
|---|----------|-----|-----------|------------|---|------------|------------|------------------|------------|------|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | LCS-W1 | [NT] |
| Date prepared | - | | | 23/11/2023 | 1 | 23/11/2023 | 23/11/2023 | | 23/11/2023 | [NT] |
| Date analysed | - | | | 23/11/2023 | 1 | 23/11/2023 | 23/11/2023 | | 23/11/2023 | [NT] |
| pH | pH Units | | Inorg-001 | [NT] | 1 | 6.5 | [NT] | | 101 | [NT] |
| Electrical Conductivity | µS/cm | 1 | Inorg-002 | <1 | 1 | 40 | [NT] | | 101 | [NT] |
| Total Suspended Solids | mg/L | 5 | Inorg-019 | <5 | 1 | 25 | [NT] | | 93 | [NT] |
| Turbidity | NTU | 0.1 | Inorg-022 | <0.1 | 1 | 20 | [NT] | | 101 | [NT] |
| BOD | mg/L | 5 | Inorg-091 | <5 | 1 | <5 | [NT] | | 84 | [NT] |
| Dissolved Oxygen* | mg/L | 0.1 | Inorg-112 | <0.1 | 1 | 8.6 | 8.6 | 0 | [NT] | [NT] |

| QUALITY CONTROL: Miscellaneous Inorganics | | | | Duplicate | | | | Spike Recovery % | | |
|---|----------|-----|-----------|-----------|---|------------|------------|------------------|------|------|
| Test Description | Units | PQL | Method | Blank | # | Base | Dup. | RPD | [NT] | [NT] |
| Date prepared | - | | | [NT] | 2 | 23/11/2023 | 23/11/2023 | | [NT] | [NT] |
| Date analysed | - | | | [NT] | 2 | 23/11/2023 | 23/11/2023 | | [NT] | [NT] |
| pH | pH Units | | Inorg-001 | [NT] | 2 | 6.1 | 6.0 | 2 | [NT] | [NT] |
| Electrical Conductivity | µS/cm | 1 | Inorg-002 | [NT] | 2 | 23 | 23 | 0 | [NT] | [NT] |
| Total Suspended Solids | mg/L | 5 | Inorg-019 | [NT] | 2 | 60 | [NT] | | [NT] | [NT] |
| Turbidity | NTU | 0.1 | Inorg-022 | [NT] | 2 | 52 | [NT] | | [NT] | [NT] |
| BOD | mg/L | 5 | Inorg-091 | [NT] | 2 | 6 | [NT] | | [NT] | [NT] |
| Dissolved Oxygen* | mg/L | 0.1 | Inorg-112 | [NT] | 2 | 8.4 | [NT] | | [NT] | [NT] |

Result Definitions

| | |
|-------------|---|
| NT | Not tested |
| NA | Test not required |
| INS | Insufficient sample for this test |
| PQL | Practical Quantitation Limit |
| < | Less than |
| > | Greater than |
| RPD | Relative Percent Difference |
| LCS | Laboratory Control Sample |
| NS | Not specified |
| NEPM | National Environmental Protection Measure |
| NR | Not Reported |

Quality Control Definitions

| | |
|--|--|
| Blank | This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. |
| Duplicate | This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable. |
| Matrix Spike | A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. |
| LCS (Laboratory Control Sample) | This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample. |
| Surrogate Spike | Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples. |
| Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011. | |
| The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016. | |
| Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2 | |

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

DO
Samples were out of the recommended holding time for this analysis.

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab.
Note: there is a possibility some elements may be underestimated.

The mass imbalance may be caused by other ions that have not been measured.