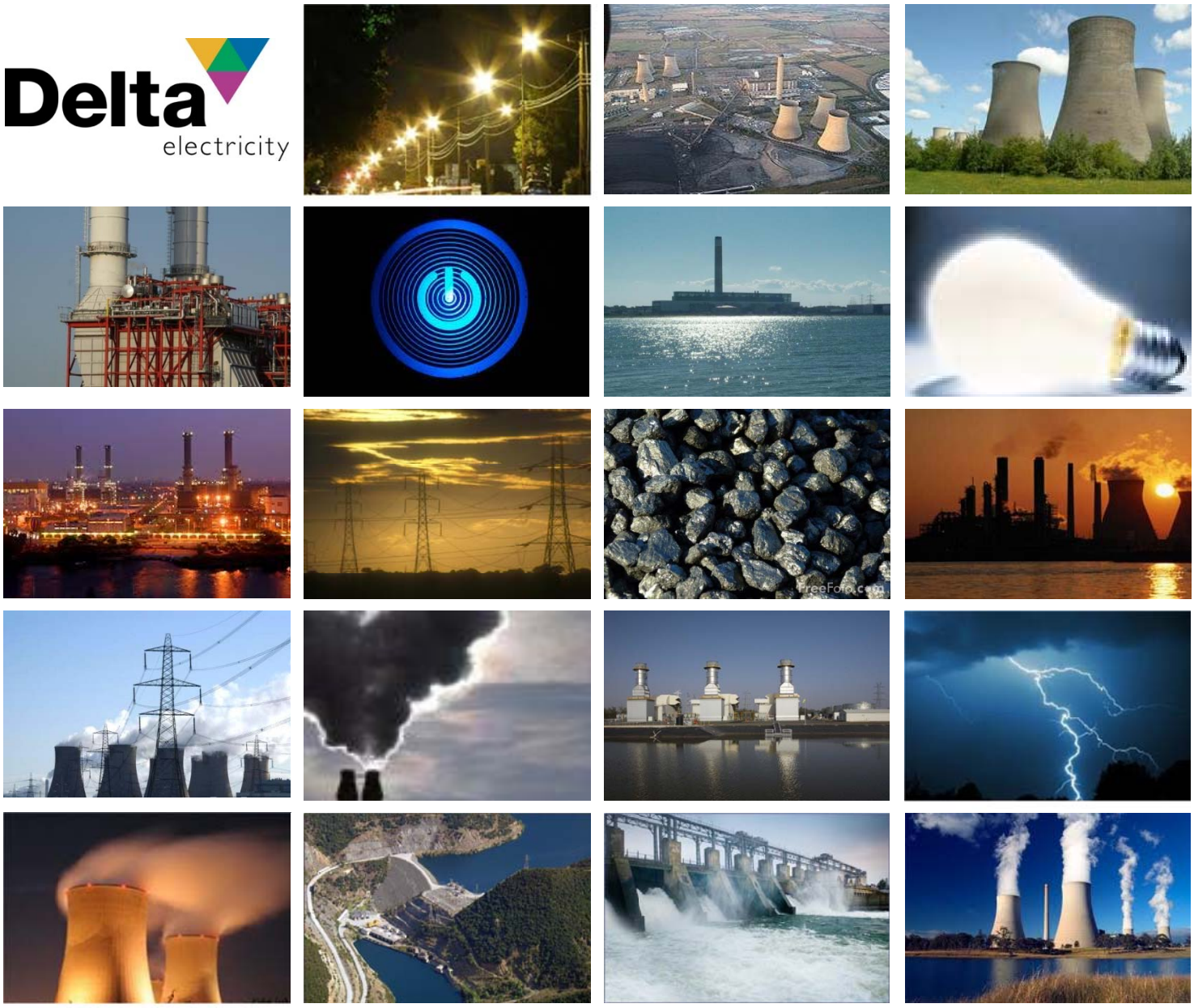

COMMERCIAL IN CONFIDENCE

Delta Electricity

Project Symphony – Vales Point Power Station

Updated Groundwater Quality Assessment

Final

Ref: 0300379

5 June 2015

The world's leading sustainability consultancy

Project Symphony –
Vales Point Power Station

Updated Groundwater Quality Assessment

Delta Electricity - Project Symphony

5 June 2015

Final

0300379

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Approved by:	John Ewing
Position:	*Project Manager*
Signed:	
Date:	5 June 2015
Approved by:	Peter Lavelle
Position:	*Partner*
Signed:	
Date:	5 June 2015

Environmental Resources Management Australia Pty Ltd Quality System

CONTENTS

1 INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by Delta Electricity (Delta) to undertake a review of the currency and validity of Environmental Due Diligence reports previously prepared by ERM in relation to the Vales Point Power Station (the Site). ERM understands that these additional works are required to be undertaken to support the potential sale of the Site.

The following reports were previously prepared by ERM in 2014 in relation to the Site and have been considered as part of this review:

- ERM, (5 February 2014), *Vales Point, Preliminary Environmental Site Assessment*
- ERM, (July 2014), *Vales Point Stage 2 Environmental Site Assessment*
- ERM, (September 2014), *A Station Environmental Site Assessment - Vales Pt*

Delta required ERM to undertake a review and confirm any changes to the findings of these reports given the passage of time between the date of the reports and now. In addition, an updated assessment of current groundwater conditions at the Site is required in order to provide an updated baseline assessment of groundwater conditions as at or near the time of the potential transaction.

2 SCOPE OF WORKS

In order to complete an assessment of the validity of the existing reports ERM completed the following scope of works:

Site Visit

ERM completed a one day site visit on Tuesday 12 May 2015 and met with key site personnel to gain an understanding of changes to the environmental conditions, regulatory requirements and / or management regime at the Site. This was undertaken in order to identify any material changes which may have occurred since completion of the previous reports.

Review of Additional Reports

ERM understood that additional reports had been prepared in relation to various contamination issues at the Site (refer to *Section 3.2*). Allowance was therefore made to undertake a review of these reports and summarise the key findings.

Preparation of Assessment of Validity

Upon completion of the above tasks, ERM prepared this report summarising the findings in the context of the previous ERM assessments and concluding with a statement as to the validity of the previous reports. This report also includes a summary of identified changes to the groundwater conditions (see *Section 4)*.

3 RESULTS OF THE REVIEW

3.1 SUMMARY OF SITE VISIT

On 12 May 2015 ERM staff visited the Site and met with Randall Jitts (Acting Manager – Sustainability) and Kerrie Davis (Senior Environment Officer). The objectives of the assessment were discussed and a range of information from the period February 2014 to May 2015 was requested from Delta including:

- a copy of the most recent Annual Return for the site Environment Protection Licence (EPL) (No. 761);
- copies of any correspondence with the NSW EPA;
- copies of any environmental management plans;
- copies of any internal environmental reports or incident reporting; and
- copies of any recently completed environmental assessment or monitoring reports.

The Delta personnel involved were highly cooperative and forthcoming with all information requested. Much of the information requested was provided on the same day and the remainder was forwarded via email over coming days.

3.2 REVIEW OF INFORMATION PROVIDED

The information obtained indicated the following with regard to the period between preparation of the ERM PESA (5 Feb 2014) and May 2015:

3.2.1 *Incidents, Regulatory Compliance and Correspondence*

There were no reported significant environmental incidents (i.e. those likely to result in a potentially material issue) .The incident register provided to ERM for review is included as *Annex F*.

No breaches of the Site EPL were reported in the most recent annual return (to end June 14). Similarly, no non-conformances were noted within the monthly internal compliance summaries which have been prepared since then (note that monthly reporting summaries reviewed included the period July 2014 to end March 2015).

Correspondence with NSW EPA centred around the resolution of potential Duty to Report issues under *Section 60* of the *CLM Act 1997* following these being raised in ERM (July 2014). The outcome of this correspondence was that NSW EPA indicated via email correspondence that it has accepted Delta's decision not to formally notify the Site under *Section 60* of the *CLM Act 1997*. Copies of the correspondence reviewed are included in *Annex G.*

3.2.2 Additional Environmental Reports Reviewed

DLA Environmental 2014 and 2015

Two groundwater monitoring reports prepared by DLA Environmental (DLA) 'Groundwater Monitoring Report DLH1099_H00297' dated December 2014 'Groundwater Monitoring Report DLH1099_H00366' dated February 2015 were provided to ERM for review. Sampling locations monitored by DLA included 10 monitoring wells installed in the vicinity of the site's Underground Petroleum Storage Systems (UPSS) (referred to by ERM as VH_X_MW01 – VH_X_MW10) and one ERM installed monitoring well associated with the decommissioned asbestos landfill in the ash dam area (VP_MW01).

DLA's investigations were focused on potential hydrocarbon impacts associated with the UPSS and concluded that two monitoring wells (VH_X_MW08 and VH_X_MW06) reported measured concentrations of Total Recoverable Hydrocarbons (TRH) and/or BTEX compounds (benzene, toluene, ethylbenzene and xylenes) exceeding DLA's adopted screening criteria in both 2014 and 2015. DLA also reported that the sample collected from VP_MW01 (adjacent to the asbestos landfill) reported a concentration of benzene greater than the adopted drinking water guidelines in 2014 but the same location reported a concentration below the laboratory limit of detection during the 2015 monitoring round. DLA considered that benzene was therefore no longer an issue at this location.

ERM notes that there is no evidence of DLA having analysed trip blank or trip spike samples to assess potential for cross contamination and loss of volatiles (respectively). It is further noted that DLA collected groundwater samples using manual bailing (which may result in excessive loss of volatile analytes due to agitation of the water column). ERM would therefore, on the basis of these omissions of standard quality control measures, question DLA's conclusion that benzene is no longer a contaminant of potential concern (COPC) for VP_MW01. Taking these points into consideration ERM proposed to further assess groundwater in these areas for the relevant CoPCs during the updated groundwater quality assessment in May 2015 (described below).

Worley Parsons (2015)

ERM also reviewed the provided a copy of Worley Parsons (22 May 2015) *Independent Engineer's Report Vales Point Power Station Addendum*. No notable environmental issues were raised which would impact the conclusions of ERM's previous reports. A significant increase in atmospheric fluoride emissions was noted by Worley Parsons in the review although these emissions are not considered to significantly impact upon the outcomes of any of the reports previously prepared by ERM.

Worley Parsons (2015)

ERM was provided with a copy of Umwelt (February 2015) *Vales Point Power Station Ash Dam Groundwater Stage 2 Investigation Report* for review. This report collated and reviewed groundwater monitoring data from key wells located in the vicinity of the Vales Point Ash Dam in order to meet the requirements of Condition U1 of the Vales Point Power Station Environment Protection Licence (EPL No. 761). Umwelt concluded from their review that available data suggested that there was no notable evidence of the Ash Dam water "*unacceptably leaching trace elements to groundwater*". Umwelt did however note that 12 months of data were not available for all the bores and therefore recommended "*that in order to complete an analysis of at least a full 12 months of data for all groundwater baseline bores, the monthly groundwater monitoring program be extended to August 2015, and a supplementary report analysing the full data set be prepared to confirm the conclusions above.*" It is noted that the data collated by Umwelt generally report total rather than dissolved metals concentrations and utilised alternate sampling methods and thus is not directly comparable with data gathered as part of ERM's assessment.

Douglas Partners (in preparation)

It is noted that Douglas Partners has recently been engaged by Delta Electricity to review all groundwater monitoring reports conducted on the 10 UPSS wells sampled by DLA (as described above) and VP_MW01. Their field works were scheduled for completion during May 2015 and the groundwater monitoring report is still in preparation. Douglas Partners proposed to analyse for TRH, BTEX, PAHs and lead at all locations. Along with the monitoring works described, Douglas Partners has proposed to provide "*recommendations to Delta Electricity regarding the duty to report contamination under UPSS Regulation and Contaminated Land Management Act and recommendations for additional work, if required (e.g. remediation etc).*"

4 ADDITIONAL GROUNDWATER MONITORING RESULTS

4.1 SAMPLING LOCATIONS AND METHODOLOGY

Based on data obtained during the previous Stage 2 ESA (ERM, July 2014) the proposed sampling works were targeted at monitoring wells that fulfil one or more of the following criteria:

- Concentrations of Contaminants of Potential Concern (CoPC) were detected at concentrations that exceeded the adopted screening levels;
- Concentrations of CoPCs were greater than the maximum background concentrations by a factor of two or more;
- Monitoring wells that provide spatial coverage of the Site, including locations adjacent to site boundaries and sensitive receptors.

The scope of works included 39 monitoring wells located in 14 out of the 21 previously identified Areas of Environmental Concern (AECs) with the addition of one existing background/boundary monitoring wells (VPMG/D10). An additional background monitoring well (VPMG/D8) was scoped to be sampled however it was inaccessible at the time of the fieldwork. Site locality and site boundaries are detailed in *Figures 1 and 2* in *Annex A*. Locations of the groundwater monitoring wells in their respective AECs are presented in *Figures 5 to 6.6* in *Annex A*. A tabular summary of the additional sampling and analysis to be undertaken is presented in *Table 1* of *Annex B*.

Groundwater purging and sampling protocol was undertaken in accordance with the Data Quality Objectives and procedures as set out in *Section 4.4.2* of "*Project Symphony – Vales Point Power Station Stage 2 Environmental Site Assessment*" (ERM, July 2014). The only exception to well specific methodology was the use of a micro-purge pump in select monitoring wells where a peristaltic pump was employed in the past. The standing water level in these wells was slightly deeper than elsewhere and micro-purge was considered a more efficient low flow pump when the depth to water was greater than 8.0 m. The sampling method employed at each location is listed in *Table 3* of *Annex B*.

4.2 RESULTS AND DISCUSSION

4.2.1 Overview

Groundwater gauging and sampling was completed between 18h – 20 May 2015. Groundwater gauging data is presented in *Table 2* of *Annex B*. Field documentation for groundwater sampling, including equipment calibration sheets are presented in *Annex C*. Groundwater field parameters recorded during purging of the wells prior to sampling are presented in *Table 3* of *Annex B*.

Given the limited number of wells gauged during the 2015 monitoring event, it was considered that there was insufficient data to produce a representative groundwater contour figure. It is also noted that high rainfall in recent months is likely to have caused some variation in the groundwater regime.

Groundwater analytical results are presented in *Tables 4a to 4e* of *Annex B* and are compared to the relevant screening values as adopted during the Stage 2 ESA (ERM, July 2014). The rationale regarding selection of screening criteria is described in detail in *Section 4.10* of the Stage 2 ESA (ERM, July 2014).

Measured concentrations of the majority of the CoPCs were generally consistent with the previous results from the Stage 2 ESA (ERM, July 2014). The exceptions to these are discussed below.

4.2.2 PFOS and PFOA

Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) (chemical's associated with firefighting foams) were detected in groundwater around the boundary of the former A Station Demolition Area in the Stage 2 ESA (ERM, July 2014). Four wells in which PFOS/PFOA was detected in 2014 were sampled in the May 2015 sampling event. Analytical results of these samples are displayed in *Table 4c* of *Annex B*. Measured concentrations of PFOS and PFOA were detected in all 4 groundwater samples collected. The concentrations of PFOA were below the adopted screening value for all four samples during both monitoring events. The concentrations of PFOS in groundwater at VB_MW01 and VB_MW02 exceeded the adopted human health screening value while the concentrations at VI_MW01 and VL_MW02 remained largely consistent and below the adopted human health screening value. Measured concentrations of PFOS at VB_MW02 have exceeded the adopted screening value in both monitoring events with the concentration remaining largely consistent. Whilst PFOS was detected at VB_MW01 during the 2014 Stage 2 ESA, the measured concentration was below the human health (drinking water) screening value. The measured concentration at this location has now increased by a factor of 2 to marginally exceed the screening value. However, on the basis that groundwater is not extracted for potable use within the vicinity of the operational area of the Site, these variations to the magnitude of the identified PFOS impact are not considered to represent a significant risk to human health.

4.2.3 TRH And BTEX Compounds

During the 2014 Stage 2 ESA, some of the key impacts identified included benzene in groundwater in the Vehicle Refuelling Area and down gradient of the Asbestos Landfill. All wells in which TRH and BTEX detections were identified were sampled in the May 2015 event along with several boundary wells. Results of all samples analysed for TRH, BTEX and VOC's are displayed in *Table 4e*. of *Annex B*.

TRH was detected in groundwater samples collected from several wells in the 2015 sampling event, which were generally consistent with the results from the 2014 Stage 2 ESA .There were no wells with new detections in 2015 and in general TRH concentrations have decreased since the 2014 Stage 2 ESA. TRH concentrations in groundwater from the wells sampled did not exceed the adopted screening values in any well across the power station site during any of the 2014 or 2015 sampling events.

The measured concentrations of benzene in groundwater samples collected from two locations in the vehicle refuelling area exceeded the adopted screening values for drinking water (VH_X_MW06) and recreational use of water (VH_X_MW08) in both the 2014 Stage 2 ESA and 2015 monitoring events. However, the measured concentration of benzene in groundwater at both locations was lower in the 2015 monitoring event. Benzene at concentrations exceeding the adopted drinking water screening values was detected in groundwater in the vicinity of the Asbestos landfill area (VP_MW01) during the 2015 monitoring event, consistent with the 2014 Stage 2 ESA (April, 2014) a subsequent groundwater monitoring event (May 2014). However, it was noted the measured concentration of benzene in groundwater in 2015 had reduced to equal the adopted drinking water screening values. It is noted that this provides an update to the DLA report dated February 2015 which indicated that benzene in groundwater at this location was below the limit of reporting. It is further noted that Douglas Partners have proposed to sample this well as part of their May 2015 works.

It should be noted that xylene was detected marginally above the LOR but below the adopted screening values in VK_MW02. Xylene had not previously been reported in groundwater at this location however the measured concentrations were 2 orders of magnitude lower than the adopted drinking water screening values. It is therefore considered that this detection does not indicate a risk to human health.

Metals

During the Stage 2 ESA (ERM, July 2014), various metals were identified in groundwater at concentrations in excess of the adopted screening values across the Site. Where metals were identified above background concentrations, impact generally appeared to be localised in distinct areas of the Site. The distinct areas identified in ERM (July 2014) included the Ash Dam and Coal Storage Area, where the creation of localised Acid Sulfate Soil (ASS) conditions through historical activities (an issue discussed in greater detail in that) may have contributed to the observed metal impacts in groundwater. ERM (July 2014) also indicated that localised acidic groundwater conditions in the vicinity of the Vehicle Refuelling Area also appear to have contributed to the presence of elevated metal concentrations in groundwater in that part of the Site.

A comparison of the metals concentrations in groundwater in the targeted wells for both the 2014 Stage 2 ESA and the 2015 monitoring event is presented in *Table 4a* of *Annex B*. Metals concentrations in groundwater have remained largely consistent between the two sampling events with the following exceptions:

- Measured concentrations of Arsenic at VH_X_MW01 were lower in 2015, and no longer exceed the adopted drinking water screening values.

- Measured concentrations of Arsenic across the VO AEC have reduced, and no longer exceed the adopted recreational screening values however several wells remain above the adopted drinking water screening values. This may be related to high rainfall in recent months causing a level of dilution.

- The measured concentration of Manganese at VO_X_MW03 has increased by 20%, and now exceeds the adopted recreational screening value. The measured concentration of Manganese at VH_X_MW03 has increased and now exceeds the adopted drinking water screening values. This was not the case in 2014. Measured concentrations of Manganese at VJ_MW09 have decreased and no longer exceed any of the adopted screening values.

- Measured concentrations of Nickel at VJ_MW09, VO_MW05 and VO_MW09 have decreased and no longer exceed the adopted drinking water screening values.

- Measured concentrations of Selenium at VH_X_MW03, VH_X_MW04, VH_X_MW08 and VO_MW18 have decreased and no longer exceed the adopted drinking water screening values. Decreases in Selenium concentrations have been noted throughout the VO AEC with monitoring wells VO_MW04, VO_MW05 and VO_MW06 no longer exceeding the adopted recreational use of water screening values, although they do remain greater than the adopted drinking water screening values.

- With the exception of Manganese (as mentioned above) the measured concentrations of metals have not increased between the 2014 Stage 2 ESA and the 2015 Groundwater Sample Event.

4.3 QUALITY OF FIELD AND ANALYTICAL DATA GATHERED

A detailed QA/QC report including field procedures, laboratory methods and an analysis of QA/QC results from the investigation is provided in *Annex D*. QA/QC information incorporating inter-laboratory and intra-laboratory duplicates, rinsate samples and trip spike/blank samples are also tabulated in *Annex D*.

In summary, the QA/QC data reported for soil and groundwater samples and field duplicate results were generally free of systematic and method biases and were assessed to be of sufficient quality for the purposes of this investigation.

5 *ASSESSMENT OF VALIDITY AND CURRENCY*

Overall the conclusions of ERM's previous Environmental Site Assessment reports in relation to the Vales Point Power Station (as listed in Section 1) remain valid and largely current. The works undertaken as part of this review have indicated the following key updates:

- No significant environmental incidents (i.e. those likely to result in a potentially material issue) have been reported (The incident register provided to ERM for review is included as *Annex F*);

- No breaches of the Site EPL were reported in the most recent annual return (to end June 14). Similarly, no non-conformances were noted within the monthly internal compliance summaries which have been prepared since then (July 2014 to end March 2015);

- Delta has engaged in correspondence with NSW EPA in relation to the Duty to Report under Section 60 of the CLM Act, with the outcome of this correspondence being that NSW EPA indicated (via email) that it has accepted Delta's decision not to formally notify the Site under Section 60 of the CLM Act. This provides a level of closure on a key component of ERM's previous conclusions in relation to the potential for a Duty to Report to exist.

- Delta has engaged consultants (DLA Environmental) to continue monitoring groundwater in the vicinity of the site's UPSS in order to meet their regulatory obligations. The results of these works have indicated an ongoing issue in relation to hydrocarbon and BTEX impacts, particularly in two monitoring locations. In response to the confirmation of these impacts (which were identified by ERM in July 2014) Delta has engaged Douglas Partners to further assess the issue and provide "*recommendations for additional work, if required (e.g. remediation etc).*" It is noted that this report has not yet been finalised, however it is clear that Delta is actively managing the issue which has been identified.

- The updated groundwater monitoring assessment indicated that whilst there have been a number of minor fluctuations in concentrations of various CoPC's, the results have not revealed any indications of significant new impacts.

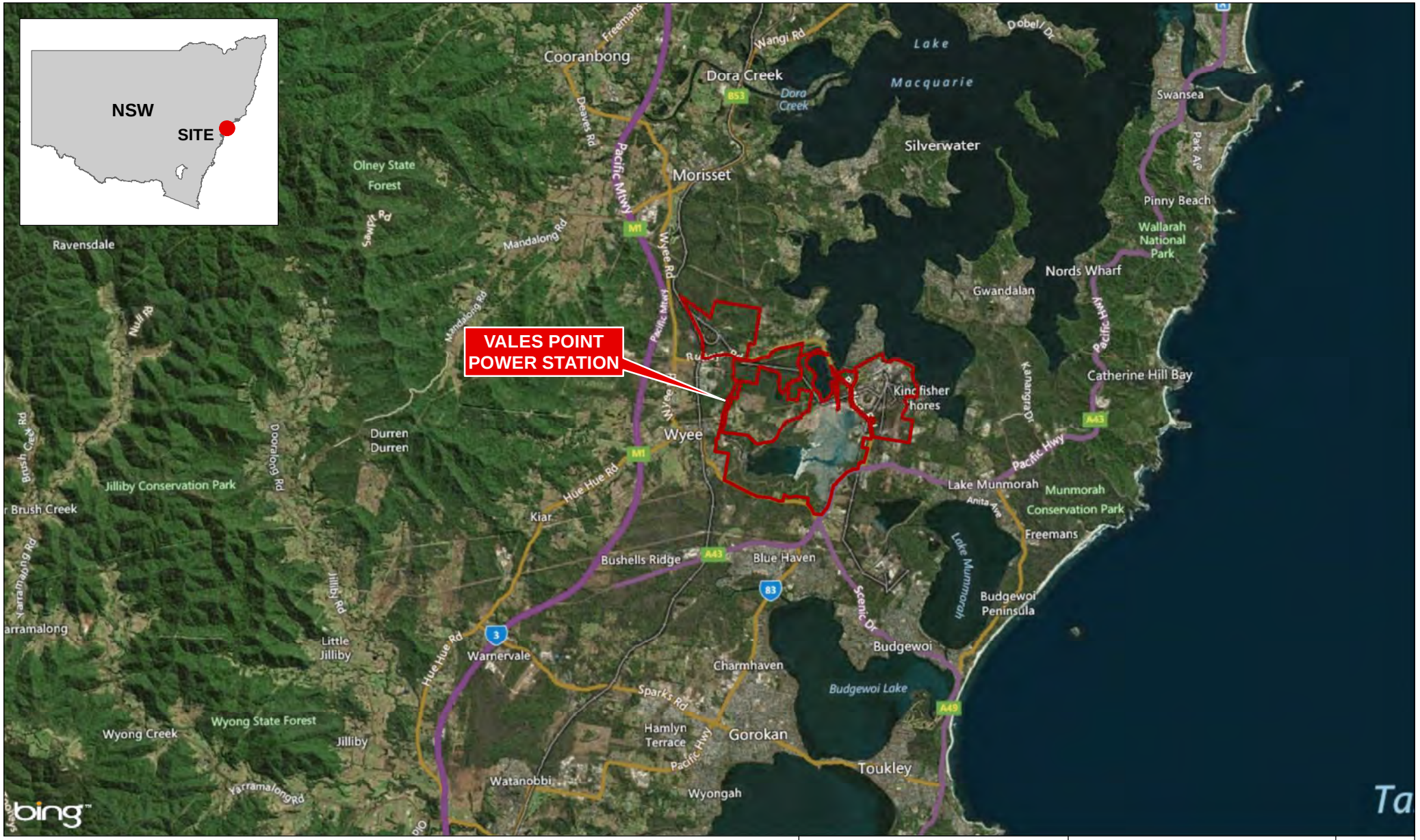
6 *CONCLUDING STATEMENT*

Whilst some minor changes to conditions on the site have occurred in the period between completion of the previous assessments (February / September 2014) and the preparation of this review (May 2015) none of these significantly impact upon the key conclusions previously drawn by ERM.

With regards to the additional groundwater monitoring data gathered, this data is in no way intended to replace the data reported in ERM (July 2014) and ERM (September 2014). The additional data should be considered as additive to the baseline data set previously gathered by ERM as it provides a level of assessment of temporal variation at key locations and supports the above observation that no significant new impacts have occurred during the intervening period.

Annex A

Figures



Legend

Site Boundary

Source:
bing imagery date Sept 2012

0 1 2 3km

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Drawing No:	0300379s_GME2015_G001_R0.mxd	
Date:	01/06/2015	Drawing Size: A4
Drawn By:	GC	Reviewed By: JE

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

Figure 1 - Site Locality

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Updated Groundwater Quality Assessment

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM

Legend

- Site Boundary
- Excluded Areas (Mine Leases)

Included Areas (External Operator):

- Fly Ash Plant
- Rail and Mandalong Coal Unloader Area

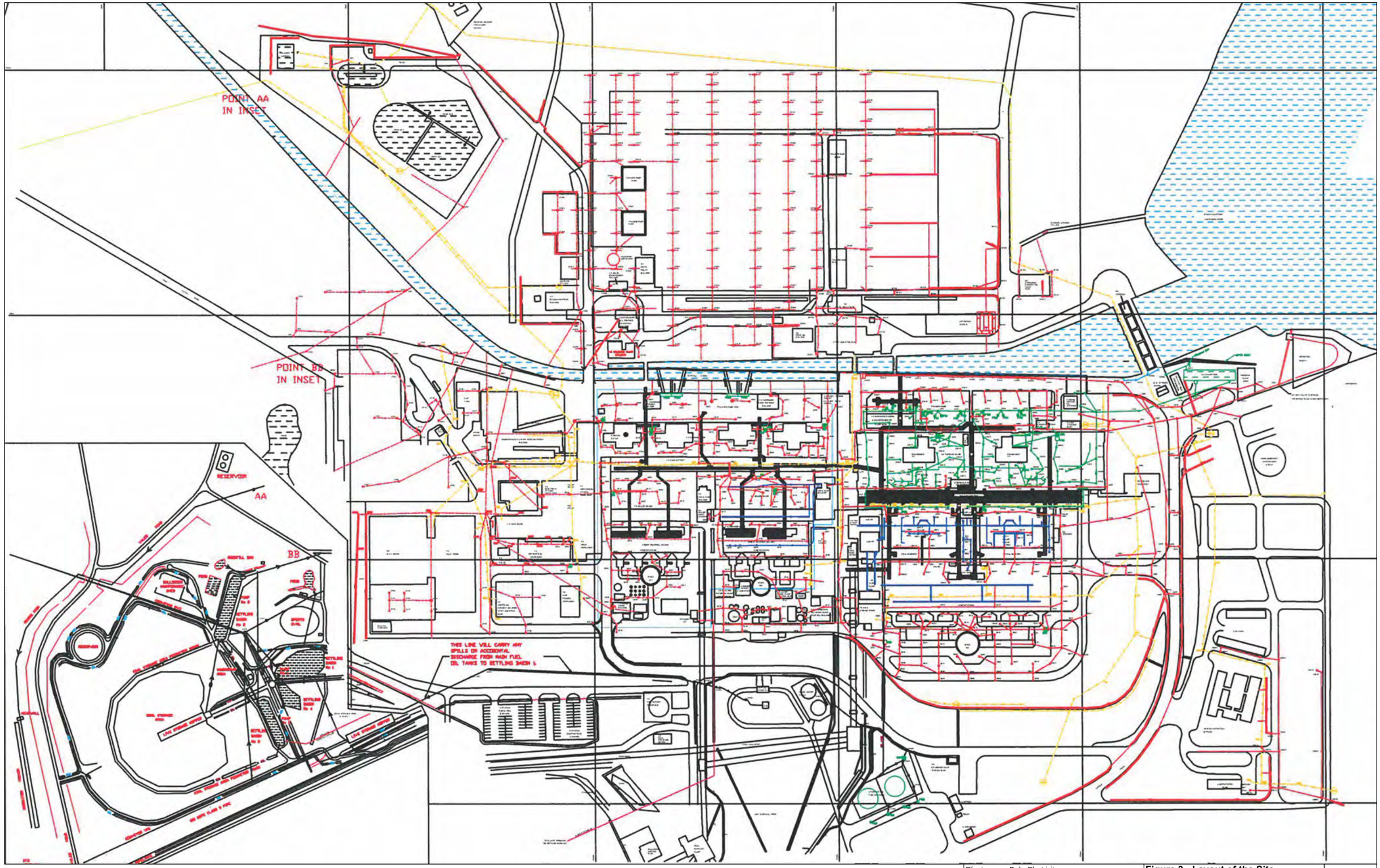
Source:
bing imagery date Sept 2012

0 250 500 750m

N

Client:	Delta Electricity		**Figure 2 - Site Boundaries**
Drawing No:	0300379s_GME2015_G002_R0.mxd		
Date:	01/06/2015	Drawing Size: A3	Project Symphony – Vales Point
Drawn By:	GC	Reviewed By: JE	Updated Groundwater Quality Assessment
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.			Environmental Resources Management ANZ Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM



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Delta Electricity,
Drawing No. VP732546-04.

0 20 40 60m

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Client:	Delta Electricity		
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Drawn by:	GC	Reviewed by: JE	

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Figure 3 - Layout of the Site Operational Area

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ERM

Legend

- Site Boundary
- Excluded Areas (Mine Leases)
- Topographic Contour

Groundwater Bores (as Sensitive Receptors):

- GW011915 (Stock/Poultry - 5.4m)
- GW034560 (Domestic - 18m)
- GW080830 (Test Bore)
- GW201977 (Monitoring Bore 7m, SWL 6m)
- GW201978 (Monitoring Bore, 7m, SWL 6m)
- GW201979 (Monitoring Bore, 7m, SWL 6m)

Source:
bing imagery date Sept 2012

0 250 500 750m

N

Client:	Delta Electricity		
Drawing No:	0300379s_GME2015_G003_R0.mxd		
Date:	01/06/2015	Drawing Size: A3	
Drawn By:	GC	Reviewed By: JE	

Figure 4 - Topographic Contours

Project Symphony – Vales Point
Updated Groundwater Quality Assessment

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Areas of Environmental Concern:

1. VA - B Station Power Block
2. VB - A Station Power Block
3. VC - Transformers
4. VD - Main Store
5. VE - Contaminated Water Treatment System
6. VF - Waste Oil Storage Area
7. VG - Fuel Oil Installation
8. VH - Vehicle Refuelling Depot
9. VI - Water Treatment Plant
10. VJ - Coal Storage Area
11. VK - Mobile Plant Maintenance
12. VL - Sewage Treatment Plant
13. VM - Chlorine Plant
14. VN - Mandalong and Rail Coal Unloader
15. VO - Ash Dam
16. VP - Asbestos Landfills
17. VQ - Asbestos-containing Pipeline
18. VS - TransGrid Switchyard
19. VT - Fly Ash Plant

bing

Legend

- Site Boundary
- Fly Ash Plant
- Rail and Mandalong Coal Unloader Area
- Excluded Areas (Mine Leases)
- Abandoned Monitoring Well
- Existing Monitoring Well
- Monitoring Well
- Abandoned Soil Bore
- Shallow Soil Bore
- Soil Bore
- Surface Soil Sample
- Surface Water Sample
- Sediment Sample

AECs:

- VA - B Station Power Block
- VB - A Station Power Block
- VC - Transformers
- VD - Main Store
- VE - Contaminated Water Treatment System
- VF - Waste Oil Storage Area
- VG - Fuel Oil Installation
- VH - Vehicle Refuelling Depot
- VI - Water Treatment Plant
- VJ - Coal Storage Area
- VK - Mobile Plant Maintenance
- VL - Sewage Treatment Plant
- VN - Mandalong and Rail Coal Unloader
- VO - Ash Dam
- VP - Asbestos Landfills
- VQ - Asbestos-containing Pipeline
- VS - TransGrid Switchyard
- VT - Fly Ash Plant

Source:
bing imagery date Sept 2012

0 250 500 750m

N

Client:	Delta Electricity		
Drawing No:	0300379s_GME2015_G004_R0.mxd		
Date:	01/06/2015	Drawing Size: A3	
Drawn By:	GC	Reviewed By: JE	

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Figure 5 - Areas of Environmental Concern

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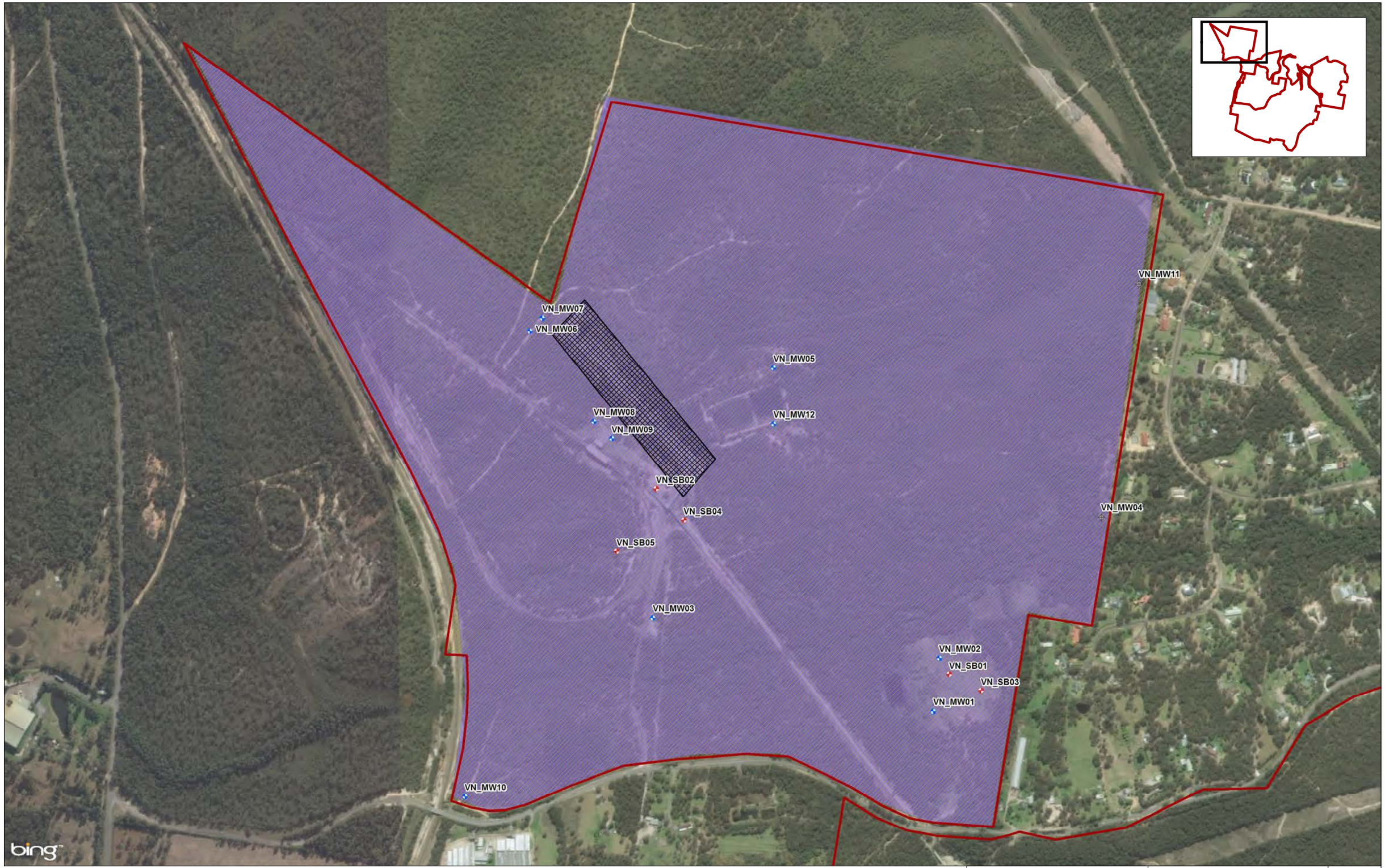
ERM



Legend

- Site Boundary
- Rail and Mandalong Coal Unloader Area
- Excluded Areas (Mine Leases)
- Abandoned Monitoring Well
- Monitoring Well
- Soil Bore

AECs:

- VN - Mandalong and Rail Coal Unloader

Source:
bing imagery date Sept 2012

0 50 100 150m

N

Client:	Delta Electricity		
Drawing No:	0300379s_GME2015_G005_R0.mxd		
Date:	01/06/2015	Drawing Size: A3	
Drawn By:	GC	Reviewed By: JE	

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Figure 6.1 - Completed Sampling Locations

Project Symphony – Vales Point
Updated Groundwater Quality Assessment

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM

Legend

- Site Boundary
- Existing Monitoring Well
- Monitoring Well
- Soil Bore
- Surface Water Sample
- Sediment Sample
- AECs:
- VO - Ash Dam
- VP - Asbestos Landfills

Source:
bing imagery date Sept 2012

0 100 200 300m

N

Client:	Delta Electricity	
Drawing No:	0300379s_GME2015_G006_R0.mxd	
Date:	01/06/2015	Drawing Size: A3
Drawn By:	GC	Reviewed By: JE

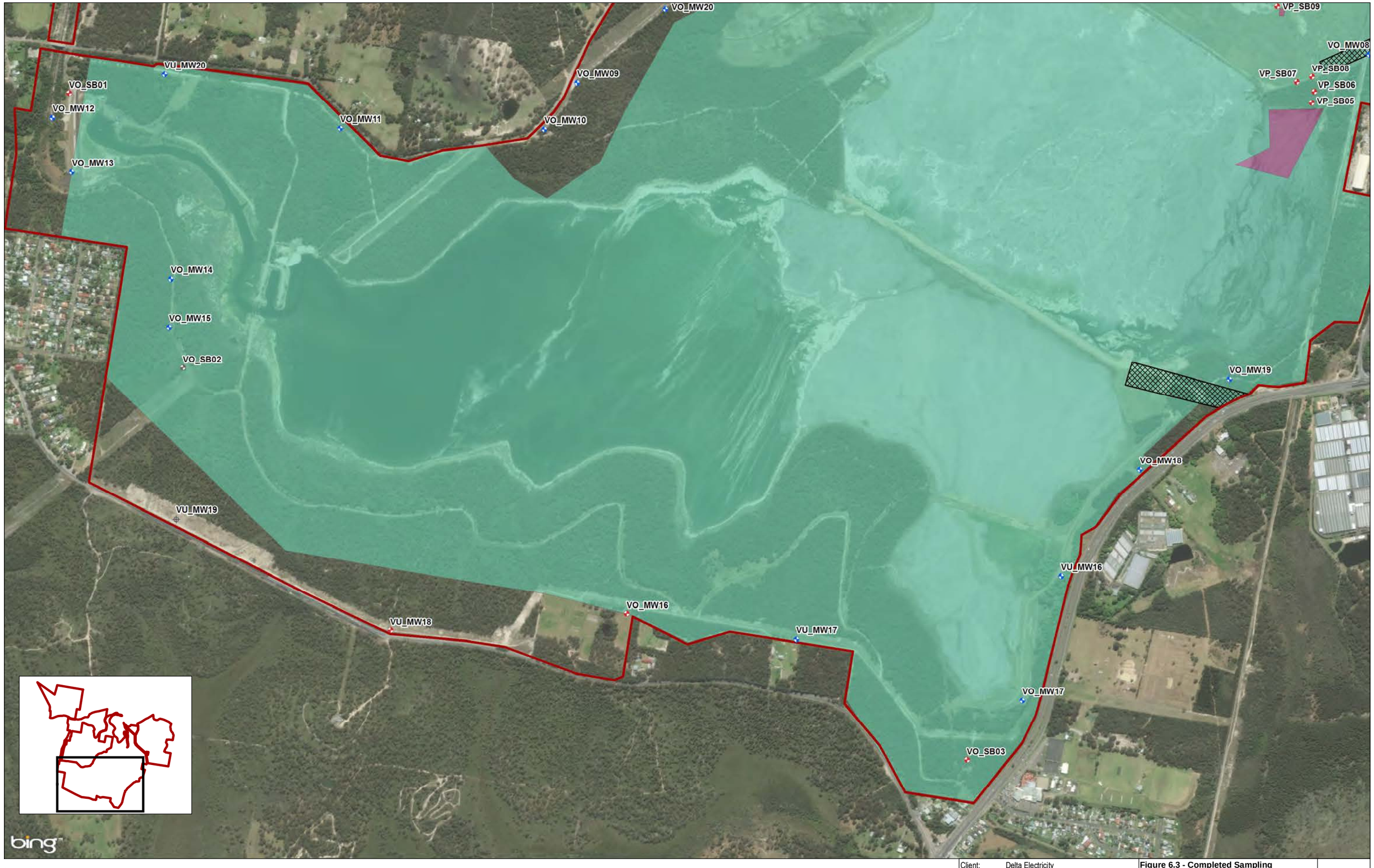
Figure 6.2 - Completed Sampling Locations

Project Symphony – Vales Point
Updated Groundwater Quality Assessment

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM



Legend

- Site Boundary
- Excluded Areas (Mine Leases)
- Abandoned Monitoring Well
- Monitoring Well
- Abandoned Soil Bore
- Soil Bore

AECs:

- VO - Ash Dam
- VP - Asbestos Landfills

Source:
bing imagery date Sept 2012

0 100 200 300m

N

Client:	Delta Electricity		
Drawing No:	0300379s_GME2015_G007_R0.mxd		
Date:	01/06/2015	Drawing Size: A3	
Drawn By:	GC	Reviewed By: JE	

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Figure 6.3 - Completed Sampling Locations

Project Symphony – Vales Point
Updated Groundwater Quality Assessment

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM

Legend

- Site Boundary
- Existing Monitoring Well
- Monitoring Well
- Shallow Soil Bore
- Soil Bore
- Surface Water Sample
- Sediment Sample

AECs:

- VE - Contaminated Water Treatment System
- VF - Waste Oil Storage Area
- VS - TransGrid Switchyard

Source:
bing imagery date Sept 2012

0 100 200 300m

N

Client:	Delta Electricity	
Drawing No:	0300379s_GME2015_G008_R0.mxd	
Date:	01/06/2015	Drawing Size: A3
Drawn By:	GC	Reviewed By: KD

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

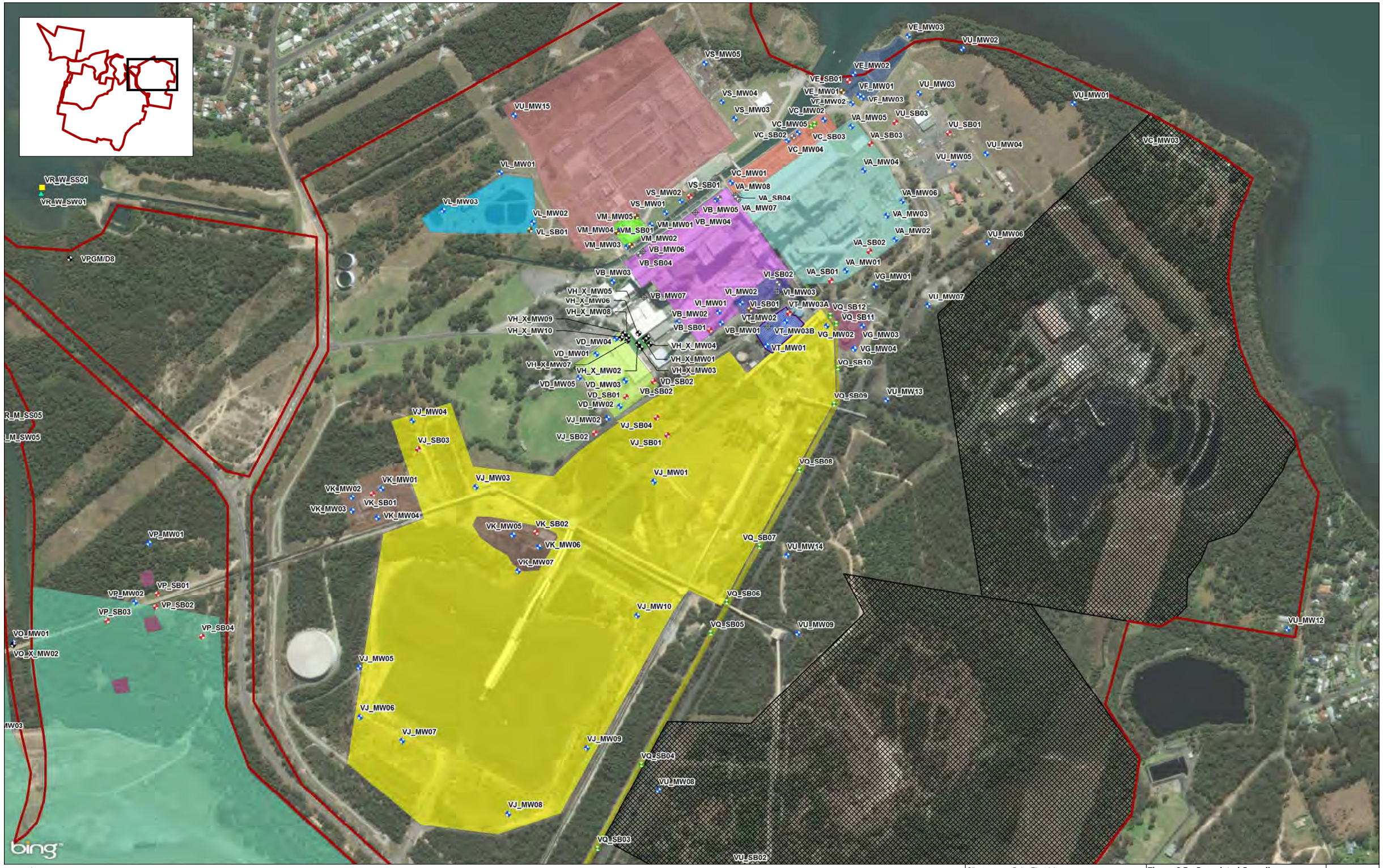
Figure 6.4 - Completed Sampling Locations

Project Symphony – Vales Point
Updated Groundwater Quality Assessment

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM



Legend

- Site Boundary
- Fly Ash Plant
- Excluded Areas (Mine Leases)
- Abandoned Monitoring Well
- Existing Monitoring Well
- Monitoring Well
- Abandoned Soil Bore
- Shallow Soil Bore
- Soil Bore
- Surface Soil Sample
- Surface Water Sample
- Sediment Sample

AECs:

- VA - B Station Power Block
- VB - A Station Power Block
- VC - Transformers
- VD - Main Store
- VE - Contaminated Water Treatment System
- VF - Waste Oil Storage Area
- VG - Fuel Oil Installation
- VH - Vehicle Refuelling Depot
- VI - Water Treatment Plant
- VJ - Coal Storage Area
- VK - Mobile Plant Maintenance
- VL - Sewage Treatment Plant
- VM - Chlorine Plant
- VO - Ash Dam
- VP - Asbestos Landfills
- VQ - Asbestos-containing Pipeline
- VS - TransGrid Switchyard
- VT - Fly Ash Plant

Source:
bing imagery date Sept 2012

0 50 100 150m

N

Client:	Delta Electricity		
Drawing No:	0300379s_GME2015_G009_R0.mxd		
Date:	01/06/2015	Drawing Size: A3	
Drawn By:	GC	Reviewed By: JE	

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

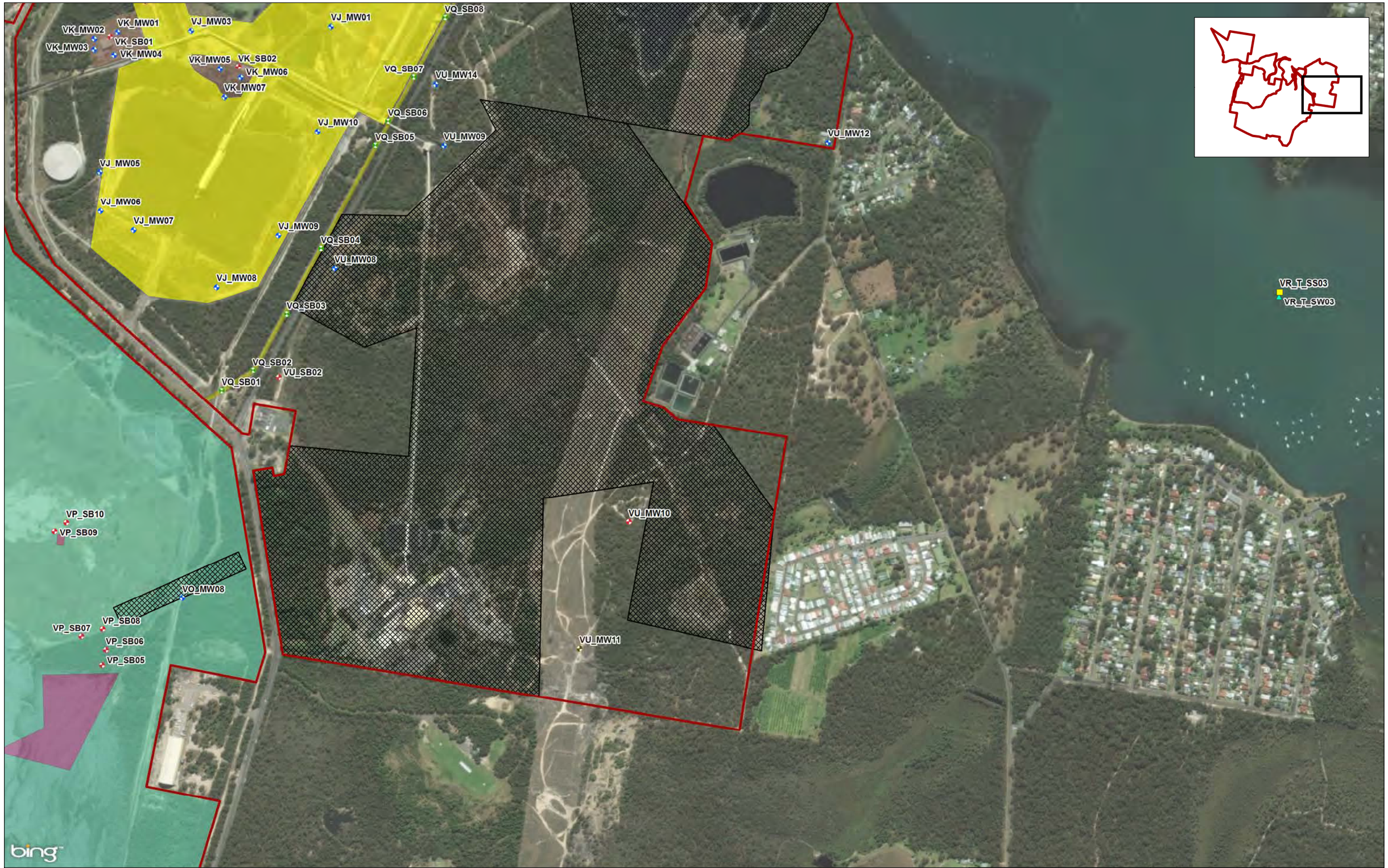
Figure 6.5 - Completed Sampling Locations

Project Symphony – Vales Point
Updated Groundwater Quality Assessment

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM



Legend

- Site Boundary
- Excluded Areas (Mine Leases)
- Monitoring Well
- Shallow Soil Bore
- Soil Bore
- Surface Soil Sample
- Surface Water Sample
- Sediment Sample
- AECs:
- VJ - Coal Storage Area
- VK - Mobile Plant Maintenance
- VO - Ash Dam
- VP - Asbestos Landfills
- VQ - Asbestos-containing Pipeline

Source:
bing imagery date Sept 2012

0 50 100 150m

N

Client:	Delta Electricity		
Drawing No:	0300379s_GME2015_G010_R0.mxd		
Date:	01/06/2015	Drawing Size: A3	
Drawn By:	GC	Reviewed By: JE	

Figure 6.6 - Completed Sampling Locations

Project Symphony – Vales Point
Updated Groundwater Quality Assessment

Environmental Resources Management ANZ

Auckland, Brisbane, Canberra, Christchurch, Melbourne, Newcastle, Perth, Port Macquarie, Sydney

ERM

Annex B

Tables

Well ID	Metals	Ultra Trace Metals	BTEX	TRH	Phenols	PAHs	VOCs	PFOS/ PFOA	Cations/ Anions
VB_MW01			1	1				1	
VB_MW02			1	1			1	1	
VB_MW03					1				
VB_MW05			1	1					
VD_MW03					1				
VE_MW02					1				
VG_MW01	1		1						
VG_MW02	1								
VH_X_MW01		1							
VH_X_MW03		1							
VH_X_MW04		1							
VH_X_MW06	1		1						
VH_X_MW08		1	1	1	1		1		
VI_MW01			1	1				1	1
VJ_MW03			1	1	1				
VJ_MW09	1								
VK_MW02	1		1	1	1	1	1		
VL_MW02								1	
VM_MW03								1	1
VM_MW04			1	1					1
VN_MW02	1		1	1	1	1			
VN_MW10	1								
VO_MW04		1							
VO_MW05	1								
VO_MW06	1								
VO_MW09	1								
VO_MW12	1								
VO_MW17	1								
VO_MW18		1							
VO_X_MW01 (VPGM/D6)	1								1
VO_X_MW02 (VPGM/D5)		1							1
VO_X_MW03 (VPGM/D3)		1							1
VP_MW01			1	1					
VU_MW01	1		1	1	1	1			
VU_MW09	1		1	1	1	1			
VU_MW12	1		1	1	1	1			
VU_MW15	1								
VPGM/D8	1								1
VPGM/D10	1								1
Total	19	8	16	13	10	5	3	5	8

Notes:

Metals	Metals (arsenic, cobalt, copper, manganese, nickel, lead, selenium, zinc)
Ultra Trace Metals	Metals in saline water >5000µ (arsenic, cobalt, copper, manganese, nickel, lead, selenium, zinc)
BTEX	Benzene, Toluene, Ethylbenzene, Xylene (BTEX)
TRH	Total Recoverable Hydrocarbons (TRH);
PAH	Ultra Trace Polycyclic Aromatic Hydrocarbons (PAHs)
Phenol	Ultra Trace Phenols
VOCs	Ultra Trace Volatile Organic Compounds (including chlorinated hydrocarbons)
PFOS/PFOA	Perfluorooctanesulfonic acid and Perfluorooctanoic acid
Cations/Anions	Major cations: Ca, Mg, Na, K. Minor Anions: Cl, SO_4, Alkalinity

Well ID	Date	Event	TOC Elevation (mAHD)	Ground Surface Elevation (mAHD)	Well Screened Interval (m)	Total Measured Depth (mbTOC)	Depth to Water (mbTOC)	Depth to LNAPL (mbTOC)	Corrected Depth to Water (mbTOC)	Corrected Water Elevation (mAHD)	Comments
VB_MW01	18-May-15	Pre	2.83	2.987	1-4	8.773	4.733	-	4.733	-1.903	No odour.
VB_MW02	18-May-15	Pre	2.775	2.856	1-4	9.584	3.135	-	3.135	-0.360	No odour.
VB_MW03	18-May-15	Pre	3.206	3.35	2-5.1	11.525	1.482	-	1.482	1.724	Strong sulfur odour.
VB_MW05	18-May-15	Pre	2.811	2.913	2-6	10.125	3.784	-	3.784	-0.973	No odour.
VD_MW03	20-May-15	Pre	2.72	2.842	0.5-3.5	9.618	2.636	-	2.636	0.084	No odour.
VE_MW02	18-May-15	Pre	1.606	1.685	1-4	5.903	0.433	-	0.433	1.173	Sulfur odour.
VG_MW01	19-May-15	Pre	16.55	16.654	11.8-14.8	4.625	2.210	-	2.210	14.340	No odour.
VG_MW02	19-May-15	Pre	16.642	16.002	6-9	12.720	7.480	-	7.480	9.162	No odour.
VH_X_MW01	20-May-15	Pre	2.93	3.03	NA	6.160	1.585	-	1.585	1.345	No odour.
VH_X_MW03	20-May-15	Pre	2.762	2.843	NA	5.205	1.005	-	1.005	1.757	No odour.
VH_X_MW04	20-May-15	Pre	2.766	2.845	NA	5.125	0.981	-	0.981	1.785	No odour.
VH_X_MW06	20-May-15	Pre	2.873	2.96	NA	3.275	1.160	-	1.160	1.713	No odour.
VH_X_MW08	20-May-15	Pre	2.794	2.898	NA	3.275	1.120	-	1.120	1.674	No odour.
VI_MW01	18-May-15	Pre	2.828	2.929	4.5-7.5	3.930	0.902	-	0.902	1.926	No odour.
VJ_MW03	19-May-15	Pre	9.942	9.189	4.3-6.3	6.985	3.495	-	3.495	6.447	No odour.
VJ_MW09	19-May-15	Pre	19.474	18.782	3-6	6.730	4.545	-	4.545	14.929	Organic odour.
VK_MW02	19-May-15	Pre	13.321	13.474	3-6	6.040	2.162	-	2.162	11.159	No odour.
VL_MW02	19-May-15	Pre	8.288	7.679	4-7	7.845	2.535	-	2.535	5.753	Mild sulfur odour.
VM_MW03	18-May-15	Pre	2.836	2.971	1.5-4.5	4.105	2.280	-	2.280	0.556	No odour, silty base.
VM_MW04	18-May-15	Pre	2.794	2.973	1-4	3.998	1.872	-	1.872	0.922	No odour.
VN_MW02	19-May-15	Pre	21.382	20.664	1-4	4.755	1.171	-	1.171	20.211	No odour.
VN_MW10	19-May-15	Pre	33.837	33.241	11-13.5	14.275	5.645	-	5.645	28.192	Slight sulfur odour.
VO_MW04	18-May-15	Pre	3.187	2.545	4-8	8.755	1.349	-	1.349	1.838	No odour.
VO_MW05	18-May-15	Pre	10.724	10.172	5-10	10.506	3.67	-	3.670	7.054	No odour.
VO_MW06	18-May-15	Pre	13.424	12.805	1-2.5	3.134	0.391	-	0.391	13.033	No odour.
VO_MW09	20-May-15	Pre	35.935	35.384	8-12	11.720	4.850	-	4.850	31.085	No odour.
VO_MW12	19-May-15	Pre	11.961	11.192	1-3	3.550	0.655	-	0.655	11.306	No odour.
VO_MW17	20-May-15	Pre	18.641	18.06	1.5-4.5	5.032	1.138	-	1.138	17.503	No odour.
VO_MW18	20-May-15	Pre	15.643	14.965	3-7	8.773	4.733	-	4.733	10.910	No odour.
VO_X_MW01	19-May-15	Pre	6.943	6.223	NA	9.584	3.135	-	3.135	3.808	No odour.
VO_X_MW02	18-May-15	Pre	2.8	1.789	NA	11.525	1.482	-	1.482	1.318	No odour.
VO_X_MW03	19-May-15	Pre	6.139	6.028	NA	10.125	3.784	-	3.784	2.355	Slight organic odour.
VP_MW01	20-May-15	Pre	16.82	16.153	6-9	9.618	2.636	-	2.636	14.184	No odour.
VU_MW01	19-May-15	Pre	4.676	3.995	0.9-3.9	4.625	2.210	-	2.210	2.466	No odour.
VU_MW09	20-May-15	Pre	22.475	21.799	9-12	12.720	7.480	-	7.480	14.995	No odour.
VU_MW12	20-May-15	Pre	3.847	4.035	3-6	6.160	1.585	-	1.585	2.262	No odour.
VU_MW15	19-May-15	Pre	11.097	10.447	3-6	6.876	2.641	-	2.641	8.456	No odour.
VPGM/D8	20-May-15	Pre	NA	NA	NA	-	-	-	-	-	Location not sampled. Unable to access.
VPGM/D10	20-May-15	Pre	NA	NA	NA	5.903	0.433	-	0.433	-	No odour.

Notes:

	metres		
	Australian		
mAHD	Height Datum	Pre	pre-purging
	metres below top		
mbTOC	of casing	NA	Information not available
m	metres		

Well ID	Purge Date	Sample Method	pH	Temp (°C)	EC (µScm^{-1})	DO (mg/L)	ORP (mV)	Purge Volume (L)	Comments
VB_MW01	18-May-15	Peristaltic	4.05	22.3	946	0.47	248.0	3.0	Slightly green in colour, clear, no odour.
VB_MW02	18-May-15	Peristaltic	4.12	21.8	391	1.13	58.5	5.0	Clear, no odour.
VB_MW03	18-May-15	Peristaltic	4.40	21.0	2172	1.19	-32.0	5.0	Brown, strong sulfuric odour.
VB_MW05	18-May-15	Peristaltic	3.31	24.2	2541	1.99	115.5	7.0	Clear, no odour.
VD_MW03	20-May-15	Peristaltic	3.63	22.0	4501	0.54	43.7	5.0	Clear, no odour.
VE_MW02	18-May-15	Peristaltic	4.87	20.9	2655	1.59	-6.8	6.0	Clear, sulfuric odour.
VG_MW01	19-May-15	Micro-purge	4.74	21.3	196	1.17	100.9	3.8	Cloudy, pale brown, no odour.
VG_MW02	19-May-15	Micro-purge	3.43	20.7	4740	1.54	118.2	3.8	Slightly cloudy, pale brown, no odour.
VH_X_MW01	20-May-15	Peristaltic	3.41	20.5	6177	0.56	448.5	6.0	Clear, no odour.
VH_X_MW03	20-May-15	Peristaltic	3.09	22.7	6767	1.33	99.1	5.0	Slightly cloudy, no odour.
VH_X_MW04	20-May-15	Peristaltic	2.89	22.2	5484	1.73	114.2	5.0	Cloudy, red/brown, no odour.
VH_X_MW06	20-May-15	Peristaltic	2.87	20.8	6033	1.48	119.5	6.0	Cloudy, red/brown, no odour.
VH_X_MW08	20-May-15	Peristaltic	3.79	21.1	5578	0.41	203.5	5.0	Clear, no odour.
VI_MW01	18-May-15	Peristaltic	4.38	20.7	822	0.43	222.5	3.0	Slightly cloudy, brown, no odour.
VJ_MW03	19-May-15	Micro-purge	6.06	20.8	409	0.14	-105.4	3.8	Slightly cloudy, colourless, no odour.
VJ_MW09	19-May-15	Micro-purge	5.64	20.5	890	3.2	61.2	3.8	Slightly cloudy, pale brown, organic odour.
VK_MW02	19-May-15	Peristaltic	3.93	22.9	413	0.31	10.7	3.8	Clear, colourless, no odour.
VL_MW02	19-May-15	Peristaltic	3.74	20.1	835	1.44	159.2	5.0	Slightly red/brown, mild sulfuric odour.
VM_MW03	18-May-15	Peristaltic	5.98	23.3	2481	1.07	25.8	4.0	Slightly orange, no odour.
VM_MW04	18-May-15	Peristaltic	6.11	22.2	601	0.28	-137.9	3.0	White, turbid, no odour.
VN_MW02	19-May-15	Peristaltic	4.62	20.3	138	3.71	45.8	4.0	Light brown, cloudy, no odour.
VN_MW10	19-May-15	Peristaltic	5.54	18.6	343	0.16	47.1	4.0	Brown, slight sulfuric odour.
VO_MW04	18-May-15	Peristaltic	2.90	19.6	38314	3.54	376.0	5.0	Clear, colourless, no odour.
VO_MW05	18-May-15	Peristaltic	3.39	20.7	17708	0.42	272.2	5.0	Cloudy, no odour, sheen.
VO_MW06	18-May-15	Peristaltic	3.06	18.5	27149	0.87	420.5	8.0	Clear, colourless, no odour, sheen.
VO_MW09	20-May-15	Micro-purge	5.40	19.8	343	0.23	8.1	5.6	Cloudy, pale yellow, no odour.
VO_MW12	19-May-15	Peristaltic	3.44	17.9	29301	0.33	318.1	5.0	Clear, colourless, no odour, sheen.
VO_MW17	20-May-15	Peristaltic	6.75	18.1	1575	0.35	110.1	6.0	Cloudy, no odour.
VO_MW18	20-May-15	Peristaltic	3.72	19.2	3271	187	294.6	8.0	Cloudy, colourless, no odour.
VO_X_MW01	19-May-15	Peristaltic	5.86	18.0	176	0.23	33.4	6.0	Cloudy, colourless, no odour.
VO_X_MW02	18-May-15	Peristaltic	4.90	19.4	24243	0.38	46.0	5.0	Clear, colourless, no odour.
VO_X_MW03	19-May-15	Peristaltic	5.57	20.3	32667	0.33	-18.5	5.0	Clear, colourless, slight organic odour.
VP_MW01	20-May-15	Peristaltic	6.62	19.3	948	0.37	-84.8	7.0	Clear, colourless, no odour.
VU_MW01	19-May-15	Peristaltic	5.73	18.6	397	0.8	-41.9	4.0	Slightly green, clear, sulfuric odour.
VU_MW09	20-May-15	Micro-purge	5.97	19.4	590	0.32	8.2	3.8	Cloudy, pale yellow, no odour.
VU_MW12	20-May-15	Micro-purge	3.91	20.3	1870	0.15	99.6	3.8	Cloudy, yellow/brown, no odour.
VU_MW15	19-May-15	Peristaltic	3.69	19.8	374	1.78	53.5	5.0	Cloudy, no odour.
VPGM/D8	-	-	-	-	-	-	-	-	Location not sampled. Unable to access.
VPGM/D10	20-May-15	Peristaltic	4.59	19.1	736	0.39	244.7	5.0	Cloudy, no odour.

Notes:

DO Dissolved oxygen
EC Electrical Conductivity
ORP Oxygen reduction potential
Temp Temperature

Table 4a. Metals and Inorganics
Updated Groundwater Quality Assessment
Vales Point Power Station
Project Symphony - 0300379

				Metals																	Inorganics											
				Arsenic (Filtered)	Barium (Filtered)	Beryllium (Filtered)	Boron (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Molybdenum (Filtered)	Nickel (Filtered)	Selenium (Filtered)	Thallium (Filtered)	Vanadium (Filtered)	Zinc (Filtered)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Carbonate as CaCO3)	Alkalinity (Hydroxide) as CaCO3	Alkalinity (total) as CaCO3	Anions Total	Calcium (Filtered)	Cations Total	Chloride	Ionic Balance	Magnesium (Filtered)	Potassium (Filtered)	Sodium (Filtered)	Sulfate as SO4 - Turbidimetric (Filtered)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	mg/L	meq/L	µg/L	meq/L	mg/L	%	µg/L	µg/L	mg/L	mg/L
EQL				0.2	0.5	0.1	5	0.05	0.2	0.1	0.5	0.1	0.5	0.1	0.1	0.5	0.2	0.02	0.2	1	1	1	1000	1	0.01	1000	0.01	1	0.01	1000	1000	1	1
Drinking Water				10[#14]		60	4000	2[#14]	50[#14]		2000[#14]	10[#14]	500	1[#4]	50	20[#14]	10[#14]																
Recreational				100[#9]		600	40000	20[#9]	500[#9]		20000[#9]	100[#9]	5000	10[#9]	500	200[#9]	100[#9]																
Ecological				890[#6]	7100[#6]		5100[#17]	5.5[#16]	220[#6]	1[#16]	1.3[#16]	4.4[#16]		0.4[#16]	27000[#3]	70[#16]	3[#15]		100[#16]	15[#16]													
LocCode	**Sampled_Date-Time**	**Monitoring_Zone**	**Field_ID**																														
VG_MW01	31/03/2014	VG	VG_MW01_310314	<1	-	-	-	<0.1	<1	-	45	<1	-	<0.1	-	3	-	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-
VG_MW01	19/05/2015	VG	VG_MW01	<1	-	-	-	-	-	<1	4	<1	17	-	-	2	<10	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-
VG_MW02	31/03/2014	VG	VG_MW02_310314	2	-	-	-	0.4	2	-	596	10	-	<0.1	-	36	-	-	-	283	-	-	-	-	-	-	-	-	-	-	-	-	-
VG_MW02	19/05/2015	VG	VG_MW02	2	-	-	-	-	-	8	38	29	122	-	-	28	10	-	-	106	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW01	24/03/2014	VH	VH_X_MW01_240314	10.5	1010	4	29	0.67	8.7	22.9	55.4	29	260	<0.1	<0.1	56.6	7	0.16	0.6	143	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW01	21/05/2015	VH	VH_X_MW01	4.1	-	-	-	-	-	16.8	56.6	22.3	392	-	-	47.3	3	-	-	126	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW03	24/03/2014	VH	VH_X_MW03_240314	3.9	295	0.7	26	0.52	0.3	19.7	38.9	10.8	344	<0.1	<0.1	38.5	3.8	0.27	0.5	99	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW03	20/05/2015	VH	VH_X_MW03	1.7	-	-	-	-	-	15.8	23.9	10.1	512	-	-	35.3	2	-	-	102	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW04	24/03/2014	VH	VH_X_MW04_240314	5.6	1590	4.3	27	0.66	3.3	22.7	44.6	20.9	310	<0.1	<0.1	53.2	3.9	0.16	0.5	153	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW04	24/03/2014	VH	D01_240314_SQ	5.8	1660	4.3	27	0.66	3.2	23.6	44.4	20.7	299	<0.1	<0.1	55.3	4.1	0.14	0.5	158	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW04	20/05/2015	VH	VH_X_MW04	2.1	-	-	-	-	-	16.4	36.7	15.4	406	-	-	43	1.9	-	-	118	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW06	1/04/2014	VH	VH_X_MW06	3	-	-	-	0.4	1	-	64	20	-	<0.1	-	30	-	-	-	95	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW06	20/05/2015	VH	D02_200515	2.1	-	-	-	-	-	10.9	27.4	13.8	366	-	-	25.3	2	-	-	83	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW06	20/05/2015	VH	VH_X_MW06	2.2	-	-	-	-	-	11.4	28.9	14.2	341	-	-	26.5	2	-	-	114	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW08	25/03/2014	VH	VH_X_MW08_250314	3.6	79.7	1	54	0.34	<0.2	17	6.7	2.5	333	<0.1	<0.1	33.5	3.5	0.21	1.5	100	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW08	21/05/2015	VH	VH_X_MW08	1.7	-	-	-	-	-	14.9	8.9	2.3	447	-	-	32	1.9	-	-	94	-	-	-	-	-	-	-	-	-	-	-	-	-
VI_MW01	25/03/2014	VI	VI_MW01_250314	1	-	-	-	0.2	<1	-	10	2	-	<0.1	-	15	-	-	-	139	-	-	-	-	-	-	-	-	-	-	-	-	-
VI_MW01	18/05/2015	VI	VI_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1000	<1	8.38	8000	7.74	267	4.03	23,000	2000	124	41
VI_MW09	28/03/2014	VI	VI_MW09_280314	1	95	<1	170	0.1	<1	138	3	<1	10,800	<0.1	2	23	<10	<1	<10	45	-	-	-	-	-	-	-	-	-	-	-	-	-
VI_MW09	19/05/2015	VI	VI_MW09	<1	-	-	-	-	-	3	2	<1	166	-	-	2	<10	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-
VK_MW02	27/03/2014	VK	VK_MW02_270314	<1	-	-	-	<0.1	<1	-	1	<1	-	<0.1	-	6	-	-	-	28	-	-	-	-	-	-	-	-	-	-	-	-	-
VK_MW02	19/05/2015	VK	VK_MW02	<1	-	-	-	-	-	<1	3	<1	14	-	-	2	<10	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-
VM_MW03	26/03/2014	VM	VM_MW03_260314	<1	-	-	-	<0.1	<1	-	1	<1	-	<0.1	-	7	-	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-
VM_MW03	18/05/2015	VM	D03_180515	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	146	<1	<1000	146	25	22,000	24.6	684	0.73	33,000	12,000	471	132
VM_MW03	18/05/2015	VM	VM_MW03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	145	<1	<1000	145	24.7	23,000	25.5	675	1.64	36,000	13,000	485	133
VM_MW04	31/03/2014	VM	VM_MW04	3	-	-	-	<0.1	<1	-	1	<1	-	<0.1	-	21	-	-	-	48	200	<1	<1000	200	8.88	46,000	9.26	151	2.07	14,000	1000	133	30
VM_MW04	18/05/2015	VM	D01_180515_AW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	123	<1	<1000	123	5.58	37,000	6.07	88	4.15	10,000	2000	77	31
VM_MW04	18/05/2015	VM	VM_MW04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	126	<1	<1000	126	5.58	37,000	5.94	87	3.15	10,000	2000	74	29
VN_MW02	25/03/2014	VN	VN_MW02_250314	<1	60	<1	60	<0.1	<1	<1	3	8	73	<0.1	<1	1	<10	<1	<10	13	-	-	-	-	-	-	-	-	-	-	-	-	-
VN_MW02	25/03/2014	VN	D01_250314_SN	<1	60	<1	60	<0.1	<1	<1	<1	7	77	<0.1	<1	<1	<10	<1	<10	<5	-	-	-	-	-	-	-	-	-	-	-	-	-
VN_MW02	19/05/2015	VN	VN_MW02	<1	-	-	-	-	-	<1	2	<1	12	-	-	<1	<10	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-
VN_MW10	23/03/2014	VN	VP_MW10	<1	54	<1	<50	<0.1	<1	3	3	51	137	<0.1	<1	2	<10	<1	<10	25	-	-	-	-	-	-	-	-	-	-	-	-	-
VN_MW10	19/05/2015	VN	VN_MW10	<1	-	-	-	-	-	5	2	41	234	-	-	3	<10	-	-	44	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW04	25/03/2014	VO	VO_MW04_250314	184	82	13.9	1340	0.5	2.5	100	155	183	2650	<0.1	<0.1	133	276	0.6	3.7	1200	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW04	18/05/2015	VO	VO_MW04	91.5	-	-	-	-	-	108	180	193	2110	-	-	108	58	-	-	1060	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW05	21/03/2014	VO	VO_MW05_210314	22	222	3 - 4	100	0.3	33 - 34	43	6	94	4240	<0.1	-	63	110	-	10	144	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW05	18/05/2015	VO	VO_MW05	7.5	-	-	-	-	-	7.8	3.3	67.1	583	-	-	10.2	5.7	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW06	21/03/2014	VO	VO_MW06_210314	49	193	3	580	1	4 - 27	169	3	52	17,300	<0.1	-	70	260	-	10	191	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW06	18/05/2015	VO	VO_MW06	40.5	-	-	-	-	-	184	4.5	40.6	2310	-	-	73.6	25.3	-	-	211	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW09	21/03/2014	VO	VO_MW09_210314	3	1770	4 - 5	80	0.6	2	44	18	20	2460	<0.1	-	32	30	-	<10	156	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW09	20/05/2015	VO	VO_MW09	<1	-	-	-	-	-	2	1	<1	1060	-	-	2	<10	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW12	20/03/2014	VO	D01_200314_SN	109	126	13.7	1710	0.4	1.9	10.3	5	13.2	699	<0.1	<0.1	33.3	248	1.7	51.8	273	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW12	20/03/2014	VO	VO_MW12_200314	109	124	13.7	1700	0.4	1.9	10.1	3	13.1	707	<0.1	<0.1	33.5	247	1.7	51.8	258	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW12	19/05/2015	VO	VO_MW12	51.3	-	-	-	-	-	6.6	1	9.5	547	-	-	26.6	141	-	-	208	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW17	31/03/2014	VO	VO_MW17_310314	14	112	<1	110	<0.1	<1	1	<1	<1	3780	<0.1	1	2	<10	<1	<10	21	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW17	20/05/2015	VO	VO_MW17	6	-	-	-	-	-	<1	<1	<1	2530	-	-	2	<10	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW18	26/03/2014	VO	D01_260314_SN	42.4	152	1.1	201	0.11	5.7	25.3	36.9	100	617	<0.1	<0.1	35.4	22.6	0.63	0.4	89	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW18	26/03/2014	VO	VO_MW18_260314	40.6	153	1.2	205	0.12	6	24.7	36.9	107	654	<0.1	<0.1	34.3	22.6	0.64	0.5	90	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_MW18	20/05/2015	VO	VO_MW18	1.2	-	-	-	-	-	3.3	4.3	6.4	40.7	-	-	4	0.9	-	-	48	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_X_MW01	31/03/2014	VO	VO_X_MW01	<1	8	<1	100	<0.1	<1	2	2	<1	95	<0.1	<1	4	<10	<1	<10	24	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_X_MW01	19/05/2015	VO	VO_X_MW01	<1	-	-	-	-	-	1	3	<1	32	-	-	2	<10	-	-	17	10	<1	<1000	10	1.52	2000	1.52	35	-	4000	2000	24	16
VO_X_MW02	31/03/2014	VO	VO_X_MW02	16.9	87	3.2	<100	<0.2	<0.5	53.8	3	2.5	3540	<0.1	0.2	117	35	<0.1	0.8	144	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_X_MW02	18/05/2015	VO	VO_X_MW02	8.9	-	-	-	-	-	57.4	2	0.4	4160	-	-	104	13	-	-	118	30	<1	<1000	30	252	400,000	278	8250	5.01	803,000	34,000	4400	882
VO_X_MW03	31/03/2014	VO	VO_X_MW03	8.4	127	<0.1	739	<0.2	<0.5	38.4	1	<0.2	4180	<0.1	0.5	16.7	<2	<0.1	<0.5	20	-	-	-	-	-	-	-	-	-	-	-	-	-
VO_X_MW03	19/05/2015	VO	VO_X_MW03	6	-	-	-	-	-	46.8	1	0.2	5450	-	-	17.9	<2	-	-	18	149	<1	<1000	149	348	809,000	375	11,400	3.84	1,040,000	95,000	5680	1110

				Metals																Inorganics												
				Arsenic (Filtered)	Barium (Filtered)	Beryllium (Filtered)	Boron (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Molybdenum (Filtered)	Nickel (Filtered)	Selenium (Filtered)	Thallium (Filtered)	Vanadium (Filtered)	Zinc (Filtered)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Carbonate as CaCO3)	Alkalinity (Hydroxide) as CaCO3	Alkalinity (total) as CaCO3	Anions Total	Calcium (Filtered)	Cations Total	Chloride	Ionic Balance	Magnesium (Filtered)	Potassium (Filtered)	Sodium (Filtered)	Sulfate as SO4 - Turbidimetric (Filtered)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	mg/L	meq/L	µg/L	meq/L	mg/L	%	µg/L	µg/L	mg/L	mg/L
EQL				0.2	0.5	0.1	5	0.05	0.2	0.1	0.5	0.1	0.5	0.1	0.1	0.5	0.2	0.02	0.2	1	1	1	1000	1	0.01	1000	0.01	1	0.01	1000	1000	1	1
Drinking Water				10 #14		60	4000	2 #14	50 #14		2000 #14	10 #14	500	1 #1	50	20 #14	10 #14																
Recreational				100 #9		600	40000	20 #9	500 #9		20000 #9	100 #9	5000	10 #9	500	200 #9	100 #9																
Ecological				890 #6	7100 #6		5100 #17	5.5 #16	220 #6	1 #16	1.3 #16	4.4 #16		0.4 #16	27000 #3	70 #16	3 #15		100 #16	15 #16													
LocCode	**Sampled_Date-Time**	**Monitoring_Zone**	**Field_ID**																														
VPGM/D10	20/05/2015		VPGM/D10	<1	-	-	-	-	-	2	2	<1	92	-	-	6	<10	-	-	29	2	<1	<1000	2	7.72	3000	6.6	248	7.87	14,000	3000	120	33
VU_MW01	1/04/2014	VU	VU_MW01_010414	2	-	-	-	<0.1	<1	-	2	<1	-	<0.1	-	3	-	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW01	19/05/2015	VU	VU_MW01	5	-	-	-	-	-	3	<1	<1	191	-	-	1	<10	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW09	1/04/2014	VU	VU_MW09_010414	<1	-	-	-	<0.1	<1	-	3	<1	-	<0.1	-	3	-	-	-	78	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW09	20/05/2015	VU	VU_MW09	2	-	-	-	-	-	13	<1	<1	886	-	-	8	<10	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW12	1/04/2014	VU	VU_MW12_010414	<1	-	-	-	<0.1	<1	-	3	2	-	<0.1	-	2	-	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW12	20/05/2015	VU	VU_MW12	<1	-	-	-	-	-	2	5	2	97	-	-	3	<10	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW15	1/04/2014	VU	VU_MW15_010414	<1	-	-	-	<0.1	<1	-	1	167	-	<0.1	-	4	-	-	-	27	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW15	19/05/2015	VU	VU_MW15	<1	-	-	-	-	-	1	4	3	28	-	-	2	<10	-	-	46	-	-	-	-	-	-	-	-	-	-	-	-	-
Statistical Summary																																	
Number of Results				59	21	21	21	32	32	48	59	59	48	32	18	59	48	18	21	59	10	10	10	10	10	10	10	10	9	10	10	10	10
Number of Detects				39	21	14	19	17	14	42	54	39	48	0	4	57	27	10	13	58	9	0	0	9	10	10	10	10	9	10	10	10	10
Minimum Concentration				<1	8	<0.1	26	<0.1	<0.2	<1	<1	<0.2	12	<0.1	<0.1	<1	0.9	<0.1	0.4	<5	<1	<1	<1000	<1	1.52	2000	1.52	35	0.73	4000	1000	24	16
Minimum Detect				1	8	0.7	26	0.1	0.3	1	1	0.2	12	ND	0.2	1	0.9	0.14	0.4	11	2	ND	ND	2	1.52	2000	1.52	35	0.73	4000	1000	24	16
Maximum Concentration				184	1770	13.9	1710	1	34	184	596	193	17300	<0.1	2	133	276	1.7	51.8	1200	200	<1	<1000	200	348	809000	375	11400	7.87	1040000	95000	5680	1110
Maximum Detect				184	1770	13.9	1710	1	34	184	596	193	17300	ND	2	133	276	1.7	51.8	1200	200	ND	ND	200	348	809000	375	11400	7.87	1040000	95000	5680	1110
Average Concentration				15	384	3.6	352	0.26	3	27	28	24	1598	0.05	0.34	27	34	0.52	8	117	93	0.5	500	93	69	138700	74	2189	3.6	198700	16600	1159	244
Median Concentration				2.1	126	1.2	100	0.105	0.5	11.15	3	6.4	399	0.05	0.05	17.9	5	0.5	5	50	124.5	0.5	500	124.5	8.63	30000	8.5	257.5	3.84	18500	2500	128.5	37
Standard Deviation				33	577	4.5	550	0.26	6.4	43	82	44	3053	0	0.5	31	73	0.47	15	204	74	0	0	74	124	264165	135	4099	2.1	385157	29372	2074	402
Number of Guideline Exceedances				13	0	0	0	0	0	42	46	30	22	0	0	29	40	0	0	55	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)				13	0	0	0	0	0	42	46	30	22	0	0	29	21	0	0	55	0	0	0	0	0	0	0	0	0	0	0	0	0

Comments

#1 WHO (2011) DWQ
#2 US EPA (2009) - Drinking water
#3 SRC eco gw
#4 RIVM 2001 (Human-toxicological SRC GW) V Chlorinated Hydrocarbons
#5 RIVM (2010) Environmental risk limits for PFOS - Maximim Acceptable Concentration
#6 RIVM (2001); SRC eco
#7 NHMRC 2011 ADWG Health (value for dichloromethane)
#8 NHMRC 2011 ADWG Health (total 1,2-dichloroethene)
#9 Guidelines for Managing Risk in Recreational Waters (2008) (GMRRW)
#10 ASC NEPM (2103) HSL for vapour intrusion HSL-D (Commercial/Industrial) 8m+
#11 ASC NEPM (2103) HSL for vapour intrusion HSL-D (Commercial/Industrial) 4-<8 m
#12 ASC NEPM (2103) HSL for vapour intrusion HSL-D (Commercial/Industrial) 2-<4 m
#13 ASC NEPM (2013) HSL for Intrusive Maint Workers 2m -8m+
#14 ASC NEPM (2013) GIL - Drinking Water
#15 ANZECC (2000) Marine - low reliability value
#16 ANZECC (2000) Marine - 95% level of protection
#17 ANZECC (2000) established background level

	PAH																										
	Benzo[b+j]fluoranthene	2-(acetylamino) fluorene	2-methylnaphthalene	3-methylcholanthrene	7,12-dimethylbenz(a)anthracene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b)fluoranthene	Benzo(e)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Naphthalene	Chrysene	Coronene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene	Perylene	PAHs (Sum of total)	Carcinogenic PAHs (as BaP TEQ
	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	0.0001	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.05
Vapour Intrusion - Commercial Worker - 2-<4 m															NL [#12]											
Vapour Intrusion - Commercial Worker - 4-<8 m															NL [#11]											
Vapour Intrusion - Commercial Worker - 8 m+															NL [#10]											
Vapour Intrusion - Intrusive Maint Worker 2m -8m+															NL [#13]											
Drinking Water										0.01 [#4]																0.01 [#4]
Recreational										0.1 [#9]																0.1 [#9]
Ecological															70 [#16]											

Monitoring_Zone	Field_ID	LocCode	WellCode	Sampled_Date-Time																							
VK	VK_MW02	VK_MW02		19/05/2015	<0.0001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05
VK	VK_MW02_270314	VK_MW02	-	27/03/2014	-	-	-	-	-	<1	<1	<1	<1	<0.5	<1	-	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	-	<0.5	<0.5
VN	D01_250314_SN	VN_MW02		25/03/2014	-	-	-	-	-	<1	<1	<1	<1	<0.5	<1	-	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	-	<0.5	<0.5
VN	VN_MW02	VN_MW02		19/05/2015	<0.0001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05
VN	VN_MW02_250314	VN_MW02		25/03/2014	-	-	-	-	-	<1	<1	<1	<1	<0.5	<1	-	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	-	<0.5	<0.5
VU	VU_MW01	VU_MW01		19/05/2015	<0.0001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05
VU	VU_MW01_010414	VU_MW01	-	1/04/2014	-	-	-	-	-	<1	<1	<1	<1	<0.5	<1	-	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	-	<0.5	<0.5
VU	VU_MW09	VU_MW09	MW09	20/05/2015	<0.0001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05
VU	VU_MW09_010414	VU_MW09	-	1/04/2014	-	-	-	-	-	<1	<1	<1	<1	<0.5	<1	-	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	-	<0.5	<0.5
VU	VU_MW12	VU_MW12	MW12	20/05/2015	<0.0001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05
VU	VU_MW12_010414	VU_MW12		1/04/2014	-	-	-	-	-	<1	<1	<1	<1	<0.5	<1	-	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	-	<0.5	<0.5

Statistical Summary

Number of Results	5	5	5	5	5	11	11	11	11	11	6	5	11	11	11	11	5	11	11	11	11	11	11	5	11	11
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.0001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.0001	<0.1	<0.1	<0.1	<0.1	<1	<1	<1	<1	<0.5	<1	<0.1	<1	<1	<1	<1	<0.1	<1	<1	<1	<1	<1	<1	<0.1	<0.5	<0.5
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration	0.00005	0.05	0.05	0.05	0.05	0.3	0.3	0.3	0.3	0.15	0.5	0.05	0.3	0.3	0.3	0.3	0.05	0.3	0.3	0.3	0.3	0.3	0.3	0.05	0.15	0.15
Median Concentration	0.00005	0.05	0.05	0.05	0.05	0.5	0.5	0.5	0.5	0.25	0.5	0.05	0.5	0.5	0.5	0.5	0.05	0.5	0.5	0.5	0.5	0.5	0.5	0.05	0.25	0.25
Standard Deviation	0	0	0	0	0	0.24	0.24	0.24	0.24	0.12	0	0	0.24	0.24	0.24	0.24	0	0.24	0.24	0.24	0.24	0.24	0.24	0	0.12	0.12
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Comments

#1 WHO (2011) DWQ
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#3 SRC eco gw
#4 RIVM 2001 (Human-toxicological SRC GW) V Chlorinated Hydrocarbons
#5 RIVM (2010) Environmental risk limits for PFOS - Maximim Acceptable Concentration
#6 RIVM (2001); SRC eco
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#14 ASC NEPM (2013) GIL - Drinking Water
#15 ANZECC (2000) Marine - low reliability value
#16 ANZECC (2000) Marine - 95% level of protection
#17 ANZECC (2000) established background level

					PFOS/PFOA		
					6:2 Fluorotelomer Sulfonate (6:2 FtS	Perfluorooctanoate	PFOS
					µg/L	µg/L	µg/L
EQL					0.1	0.02	0.02
Drinking Water						0.4[#2]	0.2[#2]
Ecological							7.2[#5]
Monitoring_Zone	**Field_ID**	**LocCode**	**WellCode**	**Sampled_Date-Time**			
VB	VB_MW01	VB_MW01		18/05/2015	<0.1	0.16	0.26
VB	VB_MW01_250314	VB_MW01		25/03/2014	<0.1	0.04	0.13
VB	VB_MW02	VB_MW02		18/05/2015	<0.1	0.12	1.14
VB	VB_MW02_250314	VB_MW02		25/03/2014	<0.1	0.08	1.53
VI	VI_MW01	VI_MW01		18/05/2015	<0.1	0.19	0.16
VI	VI_MW01_250314	VI_MW01		25/03/2014	<0.1	0.03	0.1
VL	VL_MW02	VL_MW02		19/05/2015	<0.1	<0.02	0.11
VL	VL_MW02	VL_MW02	-	1/04/2014	<0.1	<0.02	0.17
Statistical Summary							
Number of Results					8	8	8
Number of Detects					0	6	8
Minimum Concentration					<0.1	<0.02	0.1
Minimum Detect					ND	0.03	0.1
Maximum Concentration					<0.1	0.19	1.53
Maximum Detect					ND	0.19	1.53
Average Concentration					0.05	0.08	0.45
Median Concentration					0.05	0.06	0.165
Standard Deviation					0	0.07	0.56
Number of Guideline Exceedances					0	0	3
Number of Guideline Exceedances(Detects Only)					0	0	3

Comments

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Table 4d. Phenols
Updated Groundwater Quality Assessment
Vales Point Power Station
Project Symphony – 0300379

				Phenols															
				2,3,4,6-tetrachlorophenol	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2,6-dichlorophenol	2-chlorophenol	2-methylphenol	2-nitrophenol	3-&4-methylphenol	3-Methylphenol	4-chloro-3-methylphenol	4-methylphenol	4-nitrophenol	Hexachlorophene	Pentachlorophenol	Phenol
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	2	0.1	0.05	0.1	0.1	0.1	0.05	0.1
Drinking Water						20[#4]	200[#4]			300[#4]									0.05[#4]	
Recreational						200[#9]	2000[#9]			3000[#9]									0.5[#9]	
Ecological																			22[#16]	400[#16]
LocCode	**Sampled_Date-Time**	**Monitoring_Zone**	**Field_ID**																	
VB_MW03	27/05/2014	VB	D01_270514	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	3.5
VB_MW03	27/05/2014	VB	VB_MW03	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	2.9
VB_MW03	18/05/2015	VB	VB_MW03	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	<1
VD_MW03	26/03/2014	VD	VD_MW03	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	4.3
VD_MW03	20/05/2015	VD	VD_MW03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	-	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1
VE_MW02	28/03/2014	VE	VE_MW02_280314	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	3.4
VE_MW02	18/05/2015	VE	VE_MW02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	-	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1
VH_X_MW08	25/03/2014	VH	VH_X_MW08_250314	-	<1	<1	<1	2.3	<1	<1	19.8	<1	<2	-	<1	-	-	-	<2	2.5
VH_X_MW08	21/05/2015	VH	VH_X_MW08	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.05	0.1	<0.1	-	4.5	<0.05	<0.1	<0.1	<0.1	<0.05	1.8
VJ_MW03	26/03/2014	VJ	VJ_MW03_GW	-	<1	<1	<1	<1	<1	<1	<1	<1	2	-	<1	-	-	-	<2	<1
VJ_MW03	19/05/2015	VJ	VJ_MW03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	-	<0.1	<0.05	0.9	<0.1	<0.1	<0.05	0.2
VK_MW02	27/03/2014	VK	VK_MW02_270314	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	<1
VK_MW02	19/05/2015	VK	VK_MW02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	-	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1
VN_MW02	25/03/2014	VN	VN_MW02_250314	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	<1
VN_MW02	25/03/2014	VN	D01_250314_SN	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	<1
VN_MW02	19/05/2015	VN	VN_MW02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	-	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1
VU_MW01	1/04/2014	VU	VU_MW01_010414	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	<1
VU_MW01	19/05/2015	VU	VU_MW01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	-	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1
VU_MW09	1/04/2014	VU	VU_MW09_010414	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	<1
VU_MW09	20/05/2015	VU	VU_MW09	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	-	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1
VU_MW12	1/04/2014	VU	VU_MW12_010414	-	<1	<1	<1	<1	<1	<1	<1	<1	<2	-	<1	-	-	-	<2	<1
VU_MW12	20/05/2015	VU	VU_MW12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	-	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1
Statistical Summary																				
Number of Results				9	22	22	22	22	22	22	22	22	13	9	22	9	9	9	22	22
Number of Detects				0	0	0	0	2	0	0	2	0	1	1	0	1	0	0	0	7
Minimum Concentration				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.05	<0.1
Minimum Detect				ND	ND	ND	ND	0.1	ND	ND	0.1	ND	2	4.5	ND	0.9	ND	ND	ND	0.2
Maximum Concentration				<0.1	<1	<1	<1	2.3	<1	<1	19.8	<1	2	4.5	<1	0.9	<0.1	<0.1	<2	4.3
Maximum Detect				ND	ND	ND	ND	2.3	ND	ND	19.8	ND	2	4.5	ND	0.9	ND	ND	ND	4.3
Average Concentration				0.05	0.32	0.32	0.32	0.4	0.32	0.31	1.2	0.32	1.1	0.54	0.31	0.14	0.05	0.05	0.6	1
Median Concentration				0.05	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.05	0.5	0.05	0.05	0.05	1	0.5
Standard Deviation				0	0.23	0.23	0.23	0.48	0.23	0.24	4.2	0.23	0.28	1.5	0.24	0.28	0	0	0.49	1.4
Number of Guideline Exceedances				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0
Number of Guideline Exceedances(Detects Only)				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Comments

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ERM

TRH

LocCode	Sampled_Date-Time	Monitoring_Zone	Field_ID	TRH >C6-C9 Fraction	TRH >C10-C14 Fraction	TRH >C15-C28 Fraction	TRH >C29-C36 Fraction	TRH >C10-C36 Fraction	TRH >C6-C10 Fraction	TRH >C6-C10 less BTEX (F1)	TRH >C10-C16 Fraction	TRH >C10-C16 less Naphthalene (F2)	TRH >C16-C34 Fraction	TRH >C34-C40 Fraction	TRH >C10-C40 Fraction
				μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
EQL				10	50	100	50	50	10	10	50	50	100	100	100
Vapour Intrusion - Commercial Worker - 2-<4 m										6200[#12]		NL[#12]			
Vapour Intrusion - Commercial Worker - 4-<8 m										6300[#11]		NL[#11]			
Vapour Intrusion - Commercial Worker - 8 m+										6500[#10]		NL[#10]			
Vapour Intrusion - Intrusive Maint Worker 2m -8m+										NL[#13]		NL[#13]			
Drinking Water															
Recreational															
Ecological															
VB_MW01	25/03/2014	VB	VB_MW01_250314	<20	<50	410	<50	410	<20	<20	150	150	290	<100	440
VB_MW01	18/05/2015	VB	VB_MW01	<20	90	660	<50	750	<20	<20	250	-	470	<100	720
VB_MW02	25/03/2014	VB	VB_MW02_250314	20	<50	<100	<50	<50	20	20	<100	<100	<100	<100	<100
VB_MW02	18/05/2015	VB	VB_MW02	<20	<50	<100	<50	<50	<20	<20	<100	-	<100	<100	<100
VB_MW05	1/04/2014	VB	D01_010414_SN	80	<50	<100	<50	<50	100	100	<100	<100	<100	<100	<100
VB_MW05	1/04/2014	VB	VB_MW05_010414	70	<50	<100	<50	<50	80	80	<100	<100	<100	<100	<100
VB_MW05	18/05/2015	VB	VB_MW05	100	<50	<100	<50	<50	100	100	<100	-	<100	<100	<100
VG_MW01	31/03/2014	VG	VG_MW01_310314	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VG_MW01	19/05/2015	VG	VG_MW01	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VH_X_MW06	1/04/2014	VH	VH_X_MW06	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VH_X_MW06	20/05/2015	VH	D02_200515	<20	-	-	-	-	<20	<20	-	-	-	-	-
VH_X_MW06	20/05/2015	VH	VH_X_MW06	<20	-	-	-	-	<20	<20	-	-	-	-	-
VH_X_MW08	25/03/2014	VH	VH_X_MW08_250314	380	<50	<100	<50	<50	390	90	<100	<100	<100	<100	<100
VH_X_MW08	21/05/2015	VH	VH_X_MW08	180	<50	<100	<50	<50	180	20	<100	<100	<100	<100	<100
VI_MW01	25/03/2014	VI	VI_MW01_250314	<20	<50	160	<50	160	<20	<20	<100	<100	120	<100	120
VI_MW01	18/05/2015	VI	VI_MW01	<20	80	600	<50	680	<20	<20	170	-	480	<100	650
VJ_MW03	26/03/2014	VJ	VJ_MW03_GW	30	<50	<100	<50	<50	30	<20	<100	<100	<100	<100	<100
VJ_MW03	19/05/2015	VJ	VJ_MW03	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VK_MW02	27/03/2014	VK	VK_MW02_270314	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VK_MW02	19/05/2015	VK	VK_MW02	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VM_MW04	31/03/2014	VM	VM_MW04	<20	<50	560	<50	560	<20	<20	110	110	480	<100	590
VM_MW04	18/05/2015	VM	D01_180514_AW	<20	<50	<100	<50	<50	<20	<20	<100	-	<100	<100	<100
VM_MW04	18/05/2015	VM	VM_MW04	<20	<50	<100	<50	<50	<20	<20	<100	-	<100	<100	<100
VN_MW02	25/03/2014	VN	VN_MW02_250314	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VN_MW02	25/03/2014	VN	D01_250314_SN	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VN_MW02	19/05/2015	VN	VN_MW02	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VP_MW01	1/04/2014	VP	VP_MW01_010414	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VP_MW01	27/05/2014	VP	D02-270514	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	27/05/2014	VP	VP_MW01	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	20/05/2015	VP	T03-200515	<10	<50	<100	<100	-	<10	<10	<50	<50	<100	<100	-
VP_MW01	20/05/2015	VP	DO4_200515	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VP_MW01	20/05/2015	VP	VP_MW01	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VU_MW01	1/04/2014	VU	VU_MW01_010414	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VU_MW01	19/05/2015	VU	VU_MW01	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VU_MW09	1/04/2014	VU	VU_MW09_010414	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VU_MW09	20/05/2015	VU	VU_MW09	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VU_MW12	1/04/2014	VU	VU_MW12_010414	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100
VU_MW12	20/05/2015	VU	VU_MW12	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100

BTEX

LocCode	Sampled_Date-Time	Field_ID	Benzene	Ethylbenzene	Toluene	Total BTEX	Xylene (m & p)	Xylene (o)	Xylene Total
			μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
EQL			0.05	0.05	0.5	1	0.05	0.05	2
Vapour Intrusion - Commercial Worker - 2-<4 m			4900[#12]	NL[#12]	NL[#12]				NL[#12]
Vapour Intrusion - Commercial Worker - 4-<8 m			5100[#11]	NL[#11]	NL[#11]				NL[#11]
Vapour Intrusion - Commercial Worker - 8 m+			5400[#10]	NL[#10]	NL[#10]				NL[#10]
Vapour Intrusion - Intrusive Maint Worker 2m -8m+			NL[#13]	NL[#13]	NL[#13]				NL[#13]
Drinking Water			1[#14]	300[#14]	800[#14]				600[#14]
Recreational			10[#9]	3000[#9]	8000[#9]				6000[#9]
Ecological			700[#16]						
VB_MW01	25/03/2014	VB_MW01_250314	<1	<2	<2	<1	<2	<2	<2
VB_MW01	18/05/2015	VB_MW01	<1	<2	<2	<1	<2	<2	<2
VB_MW02	25/03/2014	VB_MW02_250314	<1	<2	<2	<1	<2	<2	<2
VB_MW02	18/05/2015	VB_MW02	<0.05	<0.05	<0.5	<1	<0.05	<0.05	<0.1
VB_MW05	1/04/2014	D01_010414_SN	<1	<2	<2	<1	<2	<2	<2
VB_MW05	1/04/2014	VB_MW05_010414	<1	<2	<2	<1	<2	<2	<2
VB_MW05	18/05/2015	VB_MW05	<1	<2	<2	<1	<2	<2	<2
VG_MW01	31/03/2014	VG_MW01_310314	<1	<2	<2	<1	<2	<2	<2
VG_MW01	19/05/2015	VG_MW01	<1	<2	<2	<1	<2	<2	<2
VH_X_MW06	1/04/2014	VH_X_MW06	5	<2	<2	5	<2	<2	<2
VH_X_MW06	20/05/2015	D02_200515	1	<2	<2	1	<2	<2	<2
VH_X_MW06	20/05/2015	VH_X_MW06	1	<2	<2	1	<2	<2	<2
VH_X_MW08	25/03/2014	VH_X_MW08_250314	210	16	37	297	19	15	34
VH_X_MW08	21/05/2015	VH_X_MW08	124	8	12	156	7	5	12
VI_MW01	25/03/2014	VI_MW01_250314	<1	<2	<2	<1	<2	<2	<2
VI_MW01	18/05/2015	VI_MW01	<1	<2	<2	<1	<2	<2	<2
VJ_MW03	26/03/2014	VJ_MW03_GW	<1	<2	16	16	<2	<2	<2
VJ_MW03	19/05/2015	VJ_MW03	<1	<2	<2	<1	<2	<2	<2
VK_MW02	27/03/2014	VK_MW02_270314	<1	<2	<2	<1	<2	<2	<2
VK_MW02	19/05/2015	VK_MW02	<0.05	<0.05	<0.5	<1	0.11	0.07	0.18
VM_MW04	31/03/2014	VM_MW04	<1	<2	<2	<1	<2	<2	<2
VM_MW04	18/05/2015	D01_180514_AW	<1	<2	<2	<1	<2	<2	<2
VM_MW04	18/05/2015	VM_MW04	<1	<2	<2	<1	<2	<2	<2
VN_MW02	25/03/2014	VN_MW02_250314	<1	<2	<2	<1	<2	<2	<2
VN_MW02	25/03/2014	D01_250314_SN	<1	<2	<2	<1	<2	<2	<2
VN_MW02	19/05/2015	VN_MW02	<1	<2	<2	<1	<2	<2	<2
VP_MW01	1/04/2014	VP_MW01_010414	2	<2	<2	2	<2	<2	<2
VP_MW01	27/05/2014	D02-270514	8	<1	<1	-	<2	<1	<3
VP_MW01	27/05/2014	VP_MW01	6	<2	<2	6	<2	<2	<2
VP_MW01	20/05/2015	T03-200515	1	<1	<1	-	<2	<1	<3
VP_MW01	20/05/2015	DO4_200515	1	<2	<2	1	<2	<2	<2
VP_MW01	20/05/2015	VP_MW01	1	<2	<2	1	<2	<2	<2
VU_MW01	1/04/2014	VU_MW01_010414	<1	<2	<2	<1	<2	<2	<2
VU_MW01	19/05/2015	VU_MW01	<1	<2	<2	<1	<2	<2	<2
VU_MW09	1/04/2014	VU_MW09_010414	<1	<2	<2	<1	<2	<2	<2
VU_MW09	20/05/2015	VU_MW09	<1	<2	<2	<1	<2	<2	<2
VU_MW12	1/04/2014	VU_MW12_010414	<1	<2	<2	<1	<2	<2	<2
VU_MW12	20/05/2015	VU_MW12	<1	<2	<2	<1	<2	<2	<2

Chlorinated Hydrocarbons

LocCode	Sampled_Date-Time	Field_ID	1,1,1-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,2-dichloroethane	Benzyl chloride	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	Dichloromethane	Hexachlorobutadiene	Trichloroethene	Tetrachloroethene	trans-1,2-dichloroethene	Vinyl chloride
			μg/L	μg/L	μg/L	μg/L	mg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L
EQL			0.1	0.1	0.1	0.1	0.0002	0.5	0.1	0.1	0.05	0.1	0.5	0.1	50	0.1	1	0.04	0.05	0.05	0.1	0.3
Vapour Intrusion - Commercial Worker - 2-<4 m																						
Vapour Intrusion - Commercial Worker - 4-<8 m																						
Vapour Intrusion - Commercial Worker - 8 m+																						
Vapour Intrusion - Intrusive Maint Worker 2m -8m+																						
Drinking Water					30[#14]	3[#14]					190[#4]			1910[#4]	4[#7]	60[#8]	4[#14]	0.7[#14]	20[#1]	50[#14]	60[#8]	0.3[#14]
Recreational					300[#9]	30[#9]					1900[#9]			19100[#9]	40[#9]	600[#9]	40[#9]	7[#9]	200[#9]	500[#9]	600[#9]	3[#9]
Ecological																						
VB_MW01	25/03/2014	VB_MW01_250314	<5	<5	<5	<5	-	-	<5	<5	<5	<5	<50	<5	<50	<5	-	<5	<5	<5	<5	<50
VB_MW01	18/05/2015	VB_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VB_MW02	25/03/2014	VB_MW02_250314	<5	<5	<5	<5	-	-	<5	<5	<5	<5	<50	<5	<50	14	-	<5	5	11	<5	<50
VB_MW02	18/05/2015	VB_MW02	<0.1	0.1	0.5	<0.1	<0.0002	<0.5	<0.1	<0.1	<0.05	<0.1	<0.5	<0.1	-	2.1	<1	<0.04	1.02	1.98	<0.1	<0.3
VB_MW05	1/04/2014	D01_010414_SN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VB_MW05	1/04/2014	VB_MW05_010414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VB_MW05	18/05/2015	VB_MW05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VG_MW01	31/03/2014	VG_MW01_310314	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VG_MW01	19/05/2015	VG_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW06	1/04/2014	VH_X_MW06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW06	20/05/2015	D02_200515	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW06	20/05/2015	VH_X_MW06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW08	25/03/2014	VH_X_MW08_250314	<5	<5	<5	<5	-	-	<5	<5	<5	<5	<50	<5	<50	<5	-	<5	<5	<5	<5	<50
VH_X_MW08	21/05/2015	VH_X_MW08	<0.1	<0.1	<0.1	0.2	<0.0002	<0.5	<0.1	<0.1	<0.05	<0.1	<0.5	<0.1	-	<0.1	<1	<0.04	<0.05	<0.05	<0.1	<0.3
VI_MW01	25/03/2014	VI_MW01_250314	<5	<5	<5	<5	-	-	<5	<5	<5	<5	<50	<5	<50	<5	-	<5	<5	<5	<5	<50
VI_MW01	18/05/2015	VI_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VJ_MW03	26/03/2014	VJ_MW03_GW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VJ_MW03	19/05/2015	VJ_MW03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK_MW02	27/03/2014	VK_MW02_270314	<5	<5	<5	<5	-	-	<5	<5	<5	<5	<50	<5	<50	<5	-	<5	<5	<5	<5	<50
VK_MW02	19/05/2015	VK_MW02	<0.1	<0.1	<0.1	<0.1	<0.0002	<0.5	<0.1	<0.1	<0.05	<0.1	<0.5	<0.1	-	<0.1	<1	<0.04	<0.05	<0.05	<0.1	<0.3
VM_MW04	31/03/2014	VM_MW04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VM_MW04	18/05/2015	D01_180514_AW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VM_MW04	18/05/2015	VM_MW04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VN_MW02	25/03/2014	VN_MW02_250314	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VN_MW02	25/03/2014	D01_250314_SN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VN_MW02	19/05/2015	VN_MW02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	1/04/2014	VP_MW01_010414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	27/05/2014	D02-270514	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	27/05/2014	VP_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	20/05/2015	T03-200515	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	20/05/2015	DO4_200515	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	20/05/2015	VP_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW01	1/04/2014	VU_MW01_010414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW01	19/05/2015	VU_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW09	1/04/2014	VU_MW09_010414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW09	20/05/2015	VU_MW09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW12	1/04/2014	VU_MW12_010414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW12	20/05/2015	VU_MW12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistical Summary

Statistic	TRH >C6-C9 Fraction	TRH >C10-C14 Fraction	TRH >C15-C28 Fraction	TRH >C29-C36 Fraction	TRH >C10-C36 Fraction	TRH >C6-C10 Fraction	TRH >C6-C10 less BTEX (F1)	TRH >C10-C16 Fraction	TRH >C10-C16 less Naphthalene (F2)	TRH >C16-C34 Fraction	TRH >C34-C40 Fraction	TRH >C10-C40 Fraction
Number of Results	36	34	34	34	33	36	36	34	28	34	34	33
Number of Detects	7	2	5	0	5	7	6	4	2	5	0	5
Minimum Concentration	<10	<50	<100	<50	<50	<10	<10	<50	<50	<100	<100	<100
Minimum Detect	20	80	160	ND	160	20	20	110	110	120	ND	120
Maximum Concentration	380	90	660	<100	750	390	100	250	150	480	<100	720
Maximum Detect	380	90	660	ND	750	390	100	250	150	480	ND	720
Average Concentration	32	29	113	26	99	33	20	63	55	97	50	119
Median Concentration	10	25	50	25	25	10	10	50	50	50	50	50
Standard Deviation	69	14	169	4.3	196	71	26	44	22	127	0	186
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0

Statistic	Benzene	Ethylbenzene	Toluene	Total BTEX	Xylene (m & p)	Xylene (o)	Xylene Total
Number of Results	38	38	38	36	38	38	38
Number of Detects	11	2	3	10	3	3	3
Minimum Concentration	<0.05	<0.05	<0.5	<1	<0.05	<0.05	<0.1
Minimum Detect	1	8	12	1	0.11	0.07	0.18
Maximum Concentration	210	16	37	297	19	15	34
Maximum Detect	210	16	37	297	19	15	34
Average Concentration	9.8	1.5	2.6	14	1.6	1.4	2.1
Median Concentration	0.5	1	1	0.5	1	1	1
Standard Deviation	39	2.7	6.5	55	3.1	2.4	5.6
Number of Guideline Exceedances	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0

Statistic	1,1,1-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,2-dichloroethane	Benzyl chloride	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	Dichloromethane	Hexachlorobutadiene	Trichloroethene	Tetrachloroethene	trans-1,2-dichloroethene	Vinyl chloride
Number of Results	8	8	8	8	3	3	8	8	8	8	8	8	5	8	3	8	8	8	8	8
Number of Detects	0	1	1	1	0	0	0	0	0	0	0	0	0	2	0	0	2	2	0	0
Minimum Concentration	<0.1	<0.1	<0.1	<0.1	<0.0002	<0.5	<0.1	<0.1	<0.05	<0.1	<0.5	<0.1	<50	<0.1	<1	<0.04	<0.05	<0.05	<0.1	<0.3
Minimum Detect	ND	0.1	0.5	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1	ND	ND	1.02	1.98	ND	ND
Maximum Concentration	<5	<5	<5	<5	<0.0002	<0.5	<5	<5	<5	<5	<50	<5	<50	14	<1	<5	5	11	<5	<50
Maximum Detect	ND	0.1	0.5	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	14	ND	ND	5	11	ND	ND
Average Concentration	1.6	1.6	1.6	1.6	0.0001	0.25	1.6	1.6	1.6	1.6	16	1.6	25	3.3	0.5	1.6	2	2.9	1.6	16
Median Concentration	2.5	2.5	2.5	2.5	0.0001	0.25	2.5	2.5	2.5	2.5	25	2.5	25	2.5	0.5	2.5	2.5	2.5	2.5	25
Standard Deviation	1.3	1.3	1.2	1.2	0	0	1.3	1.3	1.3	1.3	13	1.3	0	4.5	0	1.3	1.6	3.5	1.3	13
Number of Guideline Exceedances	0	0	0	5	0	0	0	0	0	0	0	0	5	0	0	5	0	0	0	5
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Comments

#1 WHO (2011) DWQ
#2 US EPA (2009) - Drinking water
#3 SRC eco gw
#4 RIVM 2001 (Human-toxicological SRC GW) V Chlorinated Hydrocarbons
#5 RIVM (2010) Environmental risk limits for PFOS - Maximim Acceptable Concentration
#6 RIVM (2001); SRC eco
#7 NHMRC 2011 ADWG Health (value for dichloromethane)
#8 NHMRC 2011 ADWG Health (total 1,2-dichloroethene)
#9 Guidelines for Managing Risk in Recreational Waters (2008) (GMRRW)
#10 ASC NEPM (2103) HSL for vapour intrusion HSL-D (Commercial/Industrial) 8m+
#11 ASC NEPM (2103) HSL for vapour intrusion HSL-D (Commercial/Industrial) 4-<8 m
#12 ASC NEPM (2103) HSL for vapour intrusion HSL-D (Commercial/Industrial) 2-<4 m
#13 ASC NEPM (2013) HSL for Intrusive Maint Workers 2m -8m+
#14 ASC NEPM (2013) GIL - Drinking Water
#15 ANZECC (2000) Marine - low reliability value
#16 ANZECC (2000) Marine - 95% level of protection
#17 ANZECC (2000) established background level

				Halogenated Benzenes										Halogenated Hydrocarbons				Solvents		
				1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Chlorobenzene	Trichlorobenzene (total)	1,2-dibromoethane	Bromomethane	Dichlorodifluoromethane	Trichlorofluoromethane	Methyl Ethyl Ketone	MTBE	Vinyl acetate
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L
EQL				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0001	0.1	0.5	0.5	0.5	50	0.0001	50
Vapour Intrusion - Commercial Worker - 2-<4 m																				
Vapour Intrusion - Commercial Worker - 4-<8 m																				
Vapour Intrusion - Commercial Worker - 8 m+																				
Vapour Intrusion - Intrusive Maint Worker 2m -8m+																				
Drinking Water				593[#4]	743[#4]	1500[#4]		40[#4]					0.03[#4]	1[#14]	1[#14]					
Recreational				5930[#9]	7430[#9]	15000[#9]		400[#9]					0.3[#9]	10[#9]	10[#9]					
Ecological					80[#16]															
LocCode	Sampled_Date-Time	Monitoring_Zone	Field_ID																	
VB_MW01	25/03/2014	VB	VB_MW01_250314	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<50	<50	<50	<50	-	<50
VB_MW01	18/05/2015	VB	VB_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VB_MW02	25/03/2014	VB	VB_MW02_250314	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<50	<50	<50	<50	-	<50
VB_MW02	18/05/2015	VB	VB_MW02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0001	-	<0.5	<0.5	<0.5	-	<0.0001	-
VB_MW05	1/04/2014	VB	D01_010414_SN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VB_MW05	1/04/2014	VB	VB_MW05_010414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VB_MW05	18/05/2015	VB	VB_MW05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VG_MW01	31/03/2014	VG	VG_MW01_310314	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VG_MW01	19/05/2015	VG	VG_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW06	1/04/2014	VH	VH_X_MW06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW06	20/05/2015	VH	D02_200515	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW06	20/05/2015	VH	VH_X_MW06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VH_X_MW08	25/03/2014	VH	VH_X_MW08_250314	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<50	<50	<50	<50	-	<50
VH_X_MW08	21/05/2015	VH	VH_X_MW08	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0001	-	<0.5	<0.5	<0.5	-	0.0006	-
VI_MW01	25/03/2014	VI	VI_MW01_250314	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<50	<50	<50	<50	-	<50
VI_MW01	18/05/2015	VI	VI_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VJ_MW03	26/03/2014	VJ	VJ_MW03_GW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VJ_MW03	19/05/2015	VI	VJ_MW03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VK_MW02	27/03/2014	VK	VK_MW02_270314	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<50	<50	<50	<50	-	<50
VK_MW02	19/05/2015	VK	VK_MW02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0001	<0.1	<0.5	<0.5	<0.5	-	<0.0001	-
VM_MW04	31/03/2014	VM	VM_MW04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VM_MW04	18/05/2015	VM	D01_180514_AW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VM_MW04	18/05/2015	VM	VM_MW04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VN_MW02	25/03/2014	VN	VN_MW02_250314	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VN_MW02	25/03/2014	VN	D01_250314_SN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VN_MW02	19/05/2015	VN	VN_MW02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	1/04/2014	VP	VP_MW01_010414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	27/05/2014	VP	D02-270514	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	27/05/2014	VP	VP_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	20/05/2015	VP	T03-200515	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	20/05/2015	VP	DO4_200515	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VP_MW01	20/05/2015	VP	VP_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW01	1/04/2014	VU	VU_MW01_010414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW01	19/05/2015	VU	VU_MW01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW09	1/04/2014	VU	VU_MW09_010414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW09	20/05/2015	VU	VU_MW09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW12	1/04/2014	VU	VU_MW12_010414	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VU_MW12	20/05/2015	VU	VU_MW12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistical Summary

Number of Results	8	8	8	8	8	8	8	8	8	3	6	8	8	8	5	3	5
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Minimum Concentration	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.0001	<0.1	<0.5	<0.5	<0.5	<50	<0.0001	<50
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0006	ND
Maximum Concentration	<5	<5	<5	<5	<5	<5	<5	<5	<5	<0.0001	<5	<50	<50	<50	<50	0.0006	<50
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0006	ND
Average Concentration	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	0.00005	2.1	16	16	16	25	0.00023	25
Median Concentration	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0.00005	2.5	25	25	25	25	0.00005	25
Standard Deviation	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0	1	13	13	13	0	0.00032	0
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Comments

#1 WHO (2011) DWQ
#2 US EPA (2009) - Drinking water
#3 SRC eco gw
#4 RIVM 2001 (Human-toxicological SRC GW) V Chlorinated Hydrocarbons
#5 RIVM (2010) Environmental risk limits for PFOS - Maximim Acceptable Concentratic
#6 RIVM (2001); SRC eco
#7 NHMRC 2011 ADWG Health (value for dichloromethane)
#8 NHMRC 2011 ADWG Health (total 1,2-dichloroethene)
#9 Guidelines for Managing Risk in Recreational Waters (2008) (GMRRW)
#10 ASC NEPM (2103) HSL for vapour intrusion HSL-D (Commercial/Industrial) 8m+
#11 ASC NEPM (2103) HSL for vapour intrusion HSL-D (Commercial/Industrial) 4-<8 r
#12 ASC NEPM (2103) HSL for vapour intrusion HSL-D (Commercial/Industrial) 2-<4 r
#13 ASC NEPM (2013) HSL for Intrusive Maint Workers 2m -8m+
#14 ASC NEPM (2013) GIL - Drinking Water
#15 ANZECC (2000) Marine - low reliability value
#16 ANZECC (2000) Marine - 95% level of protection
#17 ANZECC (2000) established background level

Annex C

Field Documentation

Oil / Water Interface Meter

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Instrument Geotech Interface Meter (30M)
Serial No. 4000

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: AR Anne Rutlidge

Calibration date: 13/05/2015

Next calibration due: 12/07/2015

Oil / Water Interface Meter

Instrument Geotech Interface Meter (30M)
Serial No. 3910

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: AR Anne Rutlidge

Calibration date: 13/05/2015

Next calibration due: 12/07/2015

PID Calibration Certificate

Instrument Minirae 3000
Serial No. 592-001359

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm	10ppm	15ppm
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		100ppm Isobutylene	NIST	SY21		100.0ppm

Calibrated by: AR Anne Rutlidge

Calibration date: 14/05/2015

Next calibration due: 10/11/2015

Groundwater - Well Sampling Data Form

ERM

Job Information

Date:	18.05.2015	Time: arrive	0730 depart 1530
Project Name:	0300879	Project Number:	0300376
Site Location:	VALES POINT POWER STATION	Sampler:	A. WILLIAMS
Well ID:	VB_MW01	Weather:	RAIN

Equipment

Water quality equipment description: YST 11K701271 Interface probe number: GEOTECH #4000

Purging equipment (please circle): Bailer type: Plastic Teflon No Purge: HydraSleeve

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
4.032 m (-) 0.802 m (=) 3.2 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
~3.2 m (x) 1.96 (=) ~6.4 L

Product present: Y N Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y N

Water Quality Parameters

Beginning purge time: 0916 Ending purge time: 0933 Intake depth: ~3.5

Litres	Time	DO mg/L	EC µS/cm	pH	Temp °C	ORP mV	Drawdown <10cm	Comments
0.5	0919	0.58	978	4.80	22.5	208.2	0.911	SLIGHTLY GREEN IN COLOUR, CLEAR, NO ODOUR
1.0	0921	0.39	995	4.21	22.6	224.4	0.965	"
1.5	0924	0.42	947	4.15	22.4	230.3	0.971	"
2.0	0927	0.43	951	4.09	22.3	240.0	0.986	"
2.5	0930	0.46	946	4.04	22.4	246.6	0.992	"
3.0	0933	0.47	946	4.05	22.3	248.0	0.998	"
								*SAMPLE TAKEN

*pH, temp, EC readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

3L Total Well Volume (Actual amount of water prior to sampling) 150- Flow rate mL/minute Did field parameters stabilise? Y N NA Was the well purged dry? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	
Rinsate blank collected?	Y	N	

Sample time: 0936 TRH/BTEX

No. Containers used: 4 PFOS.

Type: _____

Duplicate sample ID: NA

Rinsate blank ID: NA.

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	18.5.15	Time: arrive	900 depart 945
Project Name:	Symphony	Project Number:	0300379
Site Location:	Vale's Point	Sampler:	J. Grant
Well ID:	VB_MW02	Weather:	Rain

Equipment

Water quality equipment description: YSI 11K101271 Interface probe number: NSW 4000-1

Purging equipment (please circle): Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	(1.96)	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
4.055 m (-) 1.105 m (=) 2.95 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
2.95 m (x) 1.96 (=) 5.782 L

Depth to product: / m Product Thickness: / m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 910 Ending purge time:

Litres	Time	PH	Temp °C	Cond µS/cm	DO ppm mg/L	Redox mV	Drawdown <10cm	Comments
1	914	4.85	22.1	398.2	0.31	58.6	1.330	Clear, No odour
2	918	4.23	22.0	395.8	0.59	61.0	1.460	
3	922	4.16	21.9	392.9	1.03	60.4	1.540	
4	926	4.13	21.7	391.4	1.12	59.1	1.595	
5	930	4.12	21.8	391.2	1.13	58.5	1.635	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

5 Total Well Volume — Actual amount of water prior to sampling

Sample time 930 Containers used 4

250 Flow rate mL/minute

Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Were air bubbles present in vials at time of collection?	Y	(N)	NA	
Was sample for metals field filtered prior to preservations?	Y	N	(NA)	
Duplicate sample collected?	Y	(N)		Duplicate sample ID _____
Rinsate blank collected?	Y	(N)		Rinsate blank ID _____

Phenols TRH / BTEX

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	18.5.11	Time: arrive	1000 depart 1055
Project Name:	SYMBIONT 2	Project Number:	0300379
Site Location:	VALES POINT	Sampler:	S. Grant
Well ID:	VB_MW03	Weather:	fair

Equipment						
Water quality equipment description:	YSI 11K101271			Interface probe number:	NSW 4000 30m	
Purging equipment: (please cirlce)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
5.273 m (-) 2.435 m (=) 2.838 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
2.838 m (x) 1.96 (=) 5.56 L

Depth to product: / m Product Thickness: / m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1022 Ending purge time:

Litres	Time	PH	Temp °C	Cond µS/cm	DO ppm	Redox mV	Drawdown <10cm	Comments
1	1026	4.49	20.9	2117	0.50	-41.2	2.455	Cloudy with slight purplish
2	1030	4.45	20.9	2149	0.57	-43.1	2.465	brown tinge, strong H_2S odour
3	1034	4.43	21.0	2145	0.83	-39.0	2.465	
4	1038	4.42	21.0	2172	1.14	-38.7	2.460	
5	1042	4.40	21.0	2172	1.19	-32.0	2.460	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

5 — Total Well Volume (Actual amount of water prior to sampling)

250 — Flow rate mL/minute

Sample time 1042 Containers used 1

Did field parameters stabilise? Y N NA

Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	N	(NA)
Was sample for metals field filtered prior to preservations?	Y	N	(NA)
Duplicate sample collected?	Y	(N)	Duplicate sample ID _____
Rinsate blank collected?	Y	(N)	Rinsate blank ID _____

Groundwater - Well Sampling Data Form

ERM

Job Information

Date:	18.5.15	Time: arrive	1105 depart 1150
Project Name:	SYMPHONY II	Project Number:	0300379
Site Location:	VALES POINT	Sampler:	S. Grant
Well ID:	VB_MW05u	Weather:	Rain

Equipment

Water quality equipment description: YSI 11K101271 Interface probe number: NSW 4000 30m

Purging equipment (please circle) — Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column

6.125 m (-) 2.055 m (=) 4.070 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume

4.070 m (x) 1.96 (=) 7.98 L

Depth to product: 1 m Product Thickness: 1 m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1114 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO ppm	Redox mV	Drawdown <10cm	Comments
1	1118	3.28	24.3	3812	0.43	33.2	2.275	Clear, No odour
2	1122	3.28	24.3	3755	0.45	42.3	2.435	
3	1126	3.31	24.3	3594	0.65	51.2	2.670	
4	1130	3.31	24.3	3514	0.78	62.6	2.810	
5	1134	3.32	24.2	2743	1.70	106.2	2.970	
6	1138	3.32	24.1	2446	2.050	116.7	3.150	
7	1142	3.31	24.2	2541	1.99	115.5	3.330	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

7 — Total Well Volume, Actual amount of water prior to sampling

Sample time 1142 Containers used 2

250 — Flow rate mL/minute

Did field parameters stabilise? (Y) N NA

Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	Y	N	(NA)
Duplicate sample collected?	Y	(N)	Duplicate sample ID _____
Rinsate blank collected?	Y	(N)	Rinsate blank ID _____

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	20.5.15	Time: arrive	1135 depart 1215
Project Name:	Symphony II	Project Number:	0300379
Site Location:	Vales Point	Sampler:	J. Grant
Well ID:	VP-MW03	Weather:	Fine

Equipment						
Water quality equipment description:	YSI 11K101271	Interface probe number:	NSW 4000 30m			
Purging equipment: (please circle)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
3.535 m (-) 0.551 m (=) 2.984 m 2.984

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
2.984 m (x) 1.96 (=) 5.849 L

Depth to product: ____ m Product Thickness: ____ m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1145 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO ~~mg/L~~ ppm	Redox mV	Drawdown <10cm	Comments
1	1149	3.45	21.7	3499	0.21	63.8	0.65	Clear, No odour
2	1153	3.53	21.8	3788	0.32	54.2	0.67	
3	1157	3.59	21.9	4217	0.41	48.9	0.67	
4	1201	3.61	22.0	4449	0.52	45.0	0.68	
5	1205	3.63	22.0	4501	0.54	43.7	0.68	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

5 Total Well Volume — Actual amount of water prior to sampling

Sample time 1205 Containers used 1

250 Flow rate mL/minute

Did field parameters stabilise? (Y) N NA

Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Were air bubbles present in vials at time of collection?	Y	N	(NA)	
Was sample for metals field filtered prior to preservations?	Y	N	(NA)	
Duplicate sample collected?	Y	(N)		Duplicate sample ID ____
Rinsate blank collected?	Y	(N)		Rinsate blank ID ____

Groundwater - Well Sampling Data Form

ERM

Job Information

Date:	18.5.15	Time: arrive 1300	depart 1400
Project Name:	SYMPHONY II	Project Number:	0300379
Site Location:	VALES POINT	Sampler:	J. Hunt
Well ID:	VE_MW02	Weather:	Rain

Equipment

Water quality equipment description: YSI

Interface probe number: NSW 4000 30m

Purging equipment: (please circle)

Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column

4.043 m (-) 1.235 m (=) 2.808 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume

2.808 m (x) 1.96 (=) 5.50 L

Depth to product: / m Product Thickness: / m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1314 Ending purge time:

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	1318	4.05	21.5	3424	0.34	9.5	1.270	Slight brown tinge, H_2S odour
2	1322	4.00	21.3	3357	0.60	6.6	1.285	clear, H_2S odour
3	1326	4.17	21.2	3256	0.80	4.0	1.290	
4	1330	4.43	21.0	3068	1.05	0.9	1.300	
5	1334	4.80	20.9	2735	1.45	-4.9	1.310	
6	1338	4.87	20.9	2655	1.59	-6.8	1.325	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

6 Total Well Volume — Actual amount of water prior to sampling

Sample time 1338 Containers used 1

250 Flow rate mL/minute

Did field parameters stabilise? Y N NA

Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Were air bubbles present in vials at time of collection?	Y	N	(NA)	
Was sample for metals field filtered prior to preservations?	Y	N	(NA)	
Duplicate sample collected?	Y	(N)		Duplicate sample ID
Rinsate blank collected?	Y	(N)		Rinsate blank ID

Groundwater - Well Sampling Data Form

ERM

Job Information

Date: 19/5/15	Time: arrive 14:20 depart 15:00
Project Name: Symphony	Project Number: 0300379
Site Location: Vales Point	Sampler: D. Brookes
Well ID: VG_MW01	Weather: Overcast

Equipment

Water quality equipment description: 451 Interface probe number:

Purging equipment: (please circle)
Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible (Micro-purge) Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
14.645 m (-) 8.265 m (=) 6.38 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
6.38 m (x) 1.96 (=) 12.5 L

Depth to product: — m Product Thickness: — m Verified with Bailer: Y N

Water Quality Parameters

Beginning purge time: 14:23 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
0.2	14:25	5.11	21.5	0.218	4.90	102.3	8.375	Cloudy, pale brown, no odour.
0.8	14:28	4.94	21.4	0.212	1.27	109.2	8.450	" "
1.4	14:31	4.84	21.3	0.204	1.05	106.9	8.505	" "
2.0	14:34	4.81	21.3	0.202	1.04	106.5	8.535	" "
2.6	14:37	4.78	21.3	0.199	1.11	104.5	8.630	" "
3.2	14:40	4.75	21.3	0.197	1.16	101.9	8.665	" "
3.8	14:43	4.74	21.3	0.196	1.17	100.9	8.695	" "

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

3.8 Total Well Volume — Actual amount of water prior to sampling
Sample time 14:43 Containers used 4

2000 Flow rate mL/minute
Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	
Rinsate blank collected?	Y	(N)	

TRH, BTEX, Phenols Metals.

Duplicate sample ID —
Rinsate blank ID —

Groundwater - Well Sampling Data Form

ERM

Job Information

Date: 19/5/15	Time: arrive 10:30 depart 11:00
Project Name: Symphony	Project Number: 0300379
Site Location: Vales Point	Sampler: D. Brookes
Well ID: VG-MW02	Weather: Overcast

Equipment

Water quality equipment description: YSI 1400101796 Interface probe number: SYD 3909

Purging equipment (please circle): Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible (Micro-purge) Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
9.650 m (-) 7.585 m (=) 2.065 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
2.065 m (x) 1.96 (=) ~4 L

Depth to product: — m Product Thickness: — m Verified with Bailer: Y / N

Water Quality Parameters

Beginning purge time: 10:31 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
0.2	10:33	4.38	20.7	4.79	1.56	170.2	7.680	Slightly cloudy, pale brown, no odour.
0.8	10:36	3.51	20.5	4.93	1.25	175.1	7.700	" "
1.4	10:39	3.47	20.5	4.89	1.46	154.7	7.720	" "
2.0	10:42	3.45	20.6	4.80	1.51	128.3	7.740	" "
2.6	10:45	3.44	20.6	4.79	1.53	125.1	7.765	" "
3.2	10:48	3.44	20.6	4.75	1.61	120.3	7.786	" "
3.8	10:51	3.43	20.7	4.74	1.54	118.2	7.800	" "

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

3.8 Total Well Volume — Actual amount of water prior to sampling. Sample time 10:51 Containers used 1

200 Flow rate mL/minute. Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	
Rinsate blank collected?	Y	(N)	

Metals

Duplicate sample ID —

Rinsate blank ID —

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	20. 05 . 2015	Time: arrive	0730 depart 1530
Project Name:	SYMPHONY	Project Number:	0300376
Site Location:	VALES POINT POWER STATION	Sampler:	A. NILLIAMS
Well ID:	VH_X_MW01	Weather:	RAIN

Equipment

Water quality equipment description: YSI 09K700887 Interface probe number: GEOTECH #4000

Purging equipment: (please circle) Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column

5.180 m (-) 1.071 m (=) 4.1 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume

4.1 m (x) 1.96 (=) 8.2 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y N

Water Quality Parameters

Beginning purge time: 0852 Ending purge time: 0921

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	0859	3.45	20.5	6496	0.65	337.3	1.125	CLEAR, NO ODOUR
2	0902	3.42	20.5	6505	0.47	350.7	1.125	" " " "
3	0908	3.39	20.6	6542	1.02	379.3	1.125	" " " "
4	0912	3.39	20.7	6425	0.55	398.3	1.125	" " " "
5	0919	3.41	20.5	6179	0.54	440.3	1.125	" " " "
6	0921	3.41	20.5	6177	0.56	448.5	1.125	" " " "
								*SAMPLE TAKEN
								PID 0.0

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

6L Total Well Volume
Actual amount of water prior to sampling

~150 Flow rate mL/minute

Sample time 094 Containers used 1

Did field parameters stabilise? Y N NA

Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID NA
Rinsate blank collected?	Y	N	Rinsate blank ID

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	20.5.15	Time: arrive	820 depart 850
Project Name:	Symphony II	Project Number:	0300379
Site Location:	Vales Point	Sampler:	J. Grant
Well ID:	VH-MW03	Weather:	Rain

Equipment						
Water quality equipment description:	YSI 1161271			Interface probe number:	NSW 4000 3m	
Purging equipment: (please circle)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
5.205 m (-) 1.005 m (=) 4.200 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
4.200 m (x) 1.96 (=) 8.232 L

Depth to product: / m Product Thickness: / m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 819 Ending purge time:

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L ppm	Redox mV	Drawdown <10cm	Comments
1	823	3.26	22.6	6743	0.27	88.5	1.170	Slightly cloudy & No odour
2	827	3.10	22.6	7091	0.44	95.2	1.190	
3	831	3.08	22.7	6836	0.77	99.3	1.190	
4	835	3.09	22.6	6722	1.08	100.1	1.195	
5	839	3.09	22.7	6767	1.35	99.1	1.195	
								Head space: 0.0 ppm VOC

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

5 — Total Well Volume (Actual amount of water prior to sampling)

250 — Flow rate mL/minute

Sample time 840 Containers used 1

Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	N	(NA)
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	Duplicate sample ID ____
Rinsate blank collected?	Y	(N)	Rinsate blank ID ____

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	20.5.15	Time: arrive	900 depart
Project Name:	Symphony Hill	Project Number:	0300376
Site Location:	Vales Point	Sampler:	J. Grant
Well ID:	VH-X-MW04	Weather:	Rain

Equipment						
Water quality equipment description:	YSI 11K10271			Interface probe number:	Dipper 400 30m	
Purging equipment: (please circle)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
5.125 m (-) 0.981 m (=) 4.144 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
4.144 m (x) 1.96 (=) 8.122 L

Depth to product: / m Product Thickness: / m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 905 Ending purge time:

Litres	Time	PH	Temp °C	Cond uS/cm	DO ppm	Redox mV	Drawdown <10cm	Comments
1	909	2.84	22.2	5518	0.82	106.9		Cloudy Reddish brown, no odour
2	913	2.89	22.2	5511	0.86	112.1		
3	917	2.89	22.2	5505	1.13	114.6		
4	921	2.89	22.2	5496	1.63	114.3		
5	925	2.89	22.2	5484	1.73	114.2		Head Space 0.0 ppm VOC

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

5 — Total Well Volume (Actual amount of water prior to sampling)

250 — Flow rate mL/minute

Sample time 925 Containers used 1

Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Were air bubbles present in vials at time of collection?	Y	N	(NA)	
Was sample for metals field filtered prior to preservations?	(Y)	N	NA	
Duplicate sample collected?	Y	(N)		Duplicate sample ID _____
Rinsate blank collected?	Y	(N)		Rinsate blank ID _____

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	20.5.15	Time: arrive	1000 depart
Project Name:	SYMPHONY IL	Project Number:	0300379
Site Location:	Vales Point	Sampler:	J. Grant
Well ID:	VH_X_MW06	Weather:	Overcast

Equipment

Water quality equipment description: YSI 11K10127 | Interface probe number: NSW 4000 3um

Purging equipment (please circle): Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
3.275 m (-) 1.160 m (=) 2.115 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
2.115 m (x) 1.96 (=) 4.145 L

Depth to product: / m Product Thickness: / m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1007 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO ppm	Redox mV	Drawdown <10cm	Comments
1	1011	2.85	20.7	5634	0.40	126.7	1.245	Cloudy Reddish brown, No odour
2	1015	2.86	20.7	5663	0.55	134.7	1.260	
3	1019	2.87	20.8	5794	0.78	133.2	1.260	
4	1023	2.87	20.8	5934	1.02	126.4	1.260	
5	1027	2.87	20.8	6014	1.30	120.2	1.260	Ultra trace used for metals
6	1031	2.87	20.8	6033	1.48	119.5	1.260	
								0.0 PPM VOC head space

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

6 Total Well Volume — Actual amount of water prior to sampling

Sample time 1035 Containers used 3(3,3)

250 Flow rate mL/minute

Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	(Y)	N	
Rinsate blank collected?	Y	(N)	

DOZ-200515
TOZ-200515

Duplicate sample ID _____

Rinsate blank ID _____

Groundwater - Well Sampling Data Form

ERM

Job Information

Date: 20.05.2015	Time: arrive 0730 depart 1530
Project Name: SYMPHONY	Project Number: 0300376
Site Location: VALES POINT POWER STATION	Sampler: A. WILLIAMS
Well ID: VH_X_MW08	Weather: RAIN

Equipment

Water quality equipment description: YSI 09K101221 Interface probe number: GEOTECH #4000

Purging equipment: (please circle)
Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
3.275 m (-) 1.120 m (=) 2.1 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
2.1 m (x) 1.96 (=) 4.2 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y / N

Water Quality Parameters

Beginning purge time: 0950 Ending purge time: 1009

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	0955	3.98	21.2	5614	0.44	285.0	1.332	CLEAR, NO ODOUR
2	0958	3.97	21.0	5584	0.31	262.6	1.336	" " " "
3	1003	3.97	21.2	5590	0.33	258.4	1.358	" " " "
4	1006	3.97	21.2	5587	0.38	237.6	1.358	" " " "
5	1009	3.97	21.1	5578	0.41	203.5	1.358	" " " "
								* SAMPLE TAKEN
								PID 0.0

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

5L — Total Well Volume
Actual amount of water prior to sampling

450 — Flow rate mL/minute

Sample time 1015 Containers used 3

Did field parameters stabilise? Y / N / NA

Was the well dry purged? Y / N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	
Rinsate blank collected?	Y	N	

Duplicate sample ID NA

Rinsate blank ID

Groundwater - Well Sampling Data Form

ERM

Job Information

Date: 18 · 05 · 2015	Time: arrive 0736 depart 1530
Project Name: 0300379	Project Number: 0300379
Site Location: VALES POINT POWER STATION	Sampler: A.WILLIAMS
Well ID: VL_MW01	Weather: RAIN

Equipment

Water quality equipment description: YSI 09K100887 Interface probe number: GEOTECH SYD 3883

Purging equipment: (please circle) Bailer type: Plastic Teflon

Pump type: (Peristaltic) Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
3.930 m (-) 0.902 m (=) ~3 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
~3 m (x) 1.96 (=) ~6 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 0956 Ending purge time: 1014 ~3.5m

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
0.5	09.59	4.38	20.9	789	1.08	158.5	1.010	SLIGHTLY CLOUDY, BROWN COLOUR NO ODOUR
1.0	10.02	4.41	20.8	788	0.36	132.5	1.019	"
1.5	10.05	4.39	20.7	795	0.40	152.5	1.038	"
2.0	10.08	4.38	20.7	868	0.33	193.4	1.052	"
2.5	10.11	4.38	20.7	815	0.41	221.4	1.067	"
3.0	1014	4.38	20.7	822	0.43	222.5	1.082	"
								* SAMPLE TAKEN

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

3L **Total Well Volume** Actual amount of water prior to sampling Sample time 1015 Containers used 4 5

~150 **Flow rate** mL/minute Did field parameters stabilise? Y N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	Y	N	(NA)
Duplicate sample collected?	Y	(N)	
Rinsate blank collected?	Y	(N)	

PFOS / CATIONS + ANIONS

VIALS - TRH/BTEX

Duplicate sample ID

Rinsate blank ID NA

Groundwater - Well Sampling Data Form

ERM

Job Information	
Date: 19/5/15	Time: arrive 09:30 depart 10:10
Project Name: Symphony	Project Number: 0300379
Site Location: Vales Point	Sampler: D. Brookes
Well ID: VJ-MW03	Weather: Overcast

Equipment						
Water quality equipment description:				Interface probe number:		
Purging equipment: (please circle)	Bailer type:	Plastic	Teflon			
	Pump type:	(Peristaltic)	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
6.985 m (-) 3.495 m (=) 3.49 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
3.49 m (x) 1.96 (=) 6.8 L

Depth to product: — m Product Thickness: — m Verified with Bailer: Y / N

Water Quality Parameters

Beginning purge time: 09:38 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
0.2	09:40	7.51	20.5	0.425	0.48	-151.9	3.675	Turbid, dark brown, organic odour
0.8	09:43	6.66	20.7	0.418	0.25	-149.5	3.800	Slightly cloudy, colourless, no odour.
1.4	09:46	6.36	20.7	0.413	0.21	-147.1	3.880	" "
2.0	09:49	6.17	20.8	0.410	0.14	-153.1	3.950	" "
2.6	09:52	6.15	20.8	0.409	0.15	-153.6	4.150	" "
3.2	09:55	6.09	20.9	0.408	0.14	-151.1	4.244	" "
3.8	09:58	6.06	20.8	0.409	0.14	-105.4	~~4~~ 3.900	" "

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

3.8 Total Well Volume — Actual amount of water prior to sampling
Sample time 09:58 Containers used 3

200 Flow rate mL/minute
Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	Y	N	(NA)
Duplicate sample collected?	Y	(N)	
Rinsate blank collected?	Y	(N)	

TRH, BTEX, Phenols

Duplicate sample ID —

Rinsate blank ID —

Groundwater - Well Sampling Data Form

ERM

Job Information	
Date: 19/5/15	Time: arrive 11:15 depart 12:00
Project Name: Symphony	Project Number: 0300379
Site Location: Vales Point	Sampler: D. Brookes
Well ID: VJ_MW09	Weather: Overcast.

Equipment

Water quality equipment description: Interface probe number:

Purging equipment: (please circle) Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible (Micro-purge) Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
6.730 m (-) 4.545 m (=) 2.185 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
2.185 m (x) 1.96 (=) 4.3 L

Depth to product: _____ m Product Thickness: _____ m Verified with Bailer: Y / N

Water Quality Parameters

Beginning purge time: 11:20 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
0.2	11:22	5.48	20.1	0.93	3.69	63.8	4.650	Slightly cloudy, pale brown, organic odour.
0.8	11:25	5.63	20.3	0.88	3.42	64.1	4.685	" "
1.4	11:28	5.65	20.4	0.93	3.25	62.6	4.750	" "
2.0	11:31	5.65	20.4	0.87	3.19	62.1	4.800	" "
2.6	11:34	5.65	20.5	0.89	3.20	61.5	4.844	" "
3.2	11:37	5.65	20.5	0.86	3.11	61.3	4.866	" "
3.8	11:40	5.64	20.5	0.89	3.20	61.2	4.900	" "

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

3.8 Total Well Volume — Actual amount of water prior to sampling

Sample time 11:40 Containers used 1

200 Flow rate mL/minute

Did field parameters stabilise? (Y) N NA

Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	
Rinsate blank collected?	Y	(N)	

Metals

Duplicate sample ID _____

Rinsate blank ID _____

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	19/5/15	Time: arrive 12:05 depart	12:40
Project Name:	Symphony	Project Number:	0390379
Site Location:	Vales Point	Sampler:	D. Brookes
Well ID:	VK_MW02	Weather:	Fine

Equipment						
Water quality equipment description:			Interface probe number:			
Purging equipment: (please circle)	Bailer type:	Plastic	Teflon			
	Pump type:	(Peristaltic)	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
6.040 m (-) 2.162 m (=) 3.878 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
3.878 m (x) 1.96 (=) 7.6 L

Depth to product: ~ m Product Thickness: ~ m Verified with Bailer: (Y) N

Water Quality Parameters

Beginning purge time: 12:25 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
0.2	12:12	4.02	22.6	0.415	0.4	123.7	2.235	Clear, colourless, no odour.
0.8	12:15	3.90	22.6	0.412	0.27	106.7	2.255	" "
1.4	12:18	3.89	22.8	0.414	0.21	43.1	2.265	" "
2.0	12:21	3.91	22.9	0.414	0.22	30.0	2.270	" "
2.6	12:24	3.92	22.8	0.414	0.24	25.1	2.278	" "
3.2	12:27	3.93	22.9	0.413	0.27	16.5	2.278	" "
3.8	12:30	3.93	22.9	0.413	0.31	10.7	2.280	" "

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

3.8 Total Well Volume — Actual amount of water prior to sampling Sample time 12:30 Containers used 4

200 Flow rate mL/minute Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	Duplicate sample ID ~
Rinsate blank collected?	Y	(N)	Rinsate blank ID ~

Metals, TRH, BTEX, PAH, Phenols, VOC

Groundwater - Well Sampling Data Form

ERM

Job Information

Date:	19.5.15	Time: arrive 925 depart	1000
Project Name:	Symphony II	Project Number:	0300379
Site Location:	Vales Point	Sampler:	J.H / A.W.
Well ID:	VL_MW02	Weather:	Overcast

Equipment

Water quality equipment description: YSI 11K101271 Interface probe number: NSW 4000 30m

Purging equipment: (please circle) Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column

7.845 m (-) 2.535 m (=) 5.31 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume

5.31 m (x) 1.96 (=) 10.408 L

Depth to product: _____ m Product Thickness: _____ m Verified with Bailer: Y / N

Water Quality Parameters

Beginning purge time: 935 Ending purge time: 0955

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	939	3.52	20.1	839	0.36	147.4	3.025	Slight reddish brown tinge,
2	943	3.51	20.1	834	0.79	175.8	3.185	mild H_2S odour
3	947	3.66	20.1	836	1.04	171.5	3.295	
4	951	3.67	20.1	833	1.26	169.9	3.345	
5	955	3.74	20.1	835	1.44	159.2	3.375	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

5 Total Well Volume — Actual amount of water prior to sampling

Sample time 958 Containers used 1

250 Flow rate mL/minute

Did field parameters stabilise? Y / N / NA Was the well dry purged? Y / N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N		
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N		
Was documentation of equipment conducted?	Y	N	NA	
Were air bubbles present in vials at time of collection?	Y	N	NA	
Was sample for metals field filtered prior to preservations?	Y	N	NA	
Duplicate sample collected?	Y	N		Duplicate sample ID NA
Rinsate blank collected?	Y	N		Rinsate blank ID

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	18.5.15	Time: arrive 1155	depart 1235
Project Name:	Symphony II	Project Number:	0300379
Site Location:	Vales Point	Sampler:	J. Grant
Well ID:	VM-MW03	Weather:	Rain

Equipment

Water quality equipment description: YSI 11K101271 Interface probe number: NSW 4000 30m

Purging equipment (please circle): Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
4.105 m (-) 2.280 m (=) 1.825 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
1.825 m (x) 1.96 (=) 3.577 L

Depth to product: / m Product Thickness: / m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1205 Ending purge time:

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	1209	5.72	23.0	2728	1.33	49.1	2.350	Turbid brownish red, no odour
2	1213	5.88	23.2	2609	0.95	37.5	2.360	↳ becoming cloudy orange
3	1217	5.95	23.2	2528	0.86	29.4	2.360	↳ orange tinge, no odour
4	1221	5.98	23.3	2481	1.07	25.8	2.360	Slight orange tinge, no odour
								Silty bottom

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

4 Total Well Volume — Actual amount of water prior to sampling

Sample time _____ Containers used 2 (42)

250 Flow rate mL/minute

Did field parameters stabilise? (Y) N NA

Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	N	(NA)
Was sample for metals field filtered prior to preservations?	Y	N	(NA)
Duplicate sample collected?	(Y)	N	
Rinsate blank collected?	Y	(N)	

DO3-180515

Duplicate sample ID _____

Rinsate blank ID _____

Groundwater - Well Sampling Data Form

ERM

Job Information

Date: 18.05.2015	Time: arrive [illegible] depart 1530
Project Name: SYMPHONY	Project Number: 0[illegible]316
Site Location: VALES POINT POWER STATION	Sampler: A. WILLIAMS
Well ID: VM-MW04	Weather: RAIN

Equipment

Water quality equipment description: Interface probe number:

Purging equipment: (please circle)
Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
3.998 m (-) [illegible]872 m (=) 2.1 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
~2.1 m (x) 1.96 (=) ~4.2 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y / N

Water Quality Parameters

Beginning purge time: 1143 Ending purge time: 1158

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
0.5	1145	6.04	22.0	556	0.59	-30.6		MILKY APPEARANCE, TURBID, NO ODOUR
1.0	1147	6.15	[illegible]	594	0.63	-32.1	1.[illegible]	" " " " "
1.5	1149	6.16	[illegible]	[illegible]	0.24	-66.8		" " " " "
2.0	1152	[illegible]	[illegible]	[illegible]	0.23	-105.4	1.970	" " " " "
2.5	1155	[illegible]	[illegible]	[illegible]	.25	-128.2		" " " " "
3.0	1158	[illegible]	[illegible]	601	[illegible]	-137.9		" " " " "
								#SAMPLE TAKEN

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

3L — Total Well Volume (Actual amount of water prior to sampling)
~150 — Flow rate mL/minute

Sample time 1203 Containers used 3+3+3

Did field parameters stabilise? Y / N / NA

Was the well dry purged? Y / N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	
Rinsate blank collected?	Y	N	

TRH / BTEX
Cations Anions
TD1_180515_AN
D01_180515_AN

Duplicate sample ID —

Rinsate blank ID —

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	19.5.15	Time: arrive	1130 depart 1230
Project Name:	Symphony II	Project Number:	0300369
Site Location:	Vales Point	Sampler:	J.H / A.W
Well ID:	VP_MW02	Weather:	Overcast

Equipment

Water quality equipment description: YSI Interface probe number: WSW 4000 Sun

Purging equipment (please circle) — Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
4.755 m (-) 1.171 m (=) 3.584 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
3.584 m (x) 1.96 (=) 7.02 L

Depth to product: / m Product Thickness: / m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1201 Ending purge time: 1217

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	1205	4.70	20.6	139.3	3.72	46.6	1.41	Milky brown, No odour
2	1209	4.65	20.5	138.9	3.60	46.9	1.495	
3	1213	4.63	20.4	137.5	3.79	46.5		
4	1217	4.62	20.3	137.6	3.71	45.8	1.605	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

4 **Total Well Volume** Actual amount of water prior to sampling Sample time 1217 Containers used 4

250 **Flow rate** mL/minute Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Were air bubbles present in vials at time of collection?	Y	(N)	NA	
Was sample for metals field filtered prior to preservations?	(Y)	N	NA	
Duplicate sample collected?	Y	(N)		Duplicate sample ID NA
Rinsate blank collected?	Y	(N)		Rinsate blank ID

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	19.5.15	Time: arrive 1030	depart 1130
Project Name:	Symphony IV	Project Number:	0300379
Site Location:	Vales Point	Sampler:	J. Lund
Well ID:	VN-MW10	Weather:	Fine

Equipment

Water quality equipment description: YSI — Interface probe number: NSW 4000 30m

Purging equipment: (please circle)
Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
14.275 m (-) 5.65 m (=) _____ m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) _____ (=) _____ L

Depth to product: _____ m Product Thickness: _____ m Verified with Bailer: Y / N

Water Quality Parameters

Beginning purge time: Ending purge time:

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	10:55	5.49	18.6	366.7	0.52	54.0	6.77	Slight brown tinge /
2	10:59	5.54	18.6	343.0	0.31	50.4	6.48	Slight H_2S odour
3	11:03	5.54	18.6	334.7	0.27	48.0	6.710	
4	11:07	5.54	18.6	342.5	0.16	47.1	6.970	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

4 — Total Well Volume (Actual amount of water prior to sampling)
250 — Flow rate mL/minute

Sample time 1107 Containers used 1

Did field parameters stabilise? Y / N / NA Was the well dry purged? Y / N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID _____
Rinsate blank collected?	Y	N	Rinsate blank ID _____

Groundwater - Well Sampling Data Form

ERM

Job Information	
Date: 18-05-15	Time: arrive 0945 depart 1035
Project Name: VALES POINT AME	Project Number: 0300379
Site Location: Vales Point - Ash Dam	Sampler: J. Devereux
Well ID: VO_MW04	Weather: Raining

Equipment

Water quality equipment description: IIE101629 Interface probe number: SYD 3910

Purging equipment (please circle)
Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
8.755 m (-) 1.349 m (=) 7.41 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
7.41 m (x) 1.96 (=) 14.52 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 10:00 Ending purge time: 1027 Intake depth ~ 6.0m

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	1006	2.68	19.4	37800	3.92	441.5	1.40	Clear. Colourless. No odour.
2	1013	2.73	19.5	38183	4.08	450.0	1.42	
3	1018	2.92	19.6	38297	3.59	377.1	1.41	
4	1023	2.89	19.5	38310	3.57	379.2	1.41	
5	1027	2.90	19.6	38314	3.54	376.0	1.40	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

~14L. Total Well Volume — Actual amount of water prior to sampling
~200mL Flow rate — mL/minute
Sample time 1030 Containers used 1 ULTRA TRACE METALS.
Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N).

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Were air bubbles present in vials at time of collection?	Y	N	(NA)	
Was sample for metals field filtered prior to preservations?	(Y)	N	NA	
Duplicate sample collected?	Y	(N)		Duplicate sample ID NA
Rinsate blank collected?	Y	(N)		Rinsate blank ID NA

Groundwater - Well Sampling Data Form

ERM

Job Information	
Date: 18.05.15	Time: arrive 1153. depart 1235
Project Name: Vales Point GME	Project Number: 0300379
Site Location: Vales Point - Ash Dam	Sampler: J. Devereux
Well ID: VO_MW05	Weather: overcast.

Equipment

Water quality equipment description: IIE101629 Interface probe number: 540 3910

Purging equipment (please circle): Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
10.506 m (-) 3.67 m (=) 6.84 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
6.84 m (x) 1.96 (=) 13.4 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1200 Ending purge time: 1230. Intake ~ 6.0m

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	1205	3.39	20.9	17863	0.94	240.7	3.80	Clear. Colourless. Flow rate reduced.
2	12.12	3.37	21.0	17822	0.53	265.7	4.00	Became cloudy. No odour.
3	12.20	3.38	20.9	17793	0.48	270.0	4.08	Slight sheen on waters surface.
4	1226	3.39	20.8	17718	0.44	271.1	4.10	
5	1230	3.39	20.7	17708	0.42	272.2	4.09	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

~13L Total Well Volume — Actual amount of water prior to sampling

~200 Flow rate mL/minute

Sample time 1230 Containers used 2 metals + ultra trace metals.

Did field parameters stabilise? Y N NA

Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	N	(NA)
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	Duplicate sample ID NA
Rinsate blank collected?	Y	(N)	Rinsate blank ID NA.

Groundwater - Well Sampling Data Form

ERM

Job Information

Date: 18.5.15	Time: arrive 1320 depart 1400
Project Name: Vales Point GME	Project Number: 0300379
Site Location: Vales Point Ash Dam.	Sampler: J. Devereux
Well ID: VO-MW06	Weather: Raining

Equipment

Water quality equipment description: 11E101629 Interface probe number: S4D 3910

Purging equipment (please circle)
Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
3.134 m (-) 0.391 m (=) 2.74 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
2.74 m (x) 1.96 (=) 5.37 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1325 Ending purge time: 1355 Intake depth ~ 2.0m

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	1330	2.42	18.1	22408	4.25	600.4	0.392	Clear. Colourless. No odour
2	1335	2.43	18.2	23526	4.29	614.6	0.41	Sheen on water.
3	1340	2.77	18.2	26320	1.58	433.3	0.42	
4	1345	3.09	18.3	27555	0.94	402.6	0.43	
5	1340	3.70	18.4	21895	0.39	382.4	0.42	
6	1345	3.10	18.5	27424	0.48	408.1	0.42	
7	1350	3.08	18.6	27094	0.78	418.7	0.42	
8	1355	3.06	18.5	27149	0.87	420.5	0.42	Surrounding area - standing water, sand built up around well ~ 0.75m in height.

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

~5.0L. Total Well Volume — Actual amount of water prior to sampling
~250 Flow rate mL/minute

Sample time 1355 Containers used 2 ULTRA TRACE METALS + metals

Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Were air bubbles present in vials at time of collection?	Y	N	(NA)	
Was sample for metals field filtered prior to preservations?	(Y)	N	NA	
Duplicate sample collected?	Y	(N)		Duplicate sample ID NA
Rinsate blank collected?	(Y)	N		Rinsate blank ID R01_180515

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date: 20/5/15	Time: arrive 09:15	depart 10:00
Project Name: Symphony	Project Number: 0300379	
Site Location: Vales Point	Sampler: D. Brooks	
Well ID: VO_MW09	Weather: Overcast	

Equipment						
Water quality equipment description:			Interface probe number:			
Purging equipment: (please circe)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	(Micro-purge)	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	(50mm)	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
11.720 m (-) 4.950 m (=) 6.87 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
6.87 m (x) 1.96 (=)~13.5 L

Depth to product: — m Product Thickness: — m Verified with Bailer: (Y) N

Water Quality Parameters

Beginning purge time: 09:16 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
0.2	09:18	5.81	19.9	0.472	3.78	29.4	4.930	Cloudy, pale yellow, no odour
0.8	09:21	5.96	20.0	0.61	0.49	-30.7	5.000	" "
1.4	09:24	5.86	20.0	0.55	0.23	-39.9	5.080	" "
2.0	09:27	5.85	20.0	0.54	0.21	-38.4	5.085	" "
2.6	09:30	5.83	19.8	0.53	0.16	-41.8	5.090	" "
3.2	09:33	5.82	19.8	0.52	0.10	-43.9	5.100	" "
3.8	09:36	5.81	19.9	0.476	0.20	-31.8	5.150	" "
4.4	09:39	5.54	19.8	0.379	0.20	-17.2	5150	" "
5.0	09:42	5.42	19.8	0.354	0.22	-2.4	5.150	" "
5.6	09:45	5.40	19.8	0.343	0.23	8.1	5150	" "

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

5.6 Total Well Volume — Actual amount of water prior to sampling

Sample time 09:45 Containers used 1

2000 Flow rate mL/minute

Did field parameters stabilise? (Y) N NA

Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	Metals
Were air bubbles present in vials at time of collection?	Y	N	(NA)	
Was sample for metals field filtered prior to preservations?	(Y)	N	NA	
Duplicate sample collected?	Y	(N)		Duplicate sample ID —
Rinsate blank collected?	Y	(N)		Rinsate blank ID —

Groundwater - Well Sampling Data Form

ERM

Job Information	
Date: 19.5.15	Time: arrive 1145 depart 1245
Project Name: Vales Point AME	Project Number: 0300375
Site Location: Vales	Sampler: J. Devereux
Well ID: VO-MW12	Weather: Cloudy

Equipment

Water quality equipment description: 11E101629 Interface probe number: 5403910

Purging equipment (please circle): Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
3.550 m (-) 0.655 m (=) 2.89 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
2.89 m (x) 1.96 (=) 5.63 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1200 Ending purge time: 1226 Intake depth @ 1.5mbs.

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	1206	3.12	17.3	28050	0.86	402.6	0.71	Clear. Colourless. Slight sheen.
2	1211	3.37	17.7	28837	0.39	345.1	0.74	No odour
3	1216	3.45	17.8	29145	0.31	309.0	0.78	
4	1221	3.44	17.9	29229	0.32	324.0	0.75	
5	1226	3.44	17.9	29301	0.33	318.1	0.74	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

~5.0 Total Well Volume — Actual amount of water prior to sampling
~200 Flow rate mL/minute

Sample time 1230 Containers used 2 metals + Ultra trace metals

Did field parameters stabilise? (Y) N NA

Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	N	(NA)
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	Duplicate sample ID NA
Rinsate blank collected?	Y	(N)	Rinsate blank ID NA

Groundwater - Well Sampling Data Form

ERM

Job Information

Date: 20.5.15	Time: arrive 0810 depart 0900
Project Name: Vales Point CME	Project Number: 0300379
Site Location: Vales Point. Ash Dam	Sampler: J. Devereux
Well ID: VO_MW17	Weather: Overcast / Raining

Equipment

Water quality equipment description: 11E101629 Interface probe number: SYD 3910

Purging equipment (please circle)
Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
5.032 m (-) 1.188 m (=) 3.89 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
3.89 m (x) 1.96 (=) 7.62 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 0815 Ending purge time: 0845 Intake depth ~ 3m.

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	0820	6.74	18.3	1786	0.49	68.8	1.16	Cloudy, milky. No odour.
2	0825	6.75	18.3	1614	0.32	-94.7	1.18	
3	0830	6.75	18.1	1580	0.35	-103.6	1.17	
4	0835	6.75	18.1	1575	0.34	-108.2	1.17	
5	0840	6.74	18.2	1574	0.33	-109.2	1.16	
6	0845	6.75	18.1	1575	0.35	-110.1	1.16	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

~7.5 Total Well Volume (Actual amount of water prior to sampling)
~200 Flow rate mL/minute

Sample time 0845 Containers used 1-metals.

Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	N	(NA)
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	Duplicate sample ID NA
Rinsate blank collected?	Y	(N)	Rinsate blank ID NA

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	20.5.15	Time: arrive 0900 depart	1000
Project Name:	Vales Point GME	Project Number:	0300379
Site Location:	Vales Point Ash Dam	Sampler:	J. Devereux
Well ID:	VO_MW18	Weather:	Overcast

Equipment

Water quality equipment description: IE101629 Interface probe number: SYD 3910

Purging equipment (please circle): Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
8.773 m (-) 4.733 m (=) 4.04 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
4.04 m (x) 1.96 (=) 7.92 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 0907 Ending purge time: 0945 Intake depth ~ 7.5m

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	0912	3.84	19.3	2620	2.42	214.7	4.80	Colourless. Slightly cloudy.
2	0917	3.83	19.2	2336	2.42	218.5	4.80	No odour
3	0921	3.77	19.2	2760	2.00	220.1	4.81	
4	0925	3.76	19.2	2906	1.97	277.1	4.82	
5	0930	3.75	19.2	3200	1.92	286.2	4.81	
6	0935	3.73	19.2	3258	2.00	288.7	4.81	
7	0940	3.72	19.2	3260	1.99	290.1	4.81	
8	0945	3.72	19.2	3271	1.87	294.6	4.81	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

7.85 Total Well Volume — Actual amount of water prior to sampling

200 Flow rate mL/minute

Sample time 0945 Containers used 1-Ultra trace metals

Did field parameters stabilise? (Y) N NA

Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	N	(NA)
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	Duplicate sample ID NA
Rinsate blank collected?	Y	(N)	Rinsate blank ID NA

Groundwater - Well Sampling Data Form

ERM

Job Information

Date: 19.5.15	Time: arrive 0930 depart 1030
Project Name: Vales Point CME	Project Number: 0300379
Site Location: Vales Point Ash Dam	Sampler: J. Donereup.
Well ID: VP_Y_MW01 / VPAM/06	Weather: Overcast.

Equipment

Water quality equipment description: IIE 101629 Interface probe number: S403910

Purging equipment: (please circle)
Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
9.584 m (-) 3.135 m (=) 6.449 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
6.45 m (x) 7.85 (=) 50.6 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 0946 Ending purge time: 1012 Intake depth ~ 08 m

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	0950	5.94	18.0	215.2	0.26	26.7	3.17	Colourless, slightly cloudy No
2	0954	5.94	18.0	214.7	0.27	27.1	3.20	odour.
3	0958	5.89	18.0	190.3	0.25	30.3	3.21	
4	1004	5.88	18.0	180.1	0.24	32.9	3.22	
5	1007	5.87	18.0	179.1	0.24	33.0	3.21	
6	1012	5.86	18.0	176.1	0.23	33.4	3.22	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

~49L Total Well Volume
Actual amount of water prior to sampling

~200 Flow rate
mL/minute

Sample time 1015 Containers used 2 metals + ~~2 cations~~ 1 anion

Did field parameters stabilise? (Y) N NA

Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	N	(NA)
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	Duplicate sample ID NA
Rinsate blank collected?	Y	(N)	Rinsate blank ID NA

Groundwater - Well Sampling Data Form

ERM

Job Information

Date: 18-05-15	Time: arrive 1040 depart 1130
Project Name: Vales Point GME	Project Number: 0300379
Site Location: Vales Point Ash Dam	Sampler: J. Devereux
Well ID: VO_X_mw02 (VPAM/DS)	Weather: Raining.

Equipment

Water quality equipment description: 11E101629 Interface probe number: S40 3910

Purging equipment (please circle): Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
11.525 m (-) 1.482 m (=) 10.043 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
10.0 m (x) 1.96 (=) 19.6 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1050 Ending purge time: 1121 Intake depth ~ 8.0m

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	1100	4.84	19.2	24040	0.37	136.8	1.50	Clear. Colourless. No odour
2	1106	4.88	19.4	24127	0.34	95.5	1.58	
3	1111	4.99	19.5	24227	0.34	59.2	1.60	
4	1117	4.89	19.4	24248	0.37	49.2	1.60	
5	1121	4.90	19.4	24243	0.38	46.0	1.60	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

~19L Total Well Volume — Actual amount of water prior to sampling

Sample time 1122 Containers used 2 Cations/A. ~~Ultra-metals~~

~200 Flow rate mL/minute

Did field parameters stabilise? (Y) N NA

Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Ware air bubbles present in vials at time of collection?	Y	N	(NA)	
Was sample for metals field filtered prior to preservations?	(Y)	N	NA	
Duplicate sample collected?	Y	(N)		Duplicate sample ID NA
Rinsate blank collected?	Y	(N)		Rinsate blank ID NA

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date: 19.5.15		Time: arrive 0819	depart 0910
Project Name: Vales Point GME		Project Number: 0300379	
Site Location: Vales Point Ash Dam		Sampler: J-Devereux	
Well ID: VP_K_MW03/VPGM03.		Weather: Overcast	

Equipment						
Water quality equipment description: 11E101629			Interface probe number: SID 3910.			
Purging equipment: (please circle)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
10.125 m (-) 3.784 m (=) 6.24 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
6.24 m (x) 7.85 (=) 48.984 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 0828 Ending purge time: 0850 Intake depth ~ 8.0m

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	0833	5.52	20.1	32744	0.58	39.2	3.80	Clear. Colourless. Slight organic
2	0838	5.53	20.2	32705	0.45	9.4	3.82	odour.
3	0842	5.56	20.4	32675	0.39	-8.0	3.81	
4	0846	5.57	20.3	32659	0.34	-17.4	3.81	
5	0850	5.57	20.3	32667	0.33	-18.5	3.80	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

~48L. Total Well Volume — Actual amount of water prior to sampling
~250 Flow rate mL/minute

Sample time 0850 Containers used 2 (1 unpres / 1 ultra trace metals)

Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N		
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N		
Was documentation of equipment conducted?	(Y)	N	NA	
Were air bubbles present in vials at time of collection?	Y	N	(NA)	
Was sample for metals field filtered prior to preservations?	(Y)	N	NA	
Duplicate sample collected?	Y	(N)		Duplicate sample ID NA
Rinsate blank collected?	Y	(N)		Rinsate blank ID NA.

Groundwater - Well Sampling Data Form

ERM

Job Information	
Date: 20.5.15	Time: arrive 1020 depart 1130
Project Name: Vales Point Ash Pond	Project Number: 0300379
Site Location: Vales Point Ash Pond	Sampler: J. Dovercup
Well ID: VP-MW01	Weather: Overcast.

Equipment

Water quality equipment description: 11E101629 Interface probe number: SYD 3910

Purging equipment (please circle): Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
9.618 m (-) 2.636 (=) 6.98 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
6.98 m (x) 1.96 (=) 13.7 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y (N)

Water Quality Parameters

Beginning purge time: 1024 Ending purge time: 1100 ~6.0m Intake depth

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	1029	6.54	19.1	938	0.83	-183	2.91	Clear. Colourless. Flow rate
2	1034	6.58	19.2	922	0.70	-263	2.92	reduced.
3	1038	6.59	19.2	915	0.46	-57.5	2.99	
4	1042	6.59	19.2	917	0.46	-59.0	2.98	Flow rate reduced.
5	1048	6.61	19.3	943	0.41	-79.4	3.01	
6	1054	6.62	19.3	947	0.38	-83.4	3.02	
7	1100	6.62	19.3	948	0.37	-84.8	3.02	

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

13.0 Total Well Volume (Actual amount of water prior to sampling)

Sample time 1100 Containers used 3x3 TCMX BRP

200mL Flow rate mL/minute

Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	Y	N	(NA)
Duplicate sample collected?	(Y)	N	
Rinsate blank collected?	Y	(N)	

Duplicate sample ID DO4_200515 / DO3_200515

Rinsate blank ID NA

Groundwater - Well Sampling Data Form

ERM

Job Information	
Date: 20.5.15	Time: arrive 1215 depart 1310
Project Name: Vales Point GME	Project Number: 0300375
Site Location: Vales Point	Sampler: J. Devereux
Well ID: VPGM/D10	Weather: ~~OK~~ Sunny, Clear

Equipment						
Water quality equipment description:	11E101629			Interface probe number:	S403910	
Purging equipment: (please circle)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
5.903 m (-) 0.433 m (=) 5.47 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
5.47 m (x) 1.96 (=) 10.72 L

Depth to product: NA m Product Thickness: NA m Verified with Bailer: Y / N

Water Quality Parameters

Beginning purge time: 1220 Ending purge time: 1248 Intake depth ~ 4.5m

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	1227	4.61	18.0	743	0.51	231.5	0.66	Flow rate reduced.
2	1232	4.60	18.5	740	0.42	250.5	0.78	milky white - cloudy.
3	1239	4.60	19.0	736	0.38	250.7	0.92	Flow rate reduced
4	1244	4.60	19.0	736	0.40	247.7	0.96	
5	1248	4.59	19.1	736	0.39	244.7	0.95	No odour.

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

~10.0 Total Well Volume — Actual amount of water prior to sampling Sample time 1300 Containers used Nekelb + Cd 2x

~250 Flow rate mL/minute Did field parameters stabilise? Y / N / NA Was the well dry purged? Y / N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID NA
Rinsate blank collected?	Y	N	Rinsate blank ID NA.

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	19.5.15	Time: arrive 1400 depart	1500
Project Name:	Symphony II	Project Number:	0300379
Site Location:	Vales Point	Sampler:	J. Grant
Well ID:	VUMW01	Weather:	Fine

Equipment						
Water quality equipment description:	YSI			Interface probe number:	NSW 4000 30m	
Purging equipment: (please circle)	Bailer type:	Plastic	Teflon			
	Pump type:	Peristaltic	Submersible	Micro-purge	Amazon	Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V
= Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
4.625 m (-) 2.210 m (=) _____ m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
_____ m (x) _____ (=) _____ L

Depth to product: _____ m Product Thickness: _____ m Verified with Bailer: Y / N

Water Quality Parameters

Beginning purge time: 1424 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1428	1	5.66	19.1	402.6	0.15	-42.4		Clear with green tinge, H2S odour
1432	2	5.72	18.8	401.3	0.30	-39.1		
1436	3	5.73	18.7	399.1	0.56	-39.9		
1440	4	5.73	18.6	397.3	0.30	-41.9		

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

4 — Total Well Volume (Actual amount of water prior to sampling)

250 — Flow rate mL/minute

Sample time 1440 Containers used 4

Did field parameters stabilise? Y / N / NA Was the well dry purged? Y / N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID _____
Rinsate blank collected?	Y	N	Rinsate blank ID _____

Groundwater - Well Sampling Data Form

ERM

Job Information	
Date: 20/5/15	Time: arrive 10:30 depart 11:10
Project Name: Symphony	Project Number: 0300379
Site Location: Vales Point	Sampler: D Brookes
Well ID: VP-MW09	Weather: Overcast

Equipment

Water quality equipment description: Interface probe number:

Purging equipment (please circle): Bailer type: Plastic Teflon
Pump type: Peristaltic Submersible (Micro-purge) Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
12.720 m (-) 7.480 m (=) 5.24 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
5.24 m (x) 1.96 (=) 10.27 L

Depth to product: - m Product Thickness: - m Verified with Bailer: Y N

Water Quality Parameters

Beginning purge time: 10:38 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
0.2	10.40	5.97	19.5	0.61	3.23	12.1	7.500	Cloudy, pale yellow, no odour.
0.8	10:43	5.97	19.4	0.60	0.44	6.5	7.500	~ ~
1.4	10:46	5.97	19.4	0.60	0.31	6.0	7.508	" "
2.0	10:49	5.97	19.4	0.60	0.28	7.5	7.700	~ ~
2.6	10:52	5.96	19.4	0.59	0.29	7.5	7.800	~ ~
3.2	10.55	5.96	19.4	0.59	0.31	7.9	7.895	~ ~
3.8	10:58	5.97	19.4	0.59	0.32	8.2	7.995	~ ~

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

3.8 Total Well Volume — Actual amount of water prior to sampling
Sample time 10:58 Containers used 4

200 Flow rate mL/minute
Did field parameters stabilise? (Y) N NA Was the well dry purged? Y (N)

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	(Y)	N	
Was pre-cleaning sampling equipment properly protected from contamination?	(Y)	N	
Was documentation of equipment conducted?	(Y)	N	NA
Were air bubbles present in vials at time of collection?	Y	(N)	NA
Was sample for metals field filtered prior to preservations?	(Y)	N	NA
Duplicate sample collected?	Y	(N)	
Rinsate blank collected?	Y	(N)	

TRH, BTEX, Metals, Phenols, PAH.

Duplicate sample ID —
Rinsate blank ID —

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	20/5/15	Time: arrive	12:00 depart 12:45
Project Name:	Symphony	Project Number:	0300379
Site Location:	Vales Point	Sampler:	D. Brookes
Well ID:	VP_MW12	Weather:	Fine

Equipment

Water quality equipment description: Interface probe number:

Purging equipment (please circle): Bailer type: Plastic Teflon

Pump type: Peristaltic Submersible Micro-purge Amazon Other:

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column

6.160 m (-) 1.585 m (=) 4.575 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume

4.575 m (x) 1.96 (=) ~9 L

Depth to product: — m Product Thickness: — m Verified with Bailer: Y N

Water Quality Parameters

Beginning purge time: 12:13 Ending purge time:

Litres	Time	PH	Temp °C	Cond mS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
0.2	12:15	4.09	21.2	1.89	0.51	120.9	1.600	Cloudy, yellow/brown, no odour
0.8	12:18	3.97	20.6	1.88	0.13	117.0	1.600	" "
1.4	12:21	3.94	20.5	1.87	0.11	111.3	1.600	" "
2.0	12:24	3.93	20.4	1.87	0.10	106.5	1.600	" "
2.6	12:27	3.92	20.4	1.87	0.11	104.9	1.600	" "
3.2	12:30	3.91	20.3	1.87	0.13	102.1	1.605	" "
3.8	12:33	3.91	20.3	1.87	0.15	99.6	1.605	" "

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

3.8 Total Well Volume — Actual amount of water prior to sampling

Sample time 12:33 Containers used 4

200 Flow rate mL/minute

Did field parameters stabilise? Y N NA

Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	
Rinsate blank collected?	Y	N	

TRH, BTEX, Pah, Phenols Metals.

Duplicate sample ID —

Rinsate blank ID —

Groundwater - Well Sampling Data Form

ERM

Job Information			
Date:	19 · 05 · 2015	Time: arrive	0730 depart
Project Name:	SYMPHONY	Project Number:	0300376
Site Location:	VALES POINT POWER STATION	Sampler:	J·GRANT + A·WILLIAMS
Well ID:	VU - MW15	Weather:	OVERCAST

Equipment

Water quality equipment description: YSI 11K101271 Interface probe number: GEOTECH *4000

Purging equipment: (please cirlce) Bailer type: **Plastic** **Teflon**

Pump type: **Peristaltic** **Submersible** **Micro-purge** **Amazon** **Other:**

Well Gauging and Purge Volume Calculations

Casing Diameter	25mm	50mm	100mm	125mm	150mm	200mm	250mm	300mm
Conversion Factor (volume in factor L/m)	0.98	1.96	7.85	31.4	49.1	70.7	125.7	196.3

Volume of water in well / V = Pr x r x h
V = volume in litres
P = 3.14159
r = radius in cm
h = height of water column in cm

Total Well Depth (-) Water level (=) Water Column
6.876 m (-) 2.641 m (=) 4.2 m

Water Column (x) Conversion Factor (=) Litres per 1 Well Volume
4.2 m (x) 1.96 (=) 8.4 L

Depth to product: NA m Product Thickness: m Verified with Bailer: Y N

Water Quality Parameters

Beginning purge time: 0935 Ending purge time: 0955

Litres	Time	PH	Temp °C	Cond µS/cm	DO mg/L	Redox mV	Drawdown <10cm	Comments
1	0939	4.10	19.4	370.4	2.22	45.4	2.800	CLOUDY, NO ODOUR
2	0943	3.79	19.6	372.3	1.78	51.2	2.890	" " "
3	0947	3.74	19.7	373.3	1.70	52.7	2.940	BECOMING CLEARER, NO ODOUR
4	0951	3.71	19.8	374.4	1.75	53.3	2.971	" " "
5	0955	3.69	19.8	374.0	1.78	53.5	3.002	" " "
								*SAMPLE TAKEN

*pH, temp, cond readings not necessary if well is purged dry

Example Comments: clear / slightly cloudy / turbid / very turbid / no odour / slight odour / odour / strong odour / drawdown depth

5L **Total Well Volume** Actual amount of water prior to sampling Sample time 1000 Containers used

~150 **Flow rate** mL/minute Did field parameters stabilise? Y N NA Was the well dry purged? Y N

Field QC Checks

Was pre-cleaning sampling equipment used for these samples?	Y	N	
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	- metals
Was documentation of equipment conducted?	Y	N	NA
Were air bubbles present in vials at time of collection?	Y	N	NA
Was sample for metals field filtered prior to preservations?	Y	N	NA
Duplicate sample collected?	Y	N	Duplicate sample ID NA
Rinsate blank collected?	Y	N	Rinsate blank ID

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 14D101796

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper	✓	
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		LF1041	pH 7.00
2. pH 10.00		pH 10.00		MD1360	pH 10.09
3. pH 4.00		pH 4.00		MD1859	pH 4.00
4. mV		231.9mV		KH1997/MC2157	231.9mV
5. EC		2.76mS		LK2419	2.77mS
6. D.O		0 ppm		2810	0.00ppm
7. Temp		21.5°C		MultiTherm	21.4°C

Calibrated by: AR **Anne Rutlidge**

Calibration date: **13/05/2015**

Next calibration due: **09/11/2015**

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 11K101271

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper	✓	
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		LF1041	pH 6.95
2. pH 4.00		pH 4.00		MD1859	pH 4.06
3. pH 10.00		pH 10.00		MD1360	pH 10.10
3. mV		231.8mV		KH1997/MC2157	230.0mV
4. EC		2.76 mS		LK2419	2.75mS
6. D.O		0.00ppm		2810	0.00ppm
7. Temp		21.0°C		MultiTherm	20.6°C

Calibrated by: **Anne Rutlidge**

Calibration date: **13/05/2015**

Next calibration due: **9/11/2015**

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 11E101629

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		LF1041	pH 7.00
2. pH 4.00		pH 4.00		MD1360	pH 4.00
3. pH 10.00		pH 10.00		MD1859	pH 9.91
3. mV		231.8mV		KH1997/MC2157	232.1mV
4. EC		2.76 mS		LK2419	2.76mS
5. D.O		0.00ppm		2810	0.00ppm
6. Temp		21.5°C		MultiTherm	20.3°C

Calibrated by: **Anne Rutlidge**

Calibration date: **13/05/2015**

Next calibration due: **9/11/2015**

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 09K100887

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		LF1041	pH 6.97
2. pH 10.00		pH 10.00		MD1360	pH 9.87
2. pH 4.00		pH 4.00		MD1859	pH 4.03
3. mV		236.2mV		KH1997/MC2157	236.4mV
4. EC		2.76mS		LK2419	2.76mS
6. D.O		0ppm		2810	0.00ppm
7. Temp		19.0°C		MultiTherm	19.0°C

Calibrated by: **Anne Rutlidge**

Calibration date: **13/05/2015**

Next calibration due: **9/11/2015**

Annex D

QAQC Report

The objective of this data assessment is to evaluate the quality of data gathered during the project. This process has been undertaken to assess whether the sample data is of a suitable standard to be utilised in this report. The data assessment consists of comparing field and laboratory QA/QC results to documented NEPM, ANZECC, USEPA SW-846 guidelines, USEPA CLP National Functional Guidelines for Inorganic and Organic Data Review, and other internationally recognised publications. The data assessment has been prepared in accordance with the NEPC (2013) *National Environmental Protection (Assessment of Site Contamination) Measure 1999* and NSW EPA (1997) *Guidelines for Consultants Reporting on Contaminated Sites* and NSW DEC (2006) *Guidelines for the NSW Site Auditor Scheme (2nd Edition)*. Particular reference is made to the PARCC parameters (precision, accuracy, representativeness, completeness and comparability) in evaluating the data quality.

Table F1 presents the degree of QA/QC pertinent to the field investigations.

Table F2 presents the degree of QA/QC pertinent to the laboratory program.

The data quality indicators of precision, accuracy, representativeness, comparability and completeness have been assessed as shown in *Table F3*.

Table F1 Field QA/QC Assessment

QA/QC Criterion	Comments
QA/QC program includes replicate samples	Field quality control samples including 5 intra-laboratory water duplicates were analysed to assess the suitability of the data. 2 inter-laboratory water duplicate samples were sent to a secondary laboratory. The number of samples analysed, including QA/QC replicates, are presented in *Table F.4*. Duplicate samples were collected following ERM standard operating procedures, at the required ratio of at least one duplicate for 10 primary samples (10%) and one inter lab duplicate for every 20 primary samples (5%). For water samples, the ratio was 10.5% and 5%.
All relevant media assessed	Groundwater samples were collected from all targeted Areas of Environmental Concern (AECs) as part of the updated groundwater quality assessment.
Appropriateness of sampling strategy	Based on the results of the ERM Stage 2 ESA (ERM, July 2014) and consideration of the intended approach to assessing the current validity of the Stage 2 ESA report the most appropriate sampling design was considered to be targeted at monitoring wells that fulfilled one or more of the following criteria: • *Concentrations of Contaminants of Potential Concern (CoPC) were detected at concentrations that exceeded the adopted screening levels;* • *Concentrations of CoPCs were greater than the maximum background concentrations by a factor of two or more;* • *Monitoring wells that provide spatial coverage of the Site, including locations adjacent to site boundaries and sensitive receptors.* The spatial coverage achieved was considered to be suitable in achieving the project objectives within the constraints of safe and reasonable access. Where sampling locations were not able to be completed due to logistical issues, these were discussed in the report.

QA/QC Criterion	Comments
Sample collection, handling and transportation procedures.	Samples were collected, handled and transported following ERM standard operating procedures as described in the *Vales Point Stage 2 ESA [Reference VALES PT STAGE 2 REPORT_Final]* (ERM, July 2014).
Sampling is representative of site conditions	Representative groundwater samples were collected from all targeted AECs. • Groundwater – groundwater samples were collected from pre-existing monitoring wells. Groundwater monitoring wells were selected to target areas with potential impact or boundary/background areas and to aid in the assessment of the validity of the previous Stage 2 ESA report.
Field QA/QC plan	The sampling team comprised suitably qualified and experienced ERM environmental scientists. Groundwater data sheets and/or other sampling records were completed, describing the media sampled, the duplicate types and sampling locations. Samples were collected using a combination of peristaltic pumps and a micro-purge pump used for wells with deeper groundwater depths. Groundwater samples were placed in laboratory supplied sample bottles, stored in an insulated cooler, and forwarded to the NATA accredited laboratory under COC conditions. The methods used to collect the samples, the types of sample containers, preservation techniques and custody protocols were documented appropriately. Inter-laboratory and intra-laboratory analytical results and their relative percentage differences (RPDs) are presented in *Table F5*. The RPDs of the duplicate sample pairs were generally below the acceptance limits (30% RPD where one or both values were greater than 10 x LOR or 50% RPD where both values less than 10 x LOR). An evaluation of the analytical data indicated that the data was generally of acceptable precision and accuracy. Minor exceedances of RPD acceptable limits were noted for some primary and duplicate sample pairs, as presented in *Table F5* and summarised below. Decontamination procedures were implemented between the collection of different groundwater samples. The processes followed were considered suitable for minimising cross-contamination during sampling. Rinsate blanks were collected to demonstrate the efficacy of the decontamination procedures during groundwater sampling (refer to T*able F6*). Contaminants of concern were below the laboratory limit of reporting in the rinsate samples with the minor exceptions presented in *Table F6* and summarised below. Trip blank samples were collected as part of this investigation. All COPCs were reported below the laboratory LOR (refer to *Table F6*. Trip spikes were collected as part of this investigation. All COPCs were reported within the acceptable range. Field instruments used as part of this investigation were appropriately calibrated and used according to the manufacturers' instructions. Calibration certificates are provided in *Annex C*.

Field QA/QC Exceedances

Minor exceedances of field duplicate RPD acceptable limits were noted for primary and duplicate samples, as presented in *Table F5*.

Elevated RPDs between some groundwater duplicate sample pairs were noted in samples collected on 18 May 2015, and analysed for PFOS/PFOA. These results are currently being investigated by the laboratory and should be treated as approximate until clarification has been provided. RPD's exceeded acceptable limits on three other occasions. On two of these occasions the limit was exceeded by 1% and is considered minor and unlikely to affect the accuracy of the data. The remaining duplicate sample pair had an RPD for Zinc of 65% and is also under investigation by the laboratories however it is noted that both samples are within the expected range given the analytical results from sampling undertaken in 2014. These non-conformances are not expected to materially affect the outcomes of this investigation.

Rinsate samples collected during groundwater sampling were taken following decontamination of the interface probe, or from the micropurge pump (when used). Of the 3 rinsate samples collected during the groundwater sampling event, 2 rinsate samples were reported to contain minor concentrations of contaminants. The samples with detections of contaminants were:

- R01_190515_AW, 19/05/2015 for Manganese (4 ug/L)
- R01_200515_AW, 20/05/2015 for Manganese (4 ug/L)

The concentrations in the rinsate samples for Manganese are 2 orders of magnitude below the drinking water screening value of 500 ug/L. While the rinsate samples suggest there may have been some minor cross-contamination of Manganese, this is unlikely to materially affect the outcomes of the investigation.

No trip spike samples were found to be outside the acceptable limits of 70 – 130%. All 3 trip spike samples were found to have acceptable recoverability for BTEX.

Table F2 Laboratory QA/QC Assessment

QA/QC Criterion	Comments
Appropriate methodologies used for sample analyses	The primary laboratory used for the investigation was NATA accredited ALS, NATA Registration No. 825. The secondary laboratory used for the investigation was NATA accredited Envirolab, NATA Registration No 2901. All laboratory reports were NATA stamped and signed by a NATA signatory. All analytical methodologies were considered appropriate for the identified contaminants of potential concern in the matrix. Statistical data presented in the laboratory QA/QC report was considered adequate in demonstrating the precision and accuracy of the methods used to analyse field samples.
Appropriate practical quantitation limits (LORs)	LORs for each analyte are presented in the laboratory reports. All sample results were reported with LORs below the site assessment criteria during the 2015 monitoring event however comparisons to data from the 2014 Stage 2 ESA highlight a small number of volatile organic compounds in groundwater where the LOR was greater than the site assessment criteria. These were vinyl chloride, chloromethane, 1,2-Dichloroethane and 1,2-dibromomethane, and PAH compounds (Benzo(a) pyrene and Carcinogenic PAHs (as BaP TEQ).
Laboratory QA/QC plan	Copies of signed chain of custody forms were returned by the laboratory. Samples were received and analysed within specified laboratory holding times. The analytical methods used were NATA approved as documented on the laboratory reports. Laboratory quality control samples included laboratory control samples, internal duplicates, matrix spikes and method blanks. The types of QA/QC samples analysed by the laboratory for the documented samples were considered sufficient to assess the precision and accuracy of the laboratory methods used. The statistical data presented in the laboratory QA/QC report was considered adequate in demonstrating the precision and accuracy of the methods used to analyse field samples. Minor exceedances of the acceptance criteria were noted, as presented in *Table F7 and F8*.

Table F3 Overall Sampling and Analysis Methodology Assessment

Field Considerations	Laboratory Considerations
Precision Requirements	
The investigation was conducted following ERM SOPs and any variations from these procedures were documented.	Analysis of the following were reported: laboratory and inter-laboratory duplicates; field duplicates; and laboratory prepared volatile trip spikes.
Precision Comments	
No significant variations from ERM SOPs were noted. Field split duplicates were generally reported within the acceptance limits of 30% RPD where one or both values were greater than 10 x LOR or 50% RPD where both values less than 10 x LOR. Minor exceedances were noted, as presented in Table F5 Series. Trip spike recoveries were within the acceptance limits of 70% to 130% RPD. As discussed previously, these results are generally not considered to affect analytical results. It is noted that PID field screening results from samples collected as part of these laboratory batches, where available, correlated with results of analysis or otherwise suggested that volatiles were not likely to be present.	
Accuracy Requirements	
The investigation was conducted following ERM SOPs and any variations from these procedures were documented.	Analysis of the following were reported: field blanks; rinsate blanks; reagent blanks; method blanks; matrix spikes; surrogate spikes; laboratory control samples; and laboratory prepared spikes.
Accuracy Comments	
No significant variations from ERM SOPs were noted. Laboratory QA/QC samples were reported within the acceptance limits specified in the laboratory reports. Exceptions are presented in *Table F7* and *F8* and the laboratory reports.	
Representativeness Requirements	
Appropriate media were identified and sampled according to the SAQP.	All samples were analysed in general accordance with the SAQP.
Representativeness Comments	
No exceedances of the requirements were noted.	
Comparability Requirements	
The same SOPs were used during each sampling event. All sampling was conducted by an appropriately qualified and experienced sampler. The types of samples collected were consistent. Results of Field Screening comparable with Lab analysis.	Analytical methods suitable for the target media were used. The LORs used to report analyte concentrations were less than the adopted investigation levels for most analytes, however exceptions were noted. The same laboratories were used to analyse all sample. The same units were used to report analyte concentrations.

Field Considerations	Laboratory Considerations
	Results of Lab analysis comparable with field screening results. Results of TPH C6-C9 comparable to BTEX etc.
Comparability Comments	
All sample results were reported with LORs below the site assessment criteria with the exception of a small number of VOCs and PAH compounds.	
Completeness Requirements	
All critical locations were sampled. The investigation was conducted following ERM SOPs and variations from these procedures were documented. All sampling was conducted by an appropriately qualified and experienced sampler. Documentation of field works was provided.	All critical samples were analysed according to SAQP. All analytes were analysed according to the SAQP. Appropriate analysis methods and LORs were used. Sample documentation was provided. Sample holding times were complied with, apart from of vinyl chloride and styrene in three sample batches, where samples were held up to two and a half days longer that the specified holding time prior to analysis.
Completeness Comments	
Given the extent of investigation successfully completed across the site, including targeting of potential sources within AECs, the variations from the SAQP (such as using a micro-purge pump in place of a peristaltic pump) were minor and are generally not considered to affect the outcomes of the investigation.	

Table F4. QAQC Samples - Summary of Samples Analysed
Updated Groundwater Quality Assessment
Vales Point Power Station
Project Symphony – 0300379

Matrix Type	WATER
First Sample Date	18/05/2015
Last Sample Date	21/05/2015
Sampling Period (days)	5
Number of Samples Submitted	55
Number of Non QA Samples Submitted	43
Number of Trip Blanks	3
Number of Rinsates	3
Number of Field Duplicates	5
Number of Interlab Duplicates	2
Number of Trip Spikes	3
Number of Lab Duplicates	73
Number of LCSs	62
Number of CRMs	0
Number of Method Blanks	51
Number of Storage Blanks	0
Number of Matrix Spikes	32
Number of Matrix Spike Dupes	0

			SDG	ALSE-Sydney 18-May-15	ALSE-Sydney 18-May-15		ALSE-Sydney 18-May-15	ALSE-Sydney 18-May-15		ALSE-Sydney 21-May-15	ALSE-Sydney 21-May-15		ALSE-Sydney 21-May-15	ALSE-Sydney 21-May-15	
			Field ID	VM_MW03	D03_180515	**RPD**	VM_MW04	D01_180514_AW	**RPD**	VH_X_MW06	D02_200515	**RPD**	VP_MW01	DO4_200515	**RPD**
			Sampled Date	18/05/2015	18/05/2015		18/05/2015	18/05/2015		20/05/2015	20/05/2015		20/05/2015	20/05/2015	
Chem Group	**Chem Name**	**Units**	**EQL**												
BTEX	Benzene	µg/L	1				<1.0	<1.0	0	1.0	1.0	0	1.0	1.0	0
	Ethylbenzene	µg/L	2 (Primary): 1 (Interlab)				<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0
	Toluene	µg/L	2 (Primary): 1 (Interlab)				<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0
	Total BTEX	µg/L	1				<1.0	<1.0	0	1.0	1.0	0	1.0	1.0	0
	Xylene (m & p)	µg/L	2				<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0
	Xylene (o)	µg/L	2 (Primary): 1 (Interlab)				<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0
	Xylene Total	µg/L	2				<2.0	<2.0	0	<2.0	<2.0	0	<2.0	<2.0	0
Inorganics	Alkalinity (Bicarbonate as CaCO3)	mg/l	1	145.0	146.0	1	126.0	123.0	2						
	Alkalinity (Carbonate as CaCO3)	mg/l	1	<1.0	<1.0	0	<1.0	<1.0	0						
	Alkalinity (Hydroxide) as CaCO3	µg/l	1000	<1000.0	<1000.0	0	<1000.0	<1000.0	0						
	Alkalinity (total) as CaCO3	mg/l	1	145.0	146.0	1	126.0	123.0	2						
	Anions Total	meq/L	0.01	24.7	25.0	1	5.58	5.58	0						
	Cations Total	meq/L	0.01	25.5	24.6	4	5.94	6.07	2						
	Chloride	mg/l	1	675.0	684.0	1	87.0	88.0	1						
	Ionic Balance	%	0.01	**1.64**	**0.73**	**77**	3.15	4.15	27						
	Sodium (Filtered)	mg/l	1	485.0	471.0	3	74.0	77.0	4						
	Sulfate as SO4 - Turbidimetric (Filtered)	mg/l	1	133.0	132.0	1	29.0	31.0	7						
Metals	Arsenic (Filtered)	µg/L	0.2							2.2	2.1	5			
	Calcium (Filtered)	µg/l	1000	23000.0	22000.0	4	37000.0	37000.0	0						
	Cobalt (Filtered)	µg/L	0.1							11.4	10.9	4			
	Copper (Filtered)	µg/L	0.5							28.9	27.4	5			
	Lead (Filtered)	µg/L	0.1							14.2	13.8	3			
	Magnesium (Filtered)	µg/l	1000	36000.0	33000.0	9	10000.0	10000.0	0						
	Manganese (Filtered)	µg/L	0.5							341.0	366.0	7			
	Nickel (Filtered)	µg/L	0.5							26.5	25.3	5			
	Potassium (Filtered)	µg/l	1000	13000.0	12000.0	8	2000.0	2000.0	0						
	Selenium (Filtered)	µg/L	0.2							2.0	2.0	0			
	Zinc (Filtered)	µg/L	1							**114.0**	**83.0**	**31**			
PAH	Naphthalene	µg/L	5 (Primary): 1 (Interlab)				<5.0	<5.0	0	<5.0	<5.0	0	<5.0	<5.0	0
PFOS/PFOA	6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.1	<0.1	<0.1	0									
	Perfluorooctanoate	µg/L	0.02	**0.16**	**0.06**	**91**									
	PFOS	µg/L	0.02	**8.1**	**3.53**	**79**									
TRH	TRH >C6-C9 Fraction	µg/L	20 (Primary): 10 (Interlab)				<20.0	<20.0	0	<20.0	<20.0	0	<20.0	<20.0	0
	TRH >C10-C14 Fraction	µg/L	50										<50.0	<50.0	0
	TRH >C15-C28 Fraction	µg/L	100										<100.0	<100.0	0
	TRH >C29-C36 Fraction	µg/L	50 (Primary): 100 (Interlab)										<50.0	<50.0	0
	TRH >C10-C36 Fraction	µg/L	50										<50.0	<50.0	0
	TRH >C6-C10 Fraction	µg/L	20 (Primary): 10 (Interlab)				<20.0	<20.0	0	<20.0	<20.0	0	<20.0	<20.0	0
	TRH >C6-C10 less BTEX (F1)	µg/L	20 (Primary): 10 (Interlab)				<20.0	<20.0	0	<20.0	<20.0	0	<20.0	<20.0	0
	TRH >C10-C16 Fraction	µg/L	100 (Primary): 50 (Interlab)										<100.0	<100.0	0
	TRH >C10-C16 less Naphthalene (F2)	µg/L	100 (Primary): 50 (Interlab)										<100.0	<100.0	0
	TRH >C16-C34 Fraction	µg/L	100										<100.0	<100.0	0
	TRH >C34-C40 Fraction	µg/L	100										<100.0	<100.0	0
	TRH >C10-C40 Fraction	µg/L	100										<100.0	<100.0	0

*RPDs have only been considered where a concentration is greater than 0 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 50 (0-10 x EQL); 30 (10-20 x EQL); 30 (> 20 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

			SDG	ALSE-Sydney 21-May-15	ALSE-Sydney 21-May-15		ALSE-Sydney 21-May-15	Interlab_D		ALSE-Sydney 21-May-15	Interlab_D	
			Field ID	VM_MW04	D01_202515_AW	**RPD**	VP_MW01	T03-200515	**RPD**	VH_X_MW06	T02-200515	**RPD**
			Sampled Date	21/05/2015	21/05/2015		20/05/2015	20/05/2015		20/05/2015 15:00	20/05/2015 15:00	
Chem Group	**Chem Name**	**Units**	**EQL**									
BTEX	Benzene	µg/L	1				1.0	1.0	0	1.0	1.0	0
	Ethylbenzene	µg/L	2 (Primary): 1 (Interlab)				<2.0	<1.0	0	<2.0	<1.0	0
	Toluene	µg/L	2 (Primary): 1 (Interlab)				<2.0	<1.0	0	<2.0	<1.0	0
	Total BTEX	µg/L	1				1.0			1.0		
	Xylene (m & p)	µg/L	2				<2.0	<2.0	0	<2.0	<2.0	0
	Xylene (o)	µg/L	2 (Primary): 1 (Interlab)				<2.0	<1.0	0	<2.0	<1.0	0
	Xylene Total	µg/L	2				<2.0			<2.0		
Inorganics	Alkalinity (Bicarbonate as CaCO3)	mg/l	1									
	Alkalinity (Carbonate as CaCO3)	mg/l	1									
	Alkalinity (Hydroxide) as CaCO3	µg/l	1000									
	Alkalinity (total) as CaCO3	mg/l	1									
	Anions Total	meq/L	0.01									
	Cations Total	meq/L	0.01									
	Chloride	mg/l	1									
	Ionic Balance	%	0.01									
	Sodium (Filtered)	mg/l	1									
	Sulfate as SO4 - Turbidimetric (Filtered)	mg/l	1									
Metals	Arsenic (Filtered)	µg/L	0.2							**2.2**	**3.0**	**31**
	Calcium (Filtered)	µg/l	1000									
	Cobalt (Filtered)	µg/L	0.1							11.4	11.0	4
	Copper (Filtered)	µg/L	0.5							28.9	25.0	14
	Lead (Filtered)	µg/L	0.1							14.2	14.0	1
	Magnesium (Filtered)	µg/l	1000									
	Manganese (Filtered)	µg/L	0.5							341.0	290.0	16
	Nickel (Filtered)	µg/L	0.5							26.5	23.0	14
	Potassium (Filtered)	µg/l	1000									
	Selenium (Filtered)	µg/L	0.2							2.0		
	Zinc (Filtered)	µg/L	1							**114.0**	**58.0**	**65**
PAH	Naphthalene	µg/L	5 (Primary): 1 (Interlab)				<5.0	<1.0	0	<5.0	<1.0	0
PFOS/PFOA	6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.1									
	Perfluorooctanoate	µg/L	0.02									
	PFOS	µg/L	0.02									
TRH	TRH >C6-C9 Fraction	µg/L	20 (Primary): 10 (Interlab				<20.0	<10.0	0	<20.0	<10.0	0
	TRH >C10-C14 Fraction	µg/L	50	<50.0	<50.0	0	<50.0	<50.0	0			
	TRH >C15-C28 Fraction	µg/L	100	<100.0	<100.0	0	<100.0	<100.0	0			
	TRH >C29-C36 Fraction	µg/L	50 (Primary): 100 (Interla	<50.0	<50.0	0	<50.0	<100.0	0			
	TRH >C10-C36 Fraction	µg/L	50	<50.0	<50.0	0	<50.0					
	TRH >C6-C10 Fraction	µg/L	20 (Primary): 10 (Interlab				<20.0	<10.0	0	<20.0	<10.0	0
	TRH >C6-C10 less BTEX (F1)	µg/L	20 (Primary): 10 (Interlab				<20.0	<10.0	0	<20.0	<10.0	0
	TRH >C10-C16 Fraction	µg/L	100 (Primary): 50 (Interla	<100.0	<100.0	0	<100.0	<50.0	0			
	TRH >C10-C16 less Naphthalene (F2)	µg/L	100 (Primary): 50 (Interla				<100.0	<50.0	0			
	TRH >C16-C34 Fraction	µg/L	100	<100.0	<100.0	0	<100.0	<100.0	0			
	TRH >C34-C40 Fraction	µg/L	100	<100.0	<100.0	0	<100.0	<100.0	0			
	TRH >C10-C40 Fraction	µg/L	100	<100.0	<100.0	0	<100.0					

*RPDs have only been considered where a concentration is greater than 0 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 50 (0-10 x EQL); 30 (1
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories

Table F6. QAQC Samples - Rinsates Trip Blanks
Updated Groundwater Quality Assessment
Vales Point Power Station
Project Symphony – 0300379

	SDG	ALSE-Sydney 18-May-15	ALSE-Sydney 21-May-15	ALSE-Sydney 21-May-15	ALSE-Sydney 18-May-15	ALSE-Sydney 19-May-15	ALSE-Sydney 21-May-15
	Field ID	R01_180515	R01_190515_AW	R01_200515_AW	TB1	TB 2	TRIP BLANK
	Sampled Date	18/05/2015	21/05/2015	21/05/2015	18/05/2015	19/05/2015	18/05/2015
	Sample Type	Rinsate	Rinsate	Rinsate	Trip_B	Trip_B	Trip_B
Chem_Group	**ChemName**	**Units**	**EQL**						
BTEX	Benzene	µg/L	0.05	<1	<1	<1	<1	<1	<1
	Ethylbenzene	µg/L	0.05	<2	<2	<2	<2	<2	<2
	Toluene	µg/L	0.5	<2	<2	<2	<2	<2	<2
	Total BTEX	µg/L	1	<1	<1	<1	<1	<1	<1
	Xylene (m & p)	µg/L	0.05	<2	<2	<2	<2	<2	<2
	Xylene (o)	µg/L	0.05	<2	<2	<2	<2	<2	<2
	Xylene Total	µg/L	2	<2	<2	<2	<2	<2	<2
Metals	Arsenic	µg/l	1	<1	<1	<1			
	Arsenic (Filtered)	µg/L	0.2						
	Calcium (Filtered)	µg/l	1000						
	Cobalt	µg/l	1	<1	<1	<1			
	Cobalt (Filtered)	µg/L	0.1						
	Copper	µg/l	1	<1	<1	<1			
	Copper (Filtered)	µg/L	0.5						
	Lead	µg/l	1	<1	<1	<1			
	Lead (Filtered)	µg/L	0.1						
	Magnesium (Filtered)	µg/l	1000						
	Manganese	µg/l	1	<1	**4**	**4**			
	Manganese (Filtered)	µg/L	0.5						
	Nickel	µg/l	1	<1	<1	<1			
	Nickel (Filtered)	µg/L	0.5						
	Potassium (Filtered)	µg/l	1000						
	Selenium	µg/l	10	<10	<10	<10			
	Selenium (Filtered)	µg/L	0.2						
	Zinc	µg/l	5	<5	<5	<5			
	Zinc (Filtered)	µg/L	1						
PAH	Benzo[b+j]fluoranthene	mg/l	0.0001	<0.001					
	2-(acetylamino) fluorene	µg/L	0.1						
	2-methylnaphthalene	µg/L	0.1						
	3-methylcholanthrene	µg/L	0.1						
	7,12-dimethylbenz(a)anthracene	µg/L	0.1						
	Acenaphthene	µg/L	0.1	<1					
	Acenaphthylene	µg/L	0.1	<1					
	Anthracene	µg/L	0.1	<1					
	Benz(a)anthracene	µg/L	0.1	<1					
	Benzo(a) pyrene	µg/L	0.05	<0.5					
	Benzo(e)pyrene	µg/L	0.1						
	Benzo(g,h,i)perylene	µg/L	0.1	<1					
	Benzo(k)fluoranthene	µg/L	0.1	<1					
	Naphthalene	µg/L	0.05	<5	<5	<5	<5	<5	<5
	Chrysene	µg/L	0.1	<1					
	Coronene	µg/L	0.1						
	Dibenz(a,h)anthracene	µg/L	0.1	<1					
	Fluoranthene	µg/L	0.1	<1					
	Fluorene	µg/L	0.1	<1					
	Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<1					
	Phenanthrene	µg/L	0.1	<1					
	Pyrene	µg/L	0.1	<1					
	Perylene	µg/L	0.1						
	PAHs (Sum of total)	µg/L	0.05	<0.5					
	Carcinogenic PAHs (as BaP TEQ)	µg/L	0.05	<0.5					
Phenols	2,3,4,6-tetrachlorophenol	µg/L	0.1		<0.1	<0.1			
	2,4,5-trichlorophenol	µg/L	0.1	<1	<0.1	<0.1			
	2,4,6-trichlorophenol	µg/L	0.1	<1	<0.1	<0.1			
	2,4-dichlorophenol	µg/L	0.1	<1	<0.1	<0.1			
	2,4-dimethylphenol	µg/L	0.1	<1	<0.1	<0.1			
	2,6-dichlorophenol	µg/L	0.1	<1	<0.1	<0.1			
	2-chlorophenol	µg/L	0.05	<1	<0.05	<0.05			
	2-methylphenol	µg/L	0.1	<1	<0.1	<0.1			
	2-nitrophenol	µg/L	0.1	<1	<0.1	<0.1			
	3-&4-methylphenol	µg/L	2	<2					
	3-Methylphenol	µg/L	0.1		<0.1	<0.1			
	4-chloro-3-methylphenol	µg/L	0.05	<1	<0.05	<0.05			
	4-methylphenol	µg/L	0.1		<0.1	<0.1			
	4-nitrophenol	µg/L	0.1		<0.1	<0.1			
	Hexachlorophene	µg/L	0.1		<0.1	<0.1			
	Pentachlorophenol	µg/L	0.05	<2	<0.05	<0.05			
	Phenol	µg/L	0.1	<1	<0.1	<0.1			
TRH	TRH >C6-C9 Fraction	µg/L	20	<20	<20	<20	<20	<20	<20
	TRH >C10-C14 Fraction	µg/L	50	<50	<50	<50			
	TRH >C15-C28 Fraction	µg/L	100	<100	<100	<100			
	TRH >C29-C36 Fraction	µg/L	50	<50	<50	<50			
	TRH >C10-C36 Fraction	µg/L	50	<50	<50	<50			
	TRH >C6-C10 Fraction	µg/L	20	<20	<20	<20	<20	<20	<20
	TRH >C6-C10 less BTEX (F1)	µg/L	20	<20	<20	<20	<20	<20	<20
	TRH >C10-C16 Fraction	µg/L	100	<100	<100	<100			
	TRH >C10-C16 less Naphthalene (F2)	µg/L	100	<100	<100	<100			
	TRH >C16-C34 Fraction	µg/L	100	<100	<100	<100			
	TRH >C34-C40 Fraction	µg/L	100	<100	<100	<100			
	TRH >C10-C40 Fraction	µg/L	100	<100	<100	<100			

Lab Report Number	Compund Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Recovery %	Limits %	Comment
Matrix Spike (MS) Recoveries								
ES1522169	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1522169--003	V0_X_MW02	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	-	MS recovery not determined, background level greater than or equal to 4x spike level.
ES1522169	ED045G: Chloride by Discrete Analyser	ES1522169--003	V0_X_MW02	Chloride	16887-00-6	Not Determined	-	MS recovery not determined, background level greater than or equal to 4x spike level.
ES1522169	EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS	ES1522169--001	V0_MW05	Manganese	7439-96-5	Not Determined	-	MS recovery not determined, background level greater than or equal to 4x spike level.
ES1522254	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1522299--001	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	-	MS recovery not determined, background level greater than or equal to 4x spike level.
ES1522254	ED045G: Chloride by Discrete Analyser	ES1522299--001	Anonymous	Chloride	16887-00-6	Not Determined	-	MS recovery not determined, background level greater than or equal to 4x spike level.
ES1522415	EP080/071: Total Petroleum Hydrocarbons	ES1522415--003	VH_X_MW06	C6 - C9 Fraction	----	133	70-130	Recovery greater than upper data quality objective
ES1522416	ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1522331--001	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	-	MS recovery not determined, background level greater than or equal to 4x spike level.
ES1522416	EG020F: Dissolved Metals by ICP-MS	ES1522416--003	VO_MW17	Manganese	7439-96-5	Not Determined	-	MS recovery not determined, background level greater than or equal to 4x spike level.
ES1522417	EG020F: Dissolved Metals by ICP-MS	ES1522416--003	Anonymous	Manganese	7439-96-5	Not Determined	-	MS recovery not determined, background level greater than or equal to 4x spike level.
ES1522418	EP080/071: Total Petroleum Hydrocarbons	ES1522415--003	Anonymous	C6 - C9 Fraction	----	133	70-130	Recovery greater than upper data quality objective

Table F8. QAQC Samples - Quality Control Fequency Outliers
Updated Groundwater Quality Assessment
Vales Point Power Station
Project Symphony – 0300379

Lab Report Number	Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
	Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)							
ES1522150	PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	3	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522150	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	2	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522169	PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	15	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522169	TRH - Semivolatile Fraction	EP071	0	11	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522254	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	4	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522254	TRH - Semivolatile Fraction	EP071	0	4	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522255	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	4	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522255	TRH - Semivolatile Fraction	EP071	0	4	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522415	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	6	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522415	TRH - Semivolatile Fraction	EP071	0	6	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522416	TRH - Semivolatile Fraction	EP071	0	6	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522417	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	6	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522417	TRH - Semivolatile Fraction	EP071	0	5	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522418	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	6	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522418	TRH - Semivolatile Fraction	EP071	0	5	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522418	TRH - Semivolatile Fractions Only	EP071-SV	0	6	0	10	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
ES1522150	PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	3	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522150	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	2	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522169	PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	15	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522169	TRH - Semivolatile Fraction	EP071	0	11	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522254	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	4	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522254	TRH - Semivolatile Fraction	EP071	0	4	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522255	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	4	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522255	TRH - Semivolatile Fraction	EP071	0	4	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522415	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	6	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522415	TRH - Semivolatile Fraction	EP071	0	6	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522416	TRH - Semivolatile Fraction	EP071	0	6	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522417	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	6	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522417	TRH - Semivolatile Fraction	EP071	0	5	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522418	Semivolatile Compounds by GCMS(SIM - Ultra-	EP132	0	6	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522418	TRH - Semivolatile Fraction	EP071	0	5	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
ES1522418	TRH - Semivolatile Fractions Only	EP071-SV	0	6	0	5	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Annex E

Laboratory Data

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 128390

Client:

Environmental Resources Management Australia
Locked Bag 3012
Australia Square
NSW 1215

Attention: John Ewing, Janene Devereux

Sample log in details:

Your Reference:	**0300379, Vales Point GME 2015**
No. of samples:	1 water
Date samples received / completed instructions received	22/05/15 / 22/05/15

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: / Issue Date:	29/05/15 / 28/05/15
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Water		
Our Reference:	UNITS	128390-1
Your Reference	----------	T03-200515
Date Sampled	----------	20/05/2015
Type of sample		water
Date extracted	-	22/05/2015
Date analysed	-	23/05/2015
TRHC$_6$ - C$_9$	µg/L	<10
TRHC$_6$ - C$_{10}$	µg/L	<10
TRHC$_6$ - C$_{10}$ less BTEX (F1)	µg/L	<10
Benzene	µg/L	1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	92
Surrogate toluene-d8	%	109
Surrogate 4-BFB	%	96

svTRH (C10-C40) in Water		
Our Reference:	UNITS	128390-1
Your Reference	----------	T03-200515
Date Sampled	----------	20/05/2015
Type of sample		water
Date extracted	-	25/05/2015
Date analysed	-	25/05/2015
TRHC$_{10}$ - C$_{14}$	µg/L	<50
TRHC$_{15}$ - C$_{28}$	µg/L	<100
TRHC$_{29}$ - C$_{36}$	µg/L	<100
TRH>C$_{10}$ - C$_{16}$	µg/L	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	µg/L	<50
TRH>C$_{16}$ - C$_{34}$	µg/L	<100
TRH>C$_{34}$ - C$_{40}$	µg/L	<100
Surrogate o-Terphenyl	%	109

Method ID	Methodology Summary
Org-016	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.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-003	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.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/05/2015	128390-1	22/05/2015 || 22/05/2015	LCS-W6	22/05/2015
Date analysed	-			23/05/2015	128390-1	23/05/2015 || 24/05/2015	LCS-W6	23/05/2015
TRHC$_6$ - C$_9$	µg/L	10	Org-016	<10	128390-1	<10 || <10	LCS-W6	108%
TRHC$_6$ - C$_{10}$	µg/L	10	Org-016	<10	128390-1	<10 || <10	LCS-W6	108%
Benzene	µg/L	1	Org-016	<1	128390-1	1 || 1 || RPD: 0	LCS-W6	99%
Toluene	µg/L	1	Org-016	<1	128390-1	<1 || <1	LCS-W6	118%
Ethylbenzene	µg/L	1	Org-016	<1	128390-1	<1 || <1	LCS-W6	109%
m+p-xylene	µg/L	2	Org-016	<2	128390-1	<2 || <2	LCS-W6	107%
o-xylene	µg/L	1	Org-016	<1	128390-1	<1 || <1	LCS-W6	106%
Naphthalene	µg/L	1	Org-013	<1	128390-1	<1 || <1	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	93	128390-1	92 || 95 || RPD: 3	LCS-W6	92%
Surrogate toluene-d8	%		Org-016	111	128390-1	109 || 109 || RPD: 0	LCS-W6	108%
Surrogate 4-BFB	%		Org-016	93	128390-1	96 || 94 || RPD: 2	LCS-W6	101%

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/05/2015	[NT]	[NT]	LCS-W1	25/05/2015
Date analysed	-			25/05/2015	[NT]	[NT]	LCS-W1	25/05/2015
TRHC$_{10}$ - C$_{14}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	129%
TRHC$_{15}$ - C$_{28}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	118%
TRHC$_{29}$ - C$_{36}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	90%
TRH>C$_{10}$ - C$_{16}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	129%
TRH>C$_{16}$ - C$_{34}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	118%
TRH>C$_{34}$ - C$_{40}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	90%
Surrogate o-Terphenyl	%		Org-003	82	[NT]	[NT]	LCS-W1	90%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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.

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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-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.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

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WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

Emailed

CLIENT: ERM	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Standard TAT (List due date): Standard TAT (7 days) ☐ Non Standard or urgent TAT (List due date):	FOR LABORATORY USE ONLY (Circle): Custody Seal Intact? Yes / No / N/A; Free ice / frozen ice bricks present upon receipt? Yes / No / N/A; Random Sample Temperature on Receipt: 3°C
OFFICE: Newcastle		
PROJECT: Vales Point GME 2015	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle): COC: 1 2 3 4 5 6 7; OF: 6 2 3 4 5 6 7
ORDER NUMBER: 0300379		
PROJECT MANAGER: John Ewing	CONTACT PH: 0450890302/0417129239	
SAMPLER: Amy Williams, Jack Grant, Janene Devereux, Dane B SAMPLER MOBILE: A.W. 0401600349	RELINQUISHED BY: J Devereux	RECEIVED BY: Mark Spencer
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RELINQUISHED BY:
Email Reports to (will default to PM if no other addresses are listed): PM & tess.tobin@erm.com, peter.lavelle@erm.com	DATE/TIME: 20.5.15 1500	DATE/TIME: 21/05/15 12:09 pm
Email Invoice to (will default to PM if no other addresses are listed):PM & tess.tobin@erm.com, peter.lavelle@erm.com		DATE/TIME:
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Metals analysis as specified in comments.		RECEIVED BY: PT (ELS) DATE/TIME: 22/5/15 12:50

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Metals (see notes)*	Ultra Trace Metals	TRH/BTEX	Ultra Trace PAHs	Ultra Trace Phenols	Ultra Trace VOCs	PFOS/PFOA	Cations/Anions (lab code NT-1 and NT-2)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	T/B3	20.5.15	W		4			X						Notes: *Metals Analysis: As, Co, Cu, Mn, Ni, Pb, Zn, Se
	FB3	20.5.15	W		2			X						BTEXN only
	VPGM/D10 1	20.5.15	W		2	X							X	
	VP_MW01 2	20.5.15	W		3			X						
	VO_MW17 3	20.5.15	W		1	X								
	VO_MW18 4	20.5.15	W		1		X							
	TO3_200515	20.5.15	W		3			X						
	004_200515 5	20.5.15	W		3			X						
			W											

Subcon / Forward Lab / Split WO
Lab / Analysis: TO3_200515 → Envirolab
Organised By / Date: fwd.
Relinquished By / Date:
Comments / Confirmation: TO3
Attach by PO / Internal Sheet:

Environmental Division Sydney
Work Order Reference
ES1522416

Telephone : +61-2-8784 8555

ENVIROLAB
end to ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 128390
Date Received: 22/5/15
Time Received: 12:50
Received by: PT
Temp: Cool/Ambient
Cooling: Icepack
Security: Intact/Broken/None

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; F = Formaldehyde Preserved Glass;

Please send — TRIPLICATE to Enviro lab

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Resources Management Australia
Attention	John Ewing, Janene Devereux

Sample Login Details	
Your Reference	0300379, Vales Point GME 2015
Envirolab Reference	128390
Date Sample Received	22/05/2015
Date Instructions Received	22/05/2015
Date Results Expected to be Reported	29/05/2015

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	1 water
Turnaround Time Requested	Standard
Temperature on receipt (°C)	1.0
Cooling Method	Ice
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

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@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

Sample Id	*svTRH (C10-C40) in Water*	*vTRH(C6-C10)/BTEXN in Water*
T03-200515	✓	✓

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 128391

Client:

Environmental Resources Management Australia
Locked Bag 3012
Australia Square
NSW 1215

Attention: John Ewing, Janene Devereux

Sample log in details:

Your Reference:	**0300379, Vales Point GME 2015**		
No. of samples:	1 water		
Date samples received / completed instructions received	22/05/15	/	22/05/15

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: / Issue Date:	29/05/15	/	27/05/15
Date of Preliminary Report:	Not Issued		

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Water		
Our Reference:	UNITS	128391-1
Your Reference	----------	T02-200515
Date Sampled	----------	20/05/2015
Type of sample		water
Date extracted	-	22/05/2015
Date analysed	-	23/05/2015
$TRHC_6$ - C_9	µg/L	<10
$TRHC_6$ - C_{10}	µg/L	<10
$TRHC_6$ - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	92
Surrogate toluene-d8	%	108
Surrogate 4-BFB	%	96

HM in water - dissolved		
Our Reference:	UNITS	128391-1
Your Reference	----------	T02-200515
Date Sampled	----------	20/05/2015
Type of sample		water
Date prepared	-	25/05/2015
Date analysed	-	25/05/2015
Arsenic-Dissolved	µg/L	3
Cadmium-Dissolved	µg/L	0.4
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	25
Lead-Dissolved	µg/L	14
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	23
Zinc-Dissolved	µg/L	58
Cobalt-Dissolved	µg/L	11
Manganese-Dissolved	µg/L	290

Method ID	Methodology Summary
Org-016	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.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/05/2015	128391-1	22/05/2015 || 22/05/2015	LCS-W6	22/05/2015
Date analysed	-			23/05/2015	128391-1	23/05/2015 || 24/05/2015	LCS-W6	23/05/2015
TRHC$_6$ - C$_9$	µg/L	10	Org-016	<10	128391-1	<10 || <10	LCS-W6	108%
TRHC$_6$ - C$_{10}$	µg/L	10	Org-016	<10	128391-1	<10 || <10	LCS-W6	108%
Benzene	µg/L	1	Org-016	<1	128391-1	1 || 3 || RPD: 100	LCS-W6	99%
Toluene	µg/L	1	Org-016	<1	128391-1	<1 || <1	LCS-W6	118%
Ethylbenzene	µg/L	1	Org-016	<1	128391-1	<1 || <1	LCS-W6	109%
m+p-xylene	µg/L	2	Org-016	<2	128391-1	<2 || <2	LCS-W6	107%
o-xylene	µg/L	1	Org-016	<1	128391-1	<1 || <1	LCS-W6	106%
Naphthalene	µg/L	1	Org-013	<1	128391-1	<1 || <1	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	93	128391-1	92 || 94 || RPD: 2	LCS-W6	92%
Surrogate toluene-d8	%		Org-016	111	128391-1	108 || 108 || RPD: 0	LCS-W6	108%
Surrogate 4-BFB	%		Org-016	93	128391-1	96 || 94 || RPD: 2	LCS-W6	101%
QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			25/05/2015	[NT]	[NT]	LCS-W1	25/05/2015
Date analysed	-			25/05/2015	[NT]	[NT]	LCS-W1	25/05/2015
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	102%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-W1	102%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	102%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	96%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	103%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-W1	108%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	102%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	103%
Cobalt-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	101%
Manganese-Dissolved	µg/L	5	Metals-022 ICP-MS	<5	[NT]	[NT]	LCS-W1	104%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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.

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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-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.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5699 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 24 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee mail@alsglobal.com
NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4958 0433 E: samples.newcastle@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

CLIENT: ERM	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date): Standard TAT (7 days)	FOR LABORATORY USE ONLY (Circle)
OFFICE: Newcastle		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes / No / N/A
PROJECT: Vales Point GME 2015	ALS QUOTE NO.:		Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER: 0300379		COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: 3 °C
PROJECT MANAGER: John Ewing	CONTACT PH: 0450890302/0417129239		Other comment:
SAMPLER: Amy Williams, Jack Grant, Janene Devereux, Dane B SAMPLER MOBILE: A.W. 0401600349		RELINQUISHED BY:	RECEIVED BY: Mark Spencer
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME:	DATE/TIME: 21/05/12 12:09 pm
Email Reports to (will default to PM if no other addresses are listed): PM & tess.tobin@erm.com, peter.lavelle@erm.com		RELINQUISHED BY:	RECEIVED BY: PT (ELS)
Email Invoice to (will default to PM if no other addresses are listed):PM & tess.tobin@erm.com, peter.lavelle@erm.com		DATE/TIME:	DATE/TIME: 21/5/13 12:50

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Metals analysis as specified in comments.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Metals (see notes)*	Ultra Trace Metals	TRH/BTEX	Ultra Trace PAHs	Ultra Trace Phenols	Ultra Trace VOCs	PFOS/PFOA	Cations/Anions (lab code NT-1 and NT-2)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	VH-X-MW03	20.5.15	W		1		X							
2	VH-X-MW04	20.5.15	W		1		X							
3	VH-X-MW06	20.5.15	W		3		X	X						
4	D02-200515	20.5.15	W		3		X	X						
5	TO2-200515	20.5.15	W		3		X	X						TRIPLICATE
6 $	VD-MW03	20.5.15	W		1				X					
7 $	VB-MW05	20.5.15	W		1			X						TRH only
8 $	VB-MW02	20.5.15	W		1			X						TRH only

Lab / Analys: TO2-200515 → Enviroloab

Organised By / Date: ---------- Fwd.

Relinquished By / Date: ----------

Courier / Courier: ----------

WO No: ----------

TOTAL: ----------

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation Bottle; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ENVIROLAB

Enviroab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 12839

Date Received: 22/5/15
Time Received: 12:50
Received by: PT
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Notes: *Metals Analysis: As, Co, Cu, Mn, Ni, Pb, Zn, = Formaldehyde Preserved Glass;

Environmental Division
Sydney
Work Order Reference
ES1522415

Telephone : +61-2-8784 8555

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Resources Management Australia
Attention	John Ewing, Janene Devereux

Sample Login Details	
Your Reference	0300379, Vales Point GME 2015
Envirolab Reference	128391
Date Sample Received	22/05/2015
Date Instructions Received	22/05/2015
Date Results Expected to be Reported	29/05/2015

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	1 water
Turnaround Time Requested	Standard
Temperature on receipt (°C)	1.0
Cooling Method	Ice
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

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@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

Sample Id	*HM in water - dissolved*	*svTRH (C10-C40) in Water*	*vTRH(C6-C10)/BTEXN in Water*
T02-200515	✓	✓	✓

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: ERM	TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: SYDNEY	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT: SYMPHONY – VALES POINT PROJECT NO.: 030379	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER: PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: John EWING CONTACT PH: 0450 870 302		OF: 1 2 3 4 5 6 7	Other comment: 2.8
SAMPLER: J.Lam SAMPLER MOBILE: 0432596844	RELINQUISHED BY:	RECEIVED BY: SOUTHERN CROSS ALS	RELINQUISHED BY: / RECEIVED BY:
COC Emailed to ALS? (YES / NO) EDD FORMAT (or default):			
Email Reports to (will default to PM if no other addresses are listed):	DATE/TIME:	DATE/TIME: 18/5/15 1915	DATE/TIME: / DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed):			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	VOC SUITE	PFOS/PFOA	TRH/BTEX	Phenols	CATIONS/ANIONS	PAH	Metals	Comments on likely additional Information dilutions, or samples requiring specific QC analysis etc.
1	VB_MW02	18.5.15	W		4	X	X	X					
2	VB_MW03	18.5.15	W		1				X				
3	VB_MW05	18.5.15	W		2			X					
4	VM_MW03	18.5.15	W		2		X			X			
5	D03_180515	18.5.15	W		2		X			X			
6	VE_MW02	18.5.15	W		1						X		
	~~MW02_MW03~~	~~18.5.15~~	~~W~~		~~4~~			~~X~~	~~X~~		~~X~~	~~X~~	
7	VB_MW01	18.05.15	W		4		X	X					
8	VM_MW04	18.05.15	W		4			X		X			
9	VI_MW01	18.05.15	W		5		X	X		X			
10	D01_180514_AN	18.05.15	W		2			X		X			
11	TO1_180514_AN	18.05.15	W		2			X		X			
				TOTAL									

Environmental Division Sydney
Work Order Reference
ES1522150

Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5699 E: gladstone@alsglobal.com

☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

7615

CLIENT: Erm	TURNAROUND REQUIREMENTS: ☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Erm Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT: VP GME PROJECT NO.: 0300379	ALS QUOTE NO.:	Free ice/ frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER: 0300379 PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: JOHN EWING CONTACT PH: 0450 890 302			Other comment: 2-8
SAMPLER: J-DEVEREUX SAMPLER MOBILE: 0431724144	RELINQUISHED BY: JD	RECEIVED BY: Sabrina A.	RELINQUISHED BY:
COC Emailed to ALS? (YES / (NO) EDD FORMAT (or default):	18-05-15		
Email Reports to (will default to PM if no other addresses are listed): JOHN.EWING@erm.com	DATE/TIME: 1500	DATE/TIME: 18/5/15 1915	DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed):			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	ULTRA TRACE METALS	METALS #	CATIONS/ ANIONS	TRH	BTEX	PAH			Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	VO_MW05	18.5 / 1230	W	1x ultra trace 1x metals.	2	X	X							# metals on HOLD
2	VO_MW04	18.5 / 1030	W	1x ultra trace	1	X								
3	VO_MW02	18.5 / 1122	W	1x ultra trace metals 1x cations anions	2	X		X						
4	VO_MW06	18.5 / 1355	W	1x metals 1x ultra trace	2	X	X							# metals on HOLD.
5	RO1_180515	18.5 / 1355	W	2x vial, 1x amber 1x metals.	4		X	X	X	X	X			
6	TS1	18.5	W		2				X					TRIP SPIKE
7	TB1	18.5	W		2				X	X				TRIP BLANK
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserv
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

Environmental Division Sydney

Work Order Reference

ES1522169

Telephone : +61-2-8784 8555

ass:

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 85[illegible]9600 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

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WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: Erm

OFFICE: Erm Sydney

PROJECT: VP GME

PROJECT NO.: 0300379

ORDER NUMBER: 0300379

PURCHASE ORDER NO.:

PROJECT MANAGER: John Ewing

CONTACT PH: 0450 890 302

SAMPLER: J-Devereux

SAMPLER MOBILE: 0431724144

COC Emailed to ALS? (YES / (NO)

EDD FORMAT (or default):

Email Reports to (will default to PM if no other addresses are listed): JOHN.EWING@ERM.COM

Email Invoice to (will default to PM if no other addresses are listed):

TURNAROUND REQUIREMENTS: (X) Standard TAT (List due date):

(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)

☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.: Tess Tobin

COUNTRY OF ORIGIN:

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comment: 2-8

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
JD	Sarah Ho		
DATE/TIME: 18-05-15 1500	DATE/TIME: 18/5/15 1915	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)

Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ULTRA TRACE METALS	METALS	CATIONS/ ANIONS	TRH	BTEX	PAH			Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES									Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	VO_MW05	18.5 / 1230	W	1x ultra trace 1x metals.	2	X	X							*metals on HOLD
2	VO_MW04	18.5 / 1030	W	1x ultra trace	1	X								
3	VO_MW02	18.5 / 1122	W	1x ultra trace 1x metals 1x cations anions	2	X		X						
4	VO_MW06	18.5 / 1355	W	1x metals 1x ultra trace	2	X	X							*metals on HOLD.
5	R01_180515	18.5 / 1355	W	2x vial, 1x amber 1x metals.	4		X	X	X	X	X			
6	TS1	18.5	W		2				X					TRIP SPIKE
7	TB1	18.5	W		2				X	X				TRIP BLANK
				Committed all sample W/O metals please Clarify					PT		19/5			
					TOTAL									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; L = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

Natasha Mangin

From: Tess Tobin <Tess.Tobin@erm.com>
Sent: Wednesday, 20 May 2015 10:50 AM
To: Natasha Mangin
Subject: RE: Project = 0300379 VP GME - metals enquiry
Attachments: ES1522169.pdf

Ahh technology, can't live with it. Can't live without.

Give us a buzz when you're phone's up and running. I'll try and summarise our issue in this e-mail in the meantime.

Metals analysis (for standard and ultra trace metals):
As, Co, Cu, Mn, Ni, Pb, Zn, Se

VO_MW05 – Ultra trace metals analysis only (do not analyse for standard metals even though a bottle was provided)
VO_MW04 - Ultra trace metals analysis only (do not analyse for standard metals even though a bottle was provided)
VO_X_MW02 - Ultra trace metals analysis only (do not analyse for standard metals even though a bottle was provided)
VO_MW06 - Ultra trace metals analysis only (do not analyse for standard metals even though a bottle was provided)
R01_180515 – Analyse for standard metals, TRH/BTEX, PAH/**Phenols (phenols were not listed on the COC)**

An amended COC is attached

Thanks!

Tess Tobin | Environmental Scientist/Environmental Engineer
Contaminated Site Management
Environmental Resources Management Australia
Lumley House - Level 15
309 Kent Street Sydney NSW 2000

Switch: +61 2 8584 8888 Direct : +61 2 8586 8763
Mobile: +61 417 129 239 Email: tess.tobin@erm.com

From: Natasha Mangin [mailto:natasha.mangin@ALSGlobal.com]
Sent: Wednesday, May 20, 2015 10:31 AM
To: Tess Tobin
Subject: Project = 0300379 VP GME - metals enquiry

Hi Tess,

My apologies for earlier, my phone is playing up – so I hope it's ok to email at the moment ☺

As per our discussion on the phone earlier, we were working out what Ultra Trace metals you were after for sample #1-4 and what standard metals you were after for sample #1, 4 & 5.

Project = 0300379 VP GME
ALS Work order = ES1522169

Thank you for being so patient with me, I'll get this phone fixed ASAP ☺

Natasha Little

Creation Officer
ALS | Environmental Division

277-289 Woodpark Road
Smithfield NSW 2164 Australia

T +61 2 8784 8555
F +61 2 8784 8500

We are keen for your feedback! Please click here for your 1 question survey

EnviroMail™ 81 - TRH Silica and Reducing Potential False Positives on TPH

EnviroMail™ 00 - Summary of all EnviroMails™ by Category

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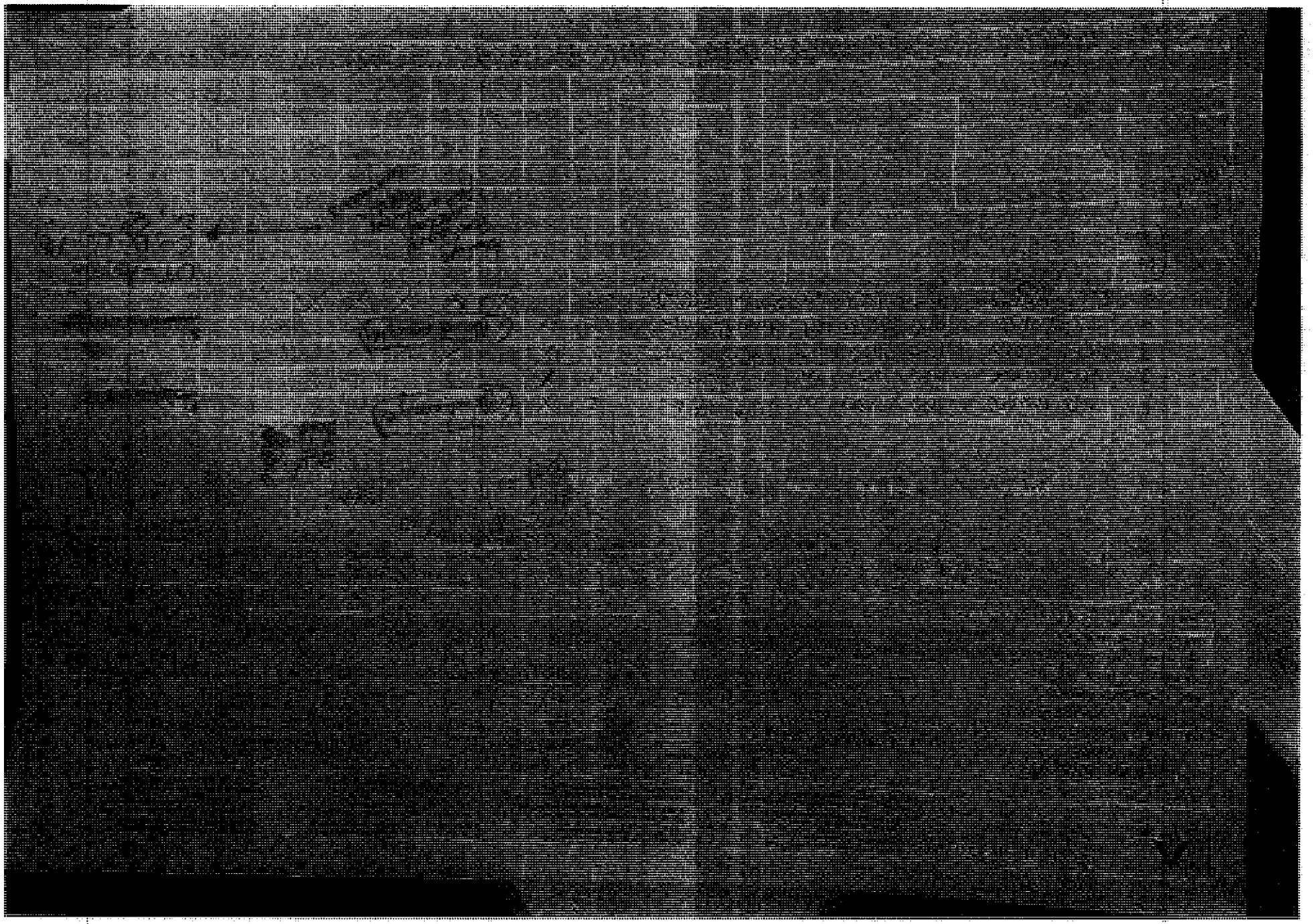

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: ERM	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date): Standard TAT (7 days)
OFFICE: Newcastle		☐ Non Standard or urgent TAT (List due date):
PROJECT: Vales Point GME 2015	ALS QUOTE NO.:	
ORDER NUMBER: 0300379		
PROJECT MANAGER: John Ewing	CONTACT PH: 0450890302/0417129239	
SAMPLER: Amy Williams, Jack Grant, Janene Devereux, Dane B SAMPLER MOBILE: A.W. 0401600349		
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	
Email Reports to (will default to PM if no other addresses are listed): PM & tess.tobin@erm.com, peter.lavelle@erm.com		
Email Invoice to (will default to PM if no other addresses are listed):PM & tess.tobin@erm.com, peter.lavelle@erm.com		

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody seal intact? Yes No N/A

Free ice / frozen ice brick present upon receipt? Yes No N/A

Random Sample Temperature on Receipt

Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
JDevereux	Soyfi Mo ALS		
DATE/TIME: 19.5.15	DATE/TIME: 19/5/15 1915	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Metals analysis as specified in comments.

ALS USE	SAMPLE DETAILS MATRIX:SOLID(S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Metals (see notes)*	Ultra Trace Metals	TRH/BTEX	Ultra Trace PAHs	Ultra Trace Phenols	Ultra Trace VOCs	PFOS/PFOA	Cations/Anions (lab code NT-1 and NT-2)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	VN_MW10	19.05.15	W		1	X								Notes:*Metals Analysis: As, Co, Cu, Mn, Ni, Pb, Zn, Se
2	VV_MW15	19.05.15	W		1	X								
3	VL_MW02	19.05.15	W		1							X		
4	VO_X_MW01	19.05.15	W		2	X							X	
5	VO_MW12	19.05.15	W		2	X	X							metals on hold.
6	VO_X_MW03	19.05.15	W		2		X						X	
7	TS 2		W		1			X						BTEX ONLY
8	TB 2		W		1			X						
9	VU_MW01	19.5.15	W		4	X		X	X	X				
10	VN_MW02	19.5.15	W		4	X		X	X	X				
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VS = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Glass;

Environmental Division Sydney

Work Order Reference

ES1522254

Telephone : +61-2-8784 8555

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

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☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: ERM	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date): Standard TAT (7 days)
OFFICE: Newcastle		☐ Non Standard or urgent TAT (List due date):
PROJECT: Vales Point GME 2015	ALS QUOTE NO.:	
ORDER NUMBER: 0300379		
PROJECT MANAGER: John Ewing	CONTACT PH: 0450890302/0417129239	

COC SEQUENCE NUMBER (Circle)

COC:	1	2	3	4	5	6	7
OF:	1	2	3	4	5	6	7

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Freezer / frozen ice blocks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: 3.4
Other comment:

SAMPLER: Amy Williams, Jack Grant, Janene Devereux, Dane B SAMPLER MOBILE: A.W. 0401600349	RELINQUISHED BY: Dane Brodie-Hall	RECEIVED BY: Sonya Apte ALS	RELINQUISHED BY:
COC emailed to ALS? (YES / NO) EDD FORMAT (or default):	DATE/TIME: 19/5/15	DATE/TIME: 19/5/15 1915	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): PM & tess.tobin@erm.com, peter.lavelle@erm.com			RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed):PM & tess.tobin@erm.com, peter.lavelle@erm.com			DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Metals analysis as specified in comments.

ALS USE ONLY | SAMPLE DETAILS — MATRIX: SOLID (S) WATER (W) | CONTAINER INFORMATION | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). | Additional Information

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Metals (see notes)*	Ultra Trace Metals	TRH/BTEX	Ultra Trace PAHs	Ultra Trace Phenols	Ultra Trace VOCs	PFOS/PFOA	Cations/Anions (lab code NT-1 and NT-2)	Additional Information
1	VG_MW01	19/5/15	W		4	X		X		X				Notes:*Metals Analysis: As, Co, Cu, Mn, Ni, Pb, Zn, Se
2	VK_MW02				4	X		X	X	X	X			
3	VJ_MW09				1	X								
4	VG_MW02				1	X								
5	VJ_MW03				3			X		X				
				TOTAL										

Environmental Division Sydney
Work Order Reference
ES1522255

Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unp
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS =
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

astic; F = Formaldehyde Preserved Glass;

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townesville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: ERM	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date): Standard TAT (7 days) ☐ Non Standard or urgent TAT (List due date):
OFFICE: Newcastle		
PROJECT: Vales Point GME 2015	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER: 0300379		
PROJECT MANAGER: John Ewing	CONTACT PH: 0450890302/0417129239	

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes / No / N/A
Freeze / frozen ice brick present upon receipt? Yes / No / N/A
Random Sample Temperature on Receipt: 3 °C
Other Comments:

SAMPLER: Amy Williams, Jack Grant, Janene Devereux, Dane B SAMPLER MOBILE: A.W. 0401600349	RELINQUISHED BY:	RECEIVED BY: Mark Spencer	RELINQUISHED BY:
COC emailed to ALS? (YES / NO) EDD FORMAT (or default):			
Email Reports to (will default to PM if no other addresses are listed): PM & tess.tobin@erm.com, peter.lavelle@erm.com	DATE/TIME:	DATE/TIME: 21/05/12 12:09pm	DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed):PM & tess.tobin@erm.com, peter.lavelle@erm.com			

RECEIVED BY:	Additional Information
Ram	
DATE/TIME: 21/5 19:15	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Metals analysis as specified in comments.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Metals (see notes)*	Ultra Trace Metals	TRH/BTEX	Ultra Trace PAHs	Ultra Trace Phenols	Ultra Trace VOCs	PFOS/PFOA	Cations/Anions (lab code NT-1 and NT-2)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	VH-X-MW03	20.5.15	W		1		X							Notes:*Metals Analysis: As, Co, Cu, Mn, Ni, Pb, Zn, Se
2	VH-X-MW04	20.5.15	W		1		X							
3	VH-X-MW06	20.5.15	W		3		X	X						
4	DG2-200515	20.5.15	W		3		X	X						
5	TO2-200515	20.5.15	W		3		X	X						→ TRIPLICATE
6	VD-MW03	20.5.15	W		1				X	X				Forwarded
7	VB-MW05	20.5.15	W		1			X						TRH only
8	VB-MW02	20.5.15	W		1			X						TRH only
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Amber Glass Preserved; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sodium Bisulphate Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Environmental Division Sydney
Work Order Reference
ES1522415

Telephone : +61-2-8784 8555

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townesville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: ERM	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT (List due date): Standard TAT (7 days) ☐ Non Standard or urgent TAT (List due date):
OFFICE: Newcastle		
PROJECT: Vales Point GME 2015	ALS QUOTE NO.:	
ORDER NUMBER: 0300379		
PROJECT MANAGER: John Ewing	CONTACT PH: 0450890302/0417129239	
SAMPLER: Amy Williams, Jack Grant, Janene Devereux, Dane B	SAMPLER MOBILE: A.W. 0401600349	
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	
Email Reports to (will default to PM if no other addresses are listed): PM & tess.tobin@erm.com, peter.lavelle@erm.com		
Email Invoice to (will default to PM if no other addresses are listed):PM & tess.tobin@erm.com, peter.lavelle@erm.com		

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes / No / N/A

Freeze / Frozen Ice Bricks Present upon Receipt? Yes / No / N/A

Random Sample Temperature on Receipt: 2

Other Comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Dane Brooks	Mark Spera		Ravi
DATE/TIME: 20/5/15	DATE/TIME: 21/05/15 12:09pm	DATE/TIME:	DATE/TIME: 21/5 21:15

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Metals analysis as specified in comments.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).									Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Metals (see notes)*	Ultra Trace Metals	TRH/BTEX	Ultra Trace PAHs	Ultra Trace Phenols	Ultra Trace VOCs	PFOS/PFOA	Cations/Anions (lab code NT-1 and NT-2)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	VU_MW12	20/5/15	W		4	X		X	X	X				Notes:*Metals Analysis: As, Co, Cu, Mn, Ni, Pb, Zn, Se
2	VU_MW09	↓	↓		4	X		X	X	X				
3	VO_MW09	↓	↓		1	X								
				TOTAL										

Environmental Division Sydney
Work Order Reference
ES1522417

Telephone : +61-2-8784 8555

E-MAILED

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohle QLD Ph: 07 4796 0600 E: townesville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW Ph: 02 4225 3125 E: portkembla@alsglobal.com

E-MAILED

CLIENT: ERM	TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date): Standard TAT (7 days)	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Newcastle	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT: Vales Point GME 2015	ALS QUOTE NO.:	Freezer/Frozen Ice Brick present Upon Receipt	Yes / No / N/A
ORDER NUMBER: 0300379	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt	3 °C
PROJECT MANAGER: John Ewing	CONTACT PH: 0450890302/0417129239 OF: 1 2 3 4 5 6 7	Other comments:	

SAMPLER: Amy Williams, Jack Grant, Janene Devereux, Dane B SAMPLER MOBILE: A.W. 0401600349	RELINQUISHED BY:	RECEIVED BY: Mark Spencer	RELINQUISHED BY:
COC emailed to ALS? (YES / NO) EDD FORMAT (or default):			
Email Reports to (will default to PM if no other addresses are listed): PM & tess.tobin@erm.com, peter.lavelle@erm.com	DATE/TIME:	DATE/TIME: 21/05/15 12:09pm	DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed):PM & tess.tobin@erm.com, peter.lavelle@erm.com			

		RECEIVED BY: Ravi	
		DATE/TIME: 21/5 19:15	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Metals analysis as specified in comments.

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Metals (see notes)*	Ultra Trace Metals	TRH/BTEX	Ultra Trace PAHs	Ultra Trace Phenols	Ultra Trace VOCs	PFOS/PFOA	Cations/Anions (lab code NT-1 and NT-2)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	RO1_190515_AW		W		4	X		X		X				Notes:*Metals Analysis: As, Co, Cu, Mn, Ni, Pb, Zn, Se
2	RO1_200515_AW		W		4	X		X		X				
3	VH_X_MW03		W		1		X							
4	VH_X_MW08		W		5		X	X		X	X			
5	VI_MW01		W		1			X						
6	VM_MW04		W		1			X						
7	DO1_200515_AW		W		1			X						
8	VB_MW01		W		1			X						
9	TRIP BLANK		W		1			X						
10	TRIP SPIKE		W		1			X						
					TOTAL									

Environmental Division Sydney
Work Order Reference
ES1522418

Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1522150**

Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	:	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: 0300379 symphony-vales point	Page	: 1 of 2
Order number	: ----	Quote number	: ES2014ENVRES0397 (EN/009/14)
C-O-C number	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
Sampler	: JOHN EWING		

Dates

Date Samples Received	: 18-May-2015	Issue Date	: 20-May-2015
Client Requested Due Date	: 26-May-2015	Scheduled Reporting Date	: **26-May-2015**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 2.8'c - Ice present
Receipt Detail	:	No. of samples received / analysed	: 11 / 10

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Due to amber orange unpreserved bottle not being supplied for sample VB-MW02, VB-MW05, VB-MW01, VM-MW04, VI-MW01,D01_180514-AW and T01_180514_AW, unable to conduct semi-volatile TRH C10-C40.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EP075 SIM Phenols only SIM - Phenols only	WATER - EP125 VOCs by HS GCMS in SIM Mode	WATER - EP132A Phenols Ultratrace - 16 analytes	WATER - EP231 Perfluorooctyl Acids and Sulfonates by	WATER - NT-01 & 02 Major Cations & Anions (Ca, Mg, Na, K, Cl, SO4,	WATER - W-18 TRH(C6 - C9)/BTEXN
ES1522150-001	[18-May-2015]	VB_MW02		✓		✓		✓
ES1522150-002	[18-May-2015]	VB_MW03	✓					
ES1522150-003	[18-May-2015]	VB_MW05						✓
ES1522150-004	[18-May-2015]	VB_MW03				✓	✓	
ES1522150-005	[18-May-2015]	D03_180515				✓	✓	
ES1522150-006	[18-May-2015]	VE_MW02			✓			
ES1522150-007	[18-May-2015]	VB_MW01				✓		✓
ES1522150-008	[18-May-2015]	VB_MW04					✓	✓
ES1522150-009	[18-May-2015]	VI_MW01				✓	✓	✓
ES1522150-010	[18-May-2015]	D01_180514_AW					✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

JOHN EWING

- *AU Certificate of Analysis - NATA (COA)	Email	john.ewing@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	john.ewing@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	john.ewing@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	john.ewing@erm.com
- A4 - AU Tax Invoice (INV)	Email	john.ewing@erm.com
- Chain of Custody (CoC) (COC)	Email	john.ewing@erm.com
- EDI Format - ENMRG (ENMRG)	Email	john.ewing@erm.com
- EDI Format - EQUIS V5 ERM (EQUIS_V5_ERM)	Email	john.ewing@erm.com
- EDI Format - ESDAT (ESDAT)	Email	john.ewing@erm.com
- EDI Format - XTab (XTAB)	Email	john.ewing@erm.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES1522150**	Page	: 1 of 12
Amendment	: **1**		
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	:	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT/COLONGRA	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 18-May-2015 19:00
C-O-C number	: ----	Date Analysis Commenced	: 19-May-2015
Sampler	: JOHN EWING	Issue Date	: 28-May-2015 18:25
Site	: ----		
		No. of samples received	: 11
Quote number	: ----	No. of samples analysed	: 11

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- PFOS and PFOA results are reported as an aggregate of linear and branched isomers.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VB_MW02	VB_MW03	VB_MW05	VB_MW03	D03_180515
				Client sampling date / time	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522150-001	ES1522150-002	ES1522150-003	ES1522150-004	ES1522150-005
					Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		----	----	----	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		----	----	----	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		----	----	----	145	146
Total Alkalinity as CaCO3	----	1	mg/L		----	----	----	145	146
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	----	----	133	132
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		----	----	----	675	684
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		----	----	----	23	22
Magnesium	7439-95-4	1	mg/L		----	----	----	36	33
Sodium	7440-23-5	1	mg/L		----	----	----	485	471
Potassium	7440-09-7	1	mg/L		----	----	----	13	12
EN055: Ionic Balance									
^ Total Anions	----	0.01	meq/L		----	----	----	24.7	25.0
^ Total Cations	----	0.01	meq/L		----	----	----	25.5	24.6
^ Ionic Balance	----	0.01	%		----	----	----	1.64	0.73
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1	µg/L		----	<1.0	----	----	----
2-Chlorophenol	95-57-8	1	µg/L		----	<1.0	----	----	----
2-Methylphenol	95-48-7	1	µg/L		----	<1.0	----	----	----
3- & 4-Methylphenol	1319-77-3	2	µg/L		----	<2.0	----	----	----
2-Nitrophenol	88-75-5	1	µg/L		----	<1.0	----	----	----
2.4-Dimethylphenol	105-67-9	1	µg/L		----	<1.0	----	----	----
2.4-Dichlorophenol	120-83-2	1	µg/L		----	<1.0	----	----	----
2.6-Dichlorophenol	87-65-0	1	µg/L		----	<1.0	----	----	----
4-Chloro-3-methylphenol	59-50-7	1	µg/L		----	<1.0	----	----	----
2.4.6-Trichlorophenol	88-06-2	1	µg/L		----	<1.0	----	----	----
2.4.5-Trichlorophenol	95-95-4	1	µg/L		----	<1.0	----	----	----
Pentachlorophenol	87-86-5	2	µg/L		----	<2.0	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	100	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	100	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VB_MW02	VB_MW03	VB_MW05	VB_MW03	D03_180515
				Client sampling date / time	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522150-001	ES1522150-002	ES1522150-003	ES1522150-004	ES1522150-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	**100**	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	<1	----	----
Toluene	108-88-3	2	µg/L		<2	----	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	<2	----	----
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	----	<2	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	----	<1	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	<5	----	----
EP125A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	0.05	µg/L		<0.05	----	----	----	----
Toluene	108-88-3	0.5	µg/L		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.05	µg/L		<0.05	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.05	µg/L		<0.05	----	----	----	----
Styrene	100-42-5	0.05	µg/L		<0.05	----	----	----	----
ortho-Xylene	95-47-6	0.05	µg/L		<0.05	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L		<0.05	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L		<0.05	----	----	----	----
EP125E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	0.5	µg/L		<0.5	----	----	----	----
Vinyl chloride	75-01-4	0.3	µg/L		<0.3	----	----	----	----
Bromomethane	74-83-9	0.5	µg/L		<0.5	----	----	----	----
Chloroethane	75-00-3	0.5	µg/L		<0.5	----	----	----	----
Trichlorofluoromethane	75-69-4	0.5	µg/L		<0.5	----	----	----	----
1.1-Dichloroethene	75-35-4	0.1	µg/L		**0.5**	----	----	----	----
Dichloromethane	75-09-2	1	µg/L		<1.0	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	0.1	µg/L		<0.1	----	----	----	----
1.1-Dichloroethane	75-34-3	0.1	µg/L		**0.1**	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	0.1	µg/L		**2.1**	----	----	----	----
Bromochloromethane	74-97-5	0.5	µg/L		<0.5	----	----	----	----
1.2-Dichloroethane	107-06-2	0.1	µg/L		<0.1	----	----	----	----
1.1.1-Trichloroethane	71-55-6	0.1	µg/L		<0.1	----	----	----	----
Carbon Tetrachloride	56-23-5	0.05	µg/L		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VB_MW02	VB_MW03	VB_MW05	VB_MW03	D03_180515
				Client sampling date / time	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522150-001	ES1522150-002	ES1522150-003	ES1522150-004	ES1522150-005
					Result	Result	Result	Result	Result
EP125E: Halogenated Aliphatic Compounds - Continued									
Trichloroethene	79-01-6	0.05	µg/L		**1.02**	----	----	----	----
Tetrachloroethene	127-18-4	0.05	µg/L		**1.98**	----	----	----	----
Hexachlorobutadiene	87-68-3	0.04	µg/L		<0.04	----	----	----	----
EP125F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	0.1	µg/L		<0.10	----	----	----	----
Bromobenzene	108-86-1	0.1	µg/L		<0.10	----	----	----	----
Benzylchloride	100-44-7	0.2	µg/L		<0.2	----	----	----	----
1.3-Dichlorobenzene	541-73-1	0.1	µg/L		<0.10	----	----	----	----
1.4-Dichlorobenzene	106-46-7	0.1	µg/L		<0.10	----	----	----	----
1.2-Dichlorobenzene	95-50-1	0.1	µg/L		<0.10	----	----	----	----
2-Chlorotoluene	95-49-8	0.1	µg/L		<0.1	----	----	----	----
4-Chlorotoluene	106-43-4	0.1	µg/L		<0.1	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L		<0.1	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L		<0.1	----	----	----	----
^ Trichlorobenzenes (Sum)	----	0.1	µg/L		<0.1	----	----	----	----
EP125G: Trihalomethanes									
Chloroform	67-66-3	0.1	µg/L		<0.10	----	----	----	----
Bromodichloromethane	75-27-4	0.1	µg/L		<0.10	----	----	----	----
Dibromochloromethane	124-48-1	0.1	µg/L		<0.10	----	----	----	----
Bromoform	75-25-2	0.1	µg/L		<0.10	----	----	----	----
^ Total Trihalomethanes	----	0.1	µg/L		<0.10	----	----	----	----
EP125H: Naphthalene									
Naphthalene	91-20-3	0.05	µg/L		<0.05	----	----	----	----
EP125L: Methyl t-butyl ether									
Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L		<0.1	----	----	----	----
EP132A: Phenolic Compounds									
2-Chlorophenol	95-57-8	0.05	µg/L		----	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.05	µg/L		----	----	----	----	----
m-Cresol	108-39-4	0.1	µg/L		----	----	----	----	----
o-Cresol	95-48-7	0.1	µg/L		----	----	----	----	----
p-Cresol	106-44-5	0.1	µg/L		----	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.1	µg/L		----	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.1	µg/L		----	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.1	µg/L		----	----	----	----	----
Hexachlorophene	70-30-4	0.1	µg/L		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VB_MW02	VB_MW03	VB_MW05	VB_MW03	D03_180515
				Client sampling date / time	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522150-001	ES1522150-002	ES1522150-003	ES1522150-004	ES1522150-005
					Result	Result	Result	Result	Result
EP132A: Phenolic Compounds - Continued									
2-Nitrophenol	88-75-5	0.1	µg/L		----	----	----	----	----
4-Nitrophenol	100-02-7	0.1	µg/L		----	----	----	----	----
Pentachlorophenol	87-86-5	0.05	µg/L		----	----	----	----	----
Phenol	108-95-2	0.1	µg/L		----	----	----	----	----
2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L		----	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.1	µg/L		----	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.1	µg/L		----	----	----	----	----
EP231: Perfluorinated Compounds									
PFOS	1763-23-1	0.02	µg/L		**1.14**	----	----	**8.10**	**3.53**
PFOA	335-67-1	0.02	µg/L		**0.12**	----	----	**0.16**	**0.06**
6:2 Fluorotelomer sulfonate (6:2 FtS)	27619-97-2	0.1	µg/L		<0.1	----	----	<0.1	<0.1
8:2 Fluorotelomer sulfonate	39108-34-4	0.1	µg/L		<0.1	----	----	<0.1	<0.1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		----	**26.9**	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%		----	**56.6**	----	----	----
2.4.6-Tribromophenol	118-79-6	1	%		----	**39.4**	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		----	**68.2**	----	----	----
Anthracene-d10	1719-06-8	1	%		----	**76.5**	----	----	----
4-Terphenyl-d14	1718-51-0	1	%		----	**69.0**	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**75.7**	----	**118**	----	----
Toluene-D8	2037-26-5	2	%		**104**	----	**108**	----	----
4-Bromofluorobenzene	460-00-4	2	%		**100**	----	**97.4**	----	----
EP125S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**105**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		**106**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		**102**	----	----	----	----
EP132S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.1	%		----	----	----	----	----
Phenol-d6	13127-88-3	0.1	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VB_MW02	VB_MW03	VB_MW05	VB_MW03	D03_180515
				Client sampling date / time	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522150-001	ES1522150-002	ES1522150-003	ES1522150-004	ES1522150-005
					Result	Result	Result	Result	Result
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	VE_MW02	VB_MW01	VB_MW04	VI_MW01	D01_180514_AW
			Client sampling date / time	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit	ES1522150-006	ES1522150-007	ES1522150-008	ES1522150-009	ES1522150-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	126	<1	123
Total Alkalinity as CaCO3	----	1	mg/L	----	----	126	<1	123
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	29	41	31
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	----	87	267	88
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	----	37	8	37
Magnesium	7439-95-4	1	mg/L	----	----	10	23	10
Sodium	7440-23-5	1	mg/L	----	----	74	124	77
Potassium	7440-09-7	1	mg/L	----	----	2	2	2
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	----	----	5.58	8.38	5.58
^ Total Cations	----	0.01	meq/L	----	----	5.94	7.74	6.07
^ Ionic Balance	----	0.01	%	----	----	3.15	4.03	4.15
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1	µg/L	----	----	----	----	----
2-Chlorophenol	95-57-8	1	µg/L	----	----	----	----	----
2-Methylphenol	95-48-7	1	µg/L	----	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2	µg/L	----	----	----	----	----
2-Nitrophenol	88-75-5	1	µg/L	----	----	----	----	----
2.4-Dimethylphenol	105-67-9	1	µg/L	----	----	----	----	----
2.4-Dichlorophenol	120-83-2	1	µg/L	----	----	----	----	----
2.6-Dichlorophenol	87-65-0	1	µg/L	----	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1	µg/L	----	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1	µg/L	----	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1	µg/L	----	----	----	----	----
Pentachlorophenol	87-86-5	2	µg/L	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	----	<20	<20	<20	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	----	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VE_MW02	VB_MW01	VB_MW04	VI_MW01	D01_180514_AW
				Client sampling date / time	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522150-006	ES1522150-007	ES1522150-008	ES1522150-009	ES1522150-010
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		----	<20	<20	<20	<20
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		----	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		----	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		----	<2	<2	<2	<2
^ **Total Xylenes**	1330-20-7	2	µg/L		----	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		----	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		----	**10**	<5	**13**	<5
EP125A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	0.05	µg/L		----	----	----	----	----
Toluene	108-88-3	0.5	µg/L		----	----	----	----	----
Ethylbenzene	100-41-4	0.05	µg/L		----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.05	µg/L		----	----	----	----	----
Styrene	100-42-5	0.05	µg/L		----	----	----	----	----
ortho-Xylene	95-47-6	0.05	µg/L		----	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L		----	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L		----	----	----	----	----
EP125E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	0.5	µg/L		----	----	----	----	----
Vinyl chloride	75-01-4	0.3	µg/L		----	----	----	----	----
Bromomethane	74-83-9	0.5	µg/L		----	----	----	----	----
Chloroethane	75-00-3	0.5	µg/L		----	----	----	----	----
Trichlorofluoromethane	75-69-4	0.5	µg/L		----	----	----	----	----
1.1-Dichloroethene	75-35-4	0.1	µg/L		----	----	----	----	----
Dichloromethane	75-09-2	1	µg/L		----	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	0.1	µg/L		----	----	----	----	----
1.1-Dichloroethane	75-34-3	0.1	µg/L		----	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	0.1	µg/L		----	----	----	----	----
Bromochloromethane	74-97-5	0.5	µg/L		----	----	----	----	----
1.2-Dichloroethane	107-06-2	0.1	µg/L		----	----	----	----	----
1.1.1-Trichloroethane	71-55-6	0.1	µg/L		----	----	----	----	----
Carbon Tetrachloride	56-23-5	0.05	µg/L		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VE_MW02	VB_MW01	VB_MW04	VI_MW01	D01_180514_AW
				Client sampling date / time	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522150-006	ES1522150-007	ES1522150-008	ES1522150-009	ES1522150-010
					Result	Result	Result	Result	Result
EP125E: Halogenated Aliphatic Compounds - Continued									
Trichloroethene	79-01-6	0.05	µg/L		----	----	----	----	----
Tetrachloroethene	127-18-4	0.05	µg/L		----	----	----	----	----
Hexachlorobutadiene	87-68-3	0.04	µg/L		----	----	----	----	----
EP125F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	0.1	µg/L		----	----	----	----	----
Bromobenzene	108-86-1	0.1	µg/L		----	----	----	----	----
Benzylchloride	100-44-7	0.2	µg/L		----	----	----	----	----
1.3-Dichlorobenzene	541-73-1	0.1	µg/L		----	----	----	----	----
1.4-Dichlorobenzene	106-46-7	0.1	µg/L		----	----	----	----	----
1.2-Dichlorobenzene	95-50-1	0.1	µg/L		----	----	----	----	----
2-Chlorotoluene	95-49-8	0.1	µg/L		----	----	----	----	----
4-Chlorotoluene	106-43-4	0.1	µg/L		----	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L		----	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L		----	----	----	----	----
^ Trichlorobenzenes (Sum)	----	0.1	µg/L		----	----	----	----	----
EP125G: Trihalomethanes									
Chloroform	67-66-3	0.1	µg/L		----	----	----	----	----
Bromodichloromethane	75-27-4	0.1	µg/L		----	----	----	----	----
Dibromochloromethane	124-48-1	0.1	µg/L		----	----	----	----	----
Bromoform	75-25-2	0.1	µg/L		----	----	----	----	----
^ Total Trihalomethanes	----	0.1	µg/L		----	----	----	----	----
EP125H: Naphthalene									
Naphthalene	91-20-3	0.05	µg/L		----	----	----	----	----
EP125L: Methyl t-butyl ether									
Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L		----	----	----	----	----
EP132A: Phenolic Compounds									
2-Chlorophenol	95-57-8	0.05	µg/L		<0.05	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.05	µg/L		<0.05	----	----	----	----
m-Cresol	108-39-4	0.1	µg/L		<0.1	----	----	----	----
o-Cresol	95-48-7	0.1	µg/L		<0.1	----	----	----	----
p-Cresol	106-44-5	0.1	µg/L		<0.1	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.1	µg/L		<0.1	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.1	µg/L		<0.1	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.1	µg/L		<0.1	----	----	----	----
Hexachlorophene	70-30-4	0.1	µg/L		<0.1	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VE_MW02	VB_MW01	VB_MW04	VI_MW01	D01_180514_AW
				Client sampling date / time	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522150-006	ES1522150-007	ES1522150-008	ES1522150-009	ES1522150-010
					Result	Result	Result	Result	Result
EP132A: Phenolic Compounds - Continued									
2-Nitrophenol	88-75-5	0.1	µg/L		<0.1	----	----	----	----
4-Nitrophenol	100-02-7	0.1	µg/L		<0.1	----	----	----	----
Pentachlorophenol	87-86-5	0.05	µg/L		<0.05	----	----	----	----
Phenol	108-95-2	0.1	µg/L		<0.1	----	----	----	----
2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L		<0.1	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.1	µg/L		<0.1	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.1	µg/L		<0.1	----	----	----	----
EP231: Perfluorinated Compounds									
PFOS	1763-23-1	0.02	µg/L		----	**0.26**	----	**0.16**	----
PFOA	335-67-1	0.02	µg/L		----	**0.16**	----	**0.19**	----
6:2 Fluorotelomer sulfonate (6:2 FtS)	27619-97-2	0.1	µg/L		----	<0.1	----	<0.1	----
8:2 Fluorotelomer sulfonate	39108-34-4	0.1	µg/L		----	<0.1	----	<0.1	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1	%		----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		----	----	----	----	----
Anthracene-d10	1719-06-8	1	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	1	%		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	**106**	**115**	**104**	**110**
Toluene-D8	2037-26-5	2	%		----	**111**	**120**	**112**	**113**
4-Bromofluorobenzene	460-00-4	2	%		----	**98.7**	**102**	**103**	**93.1**
EP125S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		----	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		----	----	----	----	----
EP132S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.1	%		**73.7**	----	----	----	----
Phenol-d6	13127-88-3	0.1	%		**57.6**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		**66.6**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		**75.8**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VE_MW02	VB_MW01	VB_MW04	VI_MW01	D01_180514_AW
				Client sampling date / time	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522150-006	ES1522150-007	ES1522150-008	ES1522150-009	ES1522150-010
					Result	Result	Result	Result	Result
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**63.8**	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		**65.7**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		**75.3**	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: **ES1522150**	Page	: 1 of 10
Amendment	: **1**		
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	:	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT/COLONGRA	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 18-May-2015
C-O-C number	: ----	Date Analysis Commenced	: 19-May-2015
Sampler	: JOHN EWING	Issue Date	: 28-May-2015
Site	: ----	No. of samples received	: 11
Quote number	: ----	No. of samples analysed	: 11

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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 ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

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

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 103293)									
ES1522150-009	VI_MW01	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.00	No Limit
ES1521936-001	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	252	255	0.911	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	252	255	0.911	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 103228)									
ES1522150-008	VB_MW04	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	29	29	0.00	0% - 20%
ES1521936-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 103229)									
ES1522150-008	VB_MW04	ED045G: Chloride	16887-00-6	1	mg/L	87	88	0.00	0% - 20%
ES1521936-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	13	13	0.00	0% - 50%
ED093F: Dissolved Major Cations (QC Lot: 103234)									
ES1522133-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	8	8	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	5	5	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	5	5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 106553)									
ES1522138-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	120	170	35.7	No Limit
ES1522150-008	VB_MW04	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 106553)									
ES1522138-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	140	210	38.9	0% - 50%
ES1522150-008	VB_MW04	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 106553)									
ES1522138-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	42	45	5.99	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1522150-008	VB_MW04	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 106553) - continued									
ES1522150-008	VB_MW04	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP125A: Monocyclic Aromatic Hydrocarbons (QC Lot: 104074)									
ES1522150-001	VB_MW02	EP125: 1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: 1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Benzene	71-43-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Ethylbenzene	100-41-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: meta- & para-Xylene	108-38-3 106-42-3	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: ortho-Xylene	95-47-6	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Styrene	100-42-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Toluene	108-88-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
EP125E: Halogenated Aliphatic Compounds (QC Lot: 104074)									
ES1522150-001	VB_MW02	EP125: Hexachlorobutadiene	87-68-3	0.04	µg/L	<0.04	<0.04	0.00	No Limit
		EP125: Carbon Tetrachloride	56-23-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Tetrachloroethene	127-18-4	0.05	µg/L	1.98	2.06	4.24	0% - 20%
		EP125: Trichloroethene	79-01-6	0.05	µg/L	1.02	1.05	2.76	0% - 20%
		EP125: 1.1.1-Trichloroethane	71-55-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.1-Dichloroethane	75-34-3	0.1	µg/L	0.1	0.1	0.00	No Limit
		EP125: 1.1-Dichloroethene	75-35-4	0.1	µg/L	0.5	0.5	0.00	No Limit
		EP125: 1.2-Dichloroethane	107-06-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: cis-1.2-Dichloroethene	156-59-2	0.1	µg/L	2.1	2.2	0.00	0% - 20%
		EP125: trans-1.2-Dichloroethene	156-60-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: Bromochloromethane	74-97-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Chloroethane	75-00-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Dichlorodifluoromethane	75-71-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Trichlorofluoromethane	75-69-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Vinyl chloride	75-01-4	0.5	µg/L	<0.3	<0.3	50.0	No Limit
		EP125: Dichloromethane	75-09-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP125: Bromomethane	74-83-9	2	µg/L	<0.5	<0.5	120	No Limit
EP125F: Halogenated Aromatic Compounds (QC Lot: 104074)									
ES1522150-001	VB_MW02	EP125: 1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichlorobenzene	95-50-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 1.3-Dichlorobenzene	541-73-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 1.4-Dichlorobenzene	106-46-7	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 2-Chlorotoluene	95-49-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP125F: Halogenated Aromatic Compounds (QC Lot: 104074) - continued									
ES1522150-001	VB_MW02	EP125: 4-Chlorotoluene	106-43-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: Bromobenzene	108-86-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Chlorobenzene	108-90-7	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Benzylchloride	100-44-7	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EP125G: Trihalomethanes (QC Lot: 104074)									
ES1522150-001	VB_MW02	EP125: Bromodichloromethane	75-27-4	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Bromoform	75-25-2	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Chloroform	67-66-3	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Dibromochloromethane	124-48-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
EP125H: Naphthalene (QC Lot: 104074)									
ES1522150-001	VB_MW02	EP125: Naphthalene	91-20-3	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP125L: Methyl t-butyl ether (QC Lot: 104074)									
ES1522150-001	VB_MW02	EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231: Perfluorinated Compounds (QC Lot: 103571)									
EB1519019-001	Anonymous	EP231: PFOA	335-67-1	0.01	µg/L	0.02	0.02	0.00	No Limit
		EP231: PFOS	1763-23-1	0.01	µg/L	0.11	0.12	0.00	No Limit
		EP231: 6:2 Fluorotelomer sulfonate (6:2 FtS)	27619-97-2	0.1	µg/L	<0.1	<0.1	0.00	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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 103293)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	90.1	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 103228)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	95.3	86	122
ED045G: Chloride by Discrete Analyser (QCLot: 103229)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	104	75	123
				<1	1000 mg/L	110	77	119
ED093F: Dissolved Major Cations (QCLot: 103234)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.4	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	105	90	110
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	102	87	117
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	99.2	82	118
EP075(SIM)A: Phenolic Compounds (QCLot: 103171)								
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	71.9	50	108
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	65.6	59	118
EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	76.9	59	122
EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	60.0	60	112
EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	76.6	64	118
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	65.1	64	110
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	82.3	56	112
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	65.5	63	117
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	53.8	43	114
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	73.2	63	119
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	13.1	10	95
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	36.1	25	62
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106553)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	95.7	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106553)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	95.8	75	127
EP080: BTEXN (QCLot: 106553)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	102	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	99.0	70	120
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	99.3	69	121
	106-42-3							
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	98.0	70	124

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP080: BTEXN (QCLot: 106553) - continued								
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.9	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	98.8	65	129
EP125A: Monocyclic Aromatic Hydrocarbons (QCLot: 104074)								
EP125: 1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L	<0.05	1 µg/L	90.3	69	129
EP125: 1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L	<0.05	1 µg/L	89.4	68	124
EP125: Benzene	71-43-2	0.05	µg/L	<0.05	1 µg/L	91.3	76	120
EP125: Ethylbenzene	100-41-4	0.05	µg/L	<0.05	1 µg/L	92.1	73	121
EP125: meta- & para-Xylene	108-38-3 106-42-3	0.05	µg/L	<0.05	1 µg/L	91.8	74	120
EP125: ortho-Xylene	95-47-6	0.05	µg/L	<0.05	1 µg/L	91.4	71	121
EP125: Styrene	100-42-5	0.05	µg/L	<0.05	1 µg/L	92.1	68	128
EP125: Toluene	108-88-3	0.5	µg/L	<0.5	1 µg/L	91.9	73	121
EP125E: Halogenated Aliphatic Compounds (QCLot: 104074)								
EP125: 1.1.1-Trichloroethane	71-55-6	0.1	µg/L	<0.1	1 µg/L	97.5	76	122
EP125: 1.1-Dichloroethane	75-34-3	0.1	µg/L	<0.1	1 µg/L	92.3	77	123
EP125: 1.1-Dichloroethene	75-35-4	0.1	µg/L	<0.1	1 µg/L	93.4	75	121
EP125: 1.2-Dichloroethane	107-06-2	0.1	µg/L	<0.1	1 µg/L	95.7	70	132
EP125: Bromochloromethane	74-97-5	0.5	µg/L	<0.5	1 µg/L	94.3	80	124
EP125: Bromomethane	74-83-9	2	µg/L	<2.0	10 µg/L	91.8	62	126
EP125: Carbon Tetrachloride	56-23-5	0.05	µg/L	<0.05	1 µg/L	93.6	77	121
EP125: Chloroethane	75-00-3	0.5	µg/L	<0.5	10 µg/L	94.2	71	125
EP125: cis-1.2-Dichloroethene	156-59-2	0.1	µg/L	<0.1	1 µg/L	94.6	77	121
EP125: Dichlorodifluoromethane	75-71-8	0.5	µg/L	<0.5	10 µg/L	93.4	69	127
EP125: Dichloromethane	75-09-2	1	µg/L	<1.0	1 µg/L	92.3	73	129
EP125: Hexachlorobutadiene	87-68-3	0.04	µg/L	<0.04	1 µg/L	81.9	65	129
EP125: Tetrachloroethene	127-18-4	0.05	µg/L	<0.05	1 µg/L	94.0	76	126
EP125: trans-1.2-Dichloroethene	156-60-5	0.1	µg/L	<0.1	1 µg/L	93.9	77	121
EP125: Trichloroethene	79-01-6	0.05	µg/L	<0.05	1 µg/L	93.1	78	122
EP125: Trichlorofluoromethane	75-69-4	0.5	µg/L	<0.5	10 µg/L	107	66	128
EP125: Vinyl chloride	75-01-4	0.5	µg/L	<0.5	10 µg/L	92.8	72	124
EP125F: Halogenated Aromatic Compounds (QCLot: 104074)								
EP125: 1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L	<0.1	1 µg/L	89.0	71	123
EP125: 1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L	<0.1	1 µg/L	87.2	71	123
EP125: 1.2-Dichlorobenzene	95-50-1	0.1	µg/L	<0.10	1 µg/L	91.3	72	122
EP125: 1.3-Dichlorobenzene	541-73-1	0.1	µg/L	<0.10	1 µg/L	89.5	66	128
EP125: 1.4-Dichlorobenzene	106-46-7	0.1	µg/L	<0.10	1 µg/L	91.2	72	122
EP125: 2-Chlorotoluene	95-49-8	0.1	µg/L	<0.1	1 µg/L	89.1	68	128
EP125: 4-Chlorotoluene	106-43-4	0.1	µg/L	<0.1	1 µg/L	91.1	71	123
EP125: Benzylchloride	100-44-7	0.2	µg/L	<0.2	1 µg/L	86.7	66	126

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP125F: Halogenated Aromatic Compounds (QCLot: 104074) - continued								
EP125: Bromobenzene	108-86-1	0.1	µg/L	<0.10	1 µg/L	91.9	74	122
EP125: Chlorobenzene	108-90-7	0.1	µg/L	<0.10	1 µg/L	92.3	74	122
EP125G: Trihalomethanes (QCLot: 104074)								
EP125: Bromodichloromethane	75-27-4	0.1	µg/L	<0.10	1 µg/L	90.5	77	125
EP125: Bromoform	75-25-2	0.1	µg/L	<0.10	1 µg/L	93.4	75	127
EP125: Chloroform	67-66-3	0.1	µg/L	<0.10	1 µg/L	96.6	80	120
EP125: Dibromochloromethane	124-48-1	0.1	µg/L	<0.10	1 µg/L	93.1	78	122
EP125H: Naphthalene (QCLot: 104074)								
EP125: Naphthalene	91-20-3	0.05	µg/L	<0.05	1 µg/L	91.3	70	122
EP125L: Methyl t-butyl ether (QCLot: 104074)								
EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L	<0.1	1 µg/L	93.9	74	124
EP132A: Phenolic Compounds (QCLot: 104434)								
EP132: 2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L	<0.1	2 µg/L	112	52	132
EP132: 2.4.5-Trichlorophenol	95-95-4	0.1	µg/L	<0.1	2 µg/L	113	63	125
EP132: 2.4.6-Trichlorophenol	88-06-2	0.1	µg/L	<0.1	2 µg/L	112	63	129
EP132: 2.4-Dichlorophenol	120-83-2	0.1	µg/L	<0.1	2 µg/L	112	66	126
EP132: 2.4-Dimethylphenol	105-67-9	0.1	µg/L	<0.1	2 µg/L	99.4	39	139
EP132: 2.6-Dichlorophenol	87-65-0	0.1	µg/L	<0.1	2 µg/L	112	66	126
EP132: 2-Chlorophenol	95-57-8	0.05	µg/L	<0.05	2 µg/L	111	74	119
EP132: 2-Nitrophenol	88-75-5	0.1	µg/L	<0.1	2 µg/L	81.6	47	145
EP132: 4-Chloro-3-methylphenol	59-50-7	0.05	µg/L	<0.05	2 µg/L	106	64	124
EP132: 4-Nitrophenol	100-02-7	0.1	µg/L	<0.1	2 µg/L	85.1	22	142
EP132: Hexachlorophene	70-30-4	0.1	µg/L	<0.1	2 µg/L	130	34	138
EP132: m-Cresol	108-39-4	0.1	µg/L	<0.1	2 µg/L	107	42	118
EP132: o-Cresol	95-48-7	0.1	µg/L	<0.1	2 µg/L	100	50	122
EP132: p-Cresol	106-44-5	0.1	µg/L	<0.1	2 µg/L	97.2	33	119
EP132: Pentachlorophenol	87-86-5	0.05	µg/L	<0.05	2 µg/L	107	32	138
EP132: Phenol	108-95-2	0.1	µg/L	<0.1	2 µg/L	57.0	27	59
EP231: Perfluorinated Compounds (QCLot: 103571)								
EP231: 6:2 Fluorotelomer sulfonate (6:2 FtS)	27619-97-2	0.1	µg/L	<0.1	2.5 µg/L	111	61	145
EP231: 8:2 Fluorotelomer sulfonate	39108-34-4	0.1	µg/L	<0.1	----	----	----	----
EP231: PFOA	335-67-1	0.01	µg/L	<0.02	0.5 µg/L	119	72	134
EP231: PFOS	1763-23-1	0.01	µg/L	<0.02	0.5 µg/L	107	70	136

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.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 103228)							
ES1521936-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	102	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 103229)							
ES1521936-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	109	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106553)							
ES1522138-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	88.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106553)							
ES1522138-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	87.7	70	130
EP080: BTEXN (QCLot: 106553)							
ES1522138-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	85.9	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	99.8	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	99.8	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	111	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	99.1	70	130
		EP080: Toluene	108-88-3	25 µg/L	90.7	70	130
EP125A: Monocyclic Aromatic Hydrocarbons (QCLot: 104074)							
ES1522150-001	VB_MW02	EP125: 1.2.4-Trimethylbenzene	95-63-6	1 µg/L	85.8	70	130
		EP125: 1.3.5-Trimethylbenzene	108-67-8	1 µg/L	85.2	70	130
		EP125: Benzene	71-43-2	1 µg/L	90.3	70	130
		EP125: Ethylbenzene	100-41-4	1 µg/L	91.0	70	130
		EP125: meta- & para-Xylene	108-38-3 106-42-3	1 µg/L	88.1	70	130
		EP125: ortho-Xylene	95-47-6	1 µg/L	90.1	70	130
		EP125: Styrene	100-42-5	1 µg/L	88.0	70	130
		EP125: Toluene	108-88-3	1 µg/L	90.1	70	130
EP125E: Halogenated Aliphatic Compounds (QCLot: 104074)							
ES1522150-001	VB_MW02	EP125: 1.1.1-Trichloroethane	71-55-6	1 µg/L	93.0	70	130
		EP125: 1.1-Dichloroethane	75-34-3	1 µg/L	92.0	70	130
		EP125: 1.1-Dichloroethene	75-35-4	1 µg/L	90.0	70	130
		EP125: 1.2-Dichloroethane	107-06-2	1 µg/L	98.1	70	130
		EP125: Bromochloromethane	74-97-5	1 µg/L	92.0	70	130
		EP125: Bromomethane	74-83-9	10 µg/L	83.3	70	130
		EP125: Carbon Tetrachloride	56-23-5	1 µg/L	96.2	70	130
		EP125: Chloroethane	75-00-3	10 µg/L	91.1	70	130
		EP125: cis-1.2-Dichloroethene	156-59-2	1 µg/L	92.1	70	130
		EP125: Dichlorodifluoromethane	75-71-8	10 µg/L	86.6	70	130
		EP125: Dichloromethane	75-09-2	1 µg/L	74.3	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP125E: Halogenated Aliphatic Compounds (QCLot: 104074) - continued							
ES1522150-001	VB_MW02	EP125: Hexachlorobutadiene	87-68-3	1 µg/L	107	70	130
		EP125: Tetrachloroethene	127-18-4	1 µg/L	74.5	70	130
		EP125: trans-1.2-Dichloroethene	156-60-5	1 µg/L	90.6	70	130
		EP125: Trichloroethene	79-01-6	1 µg/L	75.7	70	130
		EP125: Trichlorofluoromethane	75-69-4	10 µg/L	105	70	130
		EP125: Vinyl chloride	75-01-4	10 µg/L	87.3	70	130
EP125F: Halogenated Aromatic Compounds (QCLot: 104074)							
ES1522150-001	VB_MW02	EP125: 1.2.3-Trichlorobenzene	87-61-6	1 µg/L	93.1	70	130
		EP125: 1.2.4-Trichlorobenzene	120-82-1	1 µg/L	92.3	70	130
		EP125: 1.2-Dichlorobenzene	95-50-1	1 µg/L	92.2	70	130
		EP125: 1.3-Dichlorobenzene	541-73-1	1 µg/L	88.6	70	130
		EP125: 1.4-Dichlorobenzene	106-46-7	1 µg/L	90.6	70	130
		EP125: 2-Chlorotoluene	95-49-8	1 µg/L	92.4	70	130
		EP125: 4-Chlorotoluene	106-43-4	1 µg/L	89.0	70	130
		EP125: Benzylchloride	100-44-7	1 µg/L	83.9	70	130
		EP125: Bromobenzene	108-86-1	1 µg/L	93.4	70	130
		EP125: Chlorobenzene	108-90-7	1 µg/L	90.4	70	130
EP125G: Trihalomethanes (QCLot: 104074)							
ES1522150-001	VB_MW02	EP125: Bromodichloromethane	75-27-4	1 µg/L	94.3	70	130
		EP125: Bromoform	75-25-2	1 µg/L	96.3	70	130
		EP125: Chloroform	67-66-3	1 µg/L	94.7	70	130
		EP125: Dibromochloromethane	124-48-1	1 µg/L	93.2	70	130
EP125H: Naphthalene (QCLot: 104074)							
ES1522150-001	VB_MW02	EP125: Naphthalene	91-20-3	1 µg/L	93.6	70	130
EP125L: Methyl t-butyl ether (QCLot: 104074)							
ES1522150-001	VB_MW02	EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	1 µg/L	87.7	70	130
EP231: Perfluorinated Compounds (QCLot: 103571)							
EB1519019-001	Anonymous	EP231: 6:2 Fluorotelomer sulfonate (6:2 FtS)	27619-97-2	2.5 µg/L	108	60	145
		EP231: PFOA	335-67-1	0.5 µg/L	125	60	134
		EP231: PFOS	1763-23-1	0.5 µg/L	77.6	60	136

QA/QC Compliance Assessment for DQO Reporting

Work Order	: **ES1522150**	Page	: 1 of 5
Amendment	: **1**		
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Telephone	: +61 2 8784 8555
Project	: VALES POINT/COLONGRA	Date Samples Received	: 18-May-2015
Site	: ----	Issue Date	: 28-May-2015
Sampler	: JOHN EWING	No. of samples received	: 11
Order number	: ----	No. of samples analysed	: 11

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	3	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	2	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	3	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	2	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
VB_MW03, D03_180515, VB_MW04, VI_MW01, D01_180514_AW, T01_180514_AW	**18-May-2015**	**----**	----	----	**19-May-2015**	01-Jun-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
VB_MW03, D03_180515, VB_MW04, VI_MW01, D01_180514_AW, T01_180514_AW	**18-May-2015**	**----**	----	----	**19-May-2015**	15-Jun-2015	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
VB_MW03, D03_180515, VB_MW04, VI_MW01, D01_180514_AW, T01_180514_AW	**18-May-2015**	**----**	----	----	**19-May-2015**	15-Jun-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F)							
VB_MW03, D03_180515, VB_MW04, VI_MW01, D01_180514_AW, T01_180514_AW	**18-May-2015**	**----**	----	----	**19-May-2015**	25-May-2015	✓

Matrix: **WATER**

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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
VB_MW03, VE_MW02	**18-May-2015**	**19-May-2015**	25-May-2015	✓	**20-May-2015**	28-Jun-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
VB_MW02, VB_MW05, VB_MW01, VB_MW04, VI_MW01, D01_180514_AW, T01_180514_AW	**18-May-2015**	**22-May-2015**	01-Jun-2015	✓	**25-May-2015**	01-Jun-2015	✓
EP125E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP125)							
VB_MW02	**18-May-2015**	**----**	----	----	**20-May-2015**	01-Jun-2015	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP132)							
VE_MW02	**18-May-2015**	**20-May-2015**	25-May-2015	✓	**21-May-2015**	29-Jun-2015	✓
EP231: Perfluorinated Compounds							
HDPE (no PTFE) (EP231)							
VB_MW02, VB_MW03, D03_180515, VB_MW01, VI_MW01	**18-May-2015**	**----**	----	----	**22-May-2015**	14-Nov-2015	✓

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(were) 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: **WATER**

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)							
Alkalinity by PC Titrator	ED037-P	2	11	**18.18**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	13	**15.38**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	8	**12.50**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	3	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PFOS and PFOA	EP231	1	6	**16.67**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	2	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	14	**14.29**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	1	1	**100.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	11	**9.09**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	13	**15.38**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	**33.33**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PFOS and PFOA	EP231	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	2	**50.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	14	**7.14**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	1	1	**100.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	13	**7.69**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	**33.33**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PFOS and PFOA	EP231	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	2	**50.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	14	**7.14**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	1	1	**100.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	13	**7.69**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	3	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PFOS and PFOA	EP231	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	2	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	14	**7.14**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	1	1	**100.00**	**5.00**	✓	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
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
VOC by HS GCMS in SIM Mode	EP125	WATER	In-house: A sample is saturated with sodium chloride and achieving thermodynamic equilibrium between the water and gas phase in a closed thermostatted vessel. A reproducible headspace gas is extracted from the vial and injected into a gas chromatograph and the analyte of interest is seperated by means of gas/liquid partition chromatography and quantified using automated static headspace GCMS in SIM mode.
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	USEPA 3640 (GPC Cleanup), 8270 GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)
PFOS and PFOA	EP231	WATER	In-house: Direct injection analysis of fresh and diluted saline waters. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM.

CERTIFICATE OF ANALYSIS

Work Order	: **ES1522169**	Page	: 1 of 10
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 15, 309 Kent Street SYDNEY NSW AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: 0300379 VP GME	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 18-May-2015 19:15
C-O-C number	: ----	Date Analysis Commenced	: 20-May-2015
Sampler	: JANENE DEVEREUX	Issue Date	: 26-May-2015 17:21
Site	: ----		
		No. of samples received	: 7
Quote number	: ----	No. of samples analysed	: 7

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	V0_MW05	V0_MW04	V0_X_MW02	V0_MW06	R01_180515
				Client sampling date / time	18-May-2015 12:30	18-May-2015 10:30	18-May-2015 11:22	18-May-2015 13:55	18-May-2015 13:55
Compound	CAS Number	LOR	Unit		ES1522169-001	ES1522169-002	ES1522169-003	ES1522169-004	ES1522169-005
					Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		----	----	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		----	----	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		----	----	30	----	----
Total Alkalinity as CaCO3	----	1	mg/L		----	----	30	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	----	882	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		----	----	8250	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		----	----	400	----	----
Magnesium	7439-95-4	1	mg/L		----	----	803	----	----
Sodium	7440-23-5	1	mg/L		----	----	4400	----	----
Potassium	7440-09-7	1	mg/L		----	----	34	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		----	----	----	----	<0.001
Cobalt	7440-48-4	0.001	mg/L		----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L		----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L		----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L		----	----	----	----	<0.001
Nickel	7440-02-0	0.001	mg/L		----	----	----	----	<0.001
Selenium	7782-49-2	0.01	mg/L		----	----	----	----	<0.01
Zinc	7440-66-6	0.005	mg/L		----	----	----	----	<0.005
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L		----	----	13	----	----
Arsenic	7440-38-2	0.5	µg/L		----	----	8.9	----	----
Cobalt	7440-48-4	0.2	µg/L		----	----	57.4	----	----
Copper	7440-50-8	1	µg/L		----	----	2	----	----
Lead	7439-92-1	0.2	µg/L		----	----	0.4	----	----
Manganese	7439-96-5	0.5	µg/L		----	----	4160	----	----
Nickel	7440-02-0	0.5	µg/L		----	----	104	----	----
Zinc	7440-66-6	5	µg/L		----	----	118	----	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L		5.7	58.0	----	25.3	----
Arsenic	7440-38-2	0.2	µg/L		7.5	91.5	----	40.5	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	V0_MW05	V0_MW04	V0_X_MW02	V0_MW06	R01_180515
				Client sampling date / time	18-May-2015 12:30	18-May-2015 10:30	18-May-2015 11:22	18-May-2015 13:55	18-May-2015 13:55
Compound	CAS Number	LOR	Unit		ES1522169-001	ES1522169-002	ES1522169-003	ES1522169-004	ES1522169-005
					Result	Result	Result	Result	Result
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS - Continued									
Cobalt	7440-48-4	0.1	µg/L		7.8	108	----	184	----
Copper	7440-50-8	0.5	µg/L		3.3	180	----	4.5	----
Lead	7439-92-1	0.1	µg/L		67.1	193	----	40.6	----
Manganese	7439-96-5	0.5	µg/L		583	2110	----	2310	----
Nickel	7440-02-0	0.5	µg/L		10.2	108	----	73.6	----
Zinc	7440-66-6	1	µg/L		29	1060	----	211	----
EN055: Ionic Balance									
^ Total Anions	----	0.01	meq/L		----	----	252	----	----
^ Total Cations	----	0.01	meq/L		----	----	278	----	----
^ Ionic Balance	----	0.01	%		----	----	5.01	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1	µg/L		----	----	----	----	<1.0
2-Chlorophenol	95-57-8	1	µg/L		----	----	----	----	<1.0
2-Methylphenol	95-48-7	1	µg/L		----	----	----	----	<1.0
3- & 4-Methylphenol	1319-77-3	2	µg/L		----	----	----	----	<2.0
2-Nitrophenol	88-75-5	1	µg/L		----	----	----	----	<1.0
2.4-Dimethylphenol	105-67-9	1	µg/L		----	----	----	----	<1.0
2.4-Dichlorophenol	120-83-2	1	µg/L		----	----	----	----	<1.0
2.6-Dichlorophenol	87-65-0	1	µg/L		----	----	----	----	<1.0
4-Chloro-3-methylphenol	59-50-7	1	µg/L		----	----	----	----	<1.0
2.4.6-Trichlorophenol	88-06-2	1	µg/L		----	----	----	----	<1.0
2.4.5-Trichlorophenol	95-95-4	1	µg/L		----	----	----	----	<1.0
Pentachlorophenol	87-86-5	2	µg/L		----	----	----	----	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		----	----	----	----	<1.0
Acenaphthylene	208-96-8	1	µg/L		----	----	----	----	<1.0
Acenaphthene	83-32-9	1	µg/L		----	----	----	----	<1.0
Fluorene	86-73-7	1	µg/L		----	----	----	----	<1.0
Phenanthrene	85-01-8	1	µg/L		----	----	----	----	<1.0
Anthracene	120-12-7	1	µg/L		----	----	----	----	<1.0
Fluoranthene	206-44-0	1	µg/L		----	----	----	----	<1.0
Pyrene	129-00-0	1	µg/L		----	----	----	----	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		----	----	----	----	<1.0
Chrysene	218-01-9	1	µg/L		----	----	----	----	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		----	----	----	----	<1.0

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	V0_MW05	V0_MW04	V0_X_MW02	V0_MW06	R01_180515
				Client sampling date / time	18-May-2015 12:30	18-May-2015 10:30	18-May-2015 11:22	18-May-2015 13:55	18-May-2015 13:55
Compound	CAS Number	LOR	Unit		ES1522169-001	ES1522169-002	ES1522169-003	ES1522169-004	ES1522169-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(k)fluoranthene	207-08-9	1	µg/L		----	----	----	----	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		----	----	----	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		----	----	----	----	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		----	----	----	----	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		----	----	----	----	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		----	----	----	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		----	----	----	----	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	----	----	<20
C10 - C14 Fraction	----	50	µg/L		----	----	----	----	<50
C15 - C28 Fraction	----	100	µg/L		----	----	----	----	<100
C29 - C36 Fraction	----	50	µg/L		----	----	----	----	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		----	----	----	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	----	----	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		----	----	----	----	<20
>C10 - C16 Fraction	>C10_C16	100	µg/L		----	----	----	----	<100
>C16 - C34 Fraction	----	100	µg/L		----	----	----	----	<100
>C34 - C40 Fraction	----	100	µg/L		----	----	----	----	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	----	----	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	----	----	----	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	----	----	----	<1
Toluene	108-88-3	2	µg/L		----	----	----	----	<2
Ethylbenzene	100-41-4	2	µg/L		----	----	----	----	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	----	----	----	<2
ortho-Xylene	95-47-6	2	µg/L		----	----	----	----	<2
^ Total Xylenes	1330-20-7	2	µg/L		----	----	----	----	<2
^ Sum of BTEX	----	1	µg/L		----	----	----	----	<1
Naphthalene	91-20-3	5	µg/L		----	----	----	----	<5
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		----	----	----	----	**26.2**
2-Chlorophenol-D4	93951-73-6	1	%		----	----	----	----	**56.0**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	V0_MW05	V0_MW04	V0_X_MW02	V0_MW06	R01_180515
				Client sampling date / time	18-May-2015 12:30	18-May-2015 10:30	18-May-2015 11:22	18-May-2015 13:55	18-May-2015 13:55
Compound	CAS Number	LOR	Unit		ES1522169-001	ES1522169-002	ES1522169-003	ES1522169-004	ES1522169-005
					Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued									
2.4.6-Tribromophenol	118-79-6	1	%		----	----	----	----	39.2
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		----	----	----	----	73.5
Anthracene-d10	1719-06-8	1	%		----	----	----	----	77.0
4-Terphenyl-d14	1718-51-0	1	%		----	----	----	----	67.1
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	----	----	----	110
Toluene-D8	2037-26-5	2	%		----	----	----	----	104
4-Bromofluorobenzene	460-00-4	2	%		----	----	----	----	98.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	TS1	TB1	----	----	----
				Client sampling date / time	[18-May-2015]	[18-May-2015]	----	----	----
Compound	CAS Number	LOR	Unit		ES1522169-006	ES1522169-007	--------	--------	--------
					Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		----	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		----	----	----	----	----
Magnesium	7439-95-4	1	mg/L		----	----	----	----	----
Sodium	7440-23-5	1	mg/L		----	----	----	----	----
Potassium	7440-09-7	1	mg/L		----	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		----	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		----	----	----	----	----
Copper	7440-50-8	0.001	mg/L		----	----	----	----	----
Lead	7439-92-1	0.001	mg/L		----	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		----	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		----	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		----	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		----	----	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L		----	----	----	----	----
Arsenic	7440-38-2	0.5	µg/L		----	----	----	----	----
Cobalt	7440-48-4	0.2	µg/L		----	----	----	----	----
Copper	7440-50-8	1	µg/L		----	----	----	----	----
Lead	7439-92-1	0.2	µg/L		----	----	----	----	----
Manganese	7439-96-5	0.5	µg/L		----	----	----	----	----
Nickel	7440-02-0	0.5	µg/L		----	----	----	----	----
Zinc	7440-66-6	5	µg/L		----	----	----	----	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L		----	----	----	----	----
Arsenic	7440-38-2	0.2	µg/L		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	TS1	TB1	----	----	----
				Client sampling date / time	[18-May-2015]	[18-May-2015]	----	----	----
Compound	CAS Number	LOR	Unit		ES1522169-006	ES1522169-007	--------	--------	--------
					Result	Result	Result	Result	Result
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS - Continued									
Cobalt	7440-48-4	0.1	µg/L		----	----	----	----	----
Copper	7440-50-8	0.5	µg/L		----	----	----	----	----
Lead	7439-92-1	0.1	µg/L		----	----	----	----	----
Manganese	7439-96-5	0.5	µg/L		----	----	----	----	----
Nickel	7440-02-0	0.5	µg/L		----	----	----	----	----
Zinc	7440-66-6	1	µg/L		----	----	----	----	----
EN055: Ionic Balance									
^ Total Anions	----	0.01	meq/L		----	----	----	----	----
^ Total Cations	----	0.01	meq/L		----	----	----	----	----
^ Ionic Balance	----	0.01	%		----	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1	µg/L		----	----	----	----	----
2-Chlorophenol	95-57-8	1	µg/L		----	----	----	----	----
2-Methylphenol	95-48-7	1	µg/L		----	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2	µg/L		----	----	----	----	----
2-Nitrophenol	88-75-5	1	µg/L		----	----	----	----	----
2.4-Dimethylphenol	105-67-9	1	µg/L		----	----	----	----	----
2.4-Dichlorophenol	120-83-2	1	µg/L		----	----	----	----	----
2.6-Dichlorophenol	87-65-0	1	µg/L		----	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1	µg/L		----	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1	µg/L		----	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1	µg/L		----	----	----	----	----
Pentachlorophenol	87-86-5	2	µg/L		----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		----	----	----	----	----
Acenaphthylene	208-96-8	1	µg/L		----	----	----	----	----
Acenaphthene	83-32-9	1	µg/L		----	----	----	----	----
Fluorene	86-73-7	1	µg/L		----	----	----	----	----
Phenanthrene	85-01-8	1	µg/L		----	----	----	----	----
Anthracene	120-12-7	1	µg/L		----	----	----	----	----
Fluoranthene	206-44-0	1	µg/L		----	----	----	----	----
Pyrene	129-00-0	1	µg/L		----	----	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L		----	----	----	----	----
Chrysene	218-01-9	1	µg/L		----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	TS1	TB1	----	----	----
				Client sampling date / time	[18-May-2015]	[18-May-2015]	----	----	----
Compound	CAS Number	LOR	Unit		ES1522169-006	ES1522169-007	--------	--------	--------
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(k)fluoranthene	207-08-9	1	µg/L		----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L		----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L		----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L		----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		----	<20	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		----	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		----	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		**17**	<1	----	----	----
Toluene	108-88-3	2	µg/L		**17**	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L		**16**	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		**15**	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L		**17**	<2	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L		**32**	<2	----	----	----
^ Sum of BTEX	----	1	µg/L		**82**	<1	----	----	----
Naphthalene	91-20-3	5	µg/L		**20**	<5	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	TS1	TB1	----	----	----
				Client sampling date / time	[18-May-2015]	[18-May-2015]	----	----	----
Compound	CAS Number	LOR	Unit		ES1522169-006	ES1522169-007	--------	--------	--------
					Result	Result	Result	Result	Result
EP075(SIM)S: Phenolic Compound Surrogates - Continued									
2.4.6-Tribromophenol	118-79-6	1	%		----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		----	----	----	----	----
Anthracene-d10	1719-06-8	1	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	1	%		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		120	113	----	----	----
Toluene-D8	2037-26-5	2	%		114	110	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		105	98.1	----	----	----

QUALITY CONTROL REPORT

Work Order	: **ES1522169**	Page	: 1 of 10
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 15, 309 Kent Street SYDNEY NSW AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: 0300379 VP GME	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 18-May-2015
C-O-C number	: ----	Date Analysis Commenced	: 20-May-2015
Sampler	: JANENE DEVEREUX	Issue Date	: 26-May-2015
Site	: ----	No. of samples received	: 7
Quote number	: ----	No. of samples analysed	: 7

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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 ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

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

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 104144)									
ES1522200-009	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	70	70	0.00	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	70	70	0.00	0% - 20%
ES1522200-001	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	34	34	0.00	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	34	34	0.00	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 104129)									
ES1522169-003	V0_X_MW02	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	882	905	2.53	0% - 20%
ES1522225-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	808	796	1.44	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 104130)									
ES1522169-003	V0_X_MW02	ED045G: Chloride	16887-00-6	1	mg/L	8250	8260	0.176	0% - 20%
ES1522175-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	216	225	4.13	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 104407)									
ES1522149-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	418	410	1.70	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	91	89	2.94	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	100	97	3.27	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	648	643	0.674	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 104707)									
ES1522149-001	Anonymous	EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.053	0.054	2.08	0% - 20%
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	0.006	0.007	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.044	0.045	0.00	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.074	0.074	0.00	0% - 20%
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.915	0.965	5.26	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.028	0.029	0.00	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.572	0.591	3.17	0% - 20%
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1522197-001	Anonymous	EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.005	0.006	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 104707) - continued									
ES1522197-001	Anonymous	EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 108842)									
EP1510211-001	Anonymous	EG093B-F: Selenium	7782-49-2	2	µg/L	89	86	3.24	0% - 20%
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 108843)									
EP1510211-013	Anonymous	EG093A-F: Cobalt	7440-48-4	0.2	µg/L	0.5	0.5	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	1.1	0.9	16.4	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.5	1.5	0.00	No Limit
		EG093A-F: Manganese	7439-96-5	0.5	µg/L	8.6	8.8	2.56	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	3.0	3.0	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	22	28	21.8	0% - 50%
		EG093A-F: Zinc	7440-66-6	5	µg/L	40	43	7.54	No Limit
EP1510211-001	Anonymous	EG093A-F: Cobalt	7440-48-4	0.2	µg/L	1.1	1.1	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	0.8	0.7	12.7	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	<1.0	<1.0	0.00	No Limit
		EG093A-F: Manganese	7439-96-5	0.5	µg/L	23.4	23.6	0.830	0% - 20%
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	12.2	12.2	0.00	0% - 50%
		EG093A-F: Copper	7440-50-8	1	µg/L	35	34	0.00	0% - 50%
		EG093A-F: Zinc	7440-66-6	5	µg/L	56	53	5.40	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 108011)									
ES1522169-001	V0_MW05	EG094A-F: Cobalt	7440-48-4	0.1	µg/L	7.8	7.9	0.00	0% - 20%
		EG094A-F: Lead	7439-92-1	0.1	µg/L	67.1	66.8	0.481	0% - 20%
		EG094A-F: Arsenic	7440-38-2	0.2	µg/L	7.5	7.6	1.37	0% - 20%
		EG094A-F: Copper	7440-50-8	0.5	µg/L	3.3	3.5	3.88	No Limit
		EG094A-F: Manganese	7439-96-5	0.5	µg/L	583	563	3.52	0% - 20%
		EG094A-F: Nickel	7440-02-0	0.5	µg/L	10.2	10.4	1.99	0% - 20%
		EG094A-F: Zinc	7440-66-6	1	µg/L	29	29	0.00	0% - 20%
ES1522224-008	Anonymous	EG094A-F: Cobalt	7440-48-4	0.1	µg/L	1.3	1.3	0.00	0% - 50%
		EG094A-F: Lead	7439-92-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EG094A-F: Arsenic	7440-38-2	0.2	µg/L	6.1	6.0	2.21	0% - 20%
		EG094A-F: Copper	7440-50-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG094A-F: Manganese	7439-96-5	0.5	µg/L	272	286	5.16	0% - 20%
		EG094A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	0.5	0.00	No Limit
		EG094A-F: Zinc	7440-66-6	1	µg/L	<1	1	0.00	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 108012)									
ES1522169-001	V0_MW05	EG094B-F: Selenium	7782-49-2	0.2	µg/L	5.7	5.8	0.00	0% - 20%
ES1522224-008	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 106382)									
EB1519069-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1522163-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 106553)									
ES1522138-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	120	170	35.7	No Limit
ES1522150-008	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 106382)									
EB1519069-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	20	20	0.00	No Limit
ES1522163-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 106553)									
ES1522138-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	140	210	38.9	0% - 50%
ES1522150-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 106382)									
EB1519069-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	3	2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	3	3	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1522163-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP080: BTEXN (QC Lot: 106553)									
ES1522138-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	42	45	5.99	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1522150-008	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 104144)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	92.2	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 104129)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	96.7	86	122
ED045G: Chloride by Discrete Analyser (QCLot: 104130)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	98.6	75	123
				<1	1000 mg/L	95.6	77	119
ED093F: Dissolved Major Cations (QCLot: 104407)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	91.6	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	101	90	110
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.1	87	117
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	98.8	82	118
EG020T: Total Metals by ICP-MS (QCLot: 104707)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.4	79	121
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	86.7	84	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	92.4	83	117
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.8	84	116
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	94.3	85	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.9	84	116
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	101	68	128
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.6	77	117
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 108842)								
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	111	74	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 108843)								
EG093A-F: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	98.3	76	134
EG093A-F: Cobalt	7440-48-4	0.2	µg/L	<0.2	10 µg/L	96.2	75	119
EG093A-F: Copper	7440-50-8	1	µg/L	<1	10 µg/L	97.1	71	129
EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	97.3	74	120
EG093A-F: Manganese	7439-96-5	0.5	µg/L	<0.5	10 µg/L	109	72	122
EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	107	72	124
EG093A-F: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	96.2	70	126
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 108011)								
EG094A-F: Arsenic	7440-38-2	0.2	µg/L	<0.2	10 µg/L	109	75	129
EG094A-F: Cobalt	7440-48-4	0.1	µg/L	<0.1	10 µg/L	103	81	119
EG094A-F: Copper	7440-50-8	0.5	µg/L	<0.5	10 µg/L	103	84	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 108011) - continued								
EG094A-F: Lead	7439-92-1	0.1	µg/L	<0.1	10 µg/L	108	74	118
EG094A-F: Manganese	7439-96-5	0.5	µg/L	<0.5	10 µg/L	100	84	114
EG094A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	98.2	85	117
EG094A-F: Zinc	7440-66-6	1	µg/L	<1	10 µg/L	103	83	121
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 108012)								
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	102	70	122
EP075(SIM)A: Phenolic Compounds (QCLot: 103779)								
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	82.8	50	108
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	85.0	59	118
EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	77.8	59	122
EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	87.8	60	112
EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	79.1	64	118
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	74.4	64	110
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	85.4	56	112
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	78.9	63	117
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	82.8	43	114
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	76.2	63	119
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	79.9	10	95
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	46.7	25	62
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 103779)								
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	83.4	62	113
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	87.9	64	114
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	97.4	64	116
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	100	64	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	101	63	117
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	100	62	119
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	99.8	59	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	95.3	62	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	97.0	63	116
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	98.4	61	117
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	93.2	64	118
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	91.2	64	115
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	96.7	60	118
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	71.0	59	119
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	92.6	63	116
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	91.2	63	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 103778)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 103778) - continued								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	95.8	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	98.2	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	99.8	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106382)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	90.8	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106553)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	95.7	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 103778)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	100	59	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	96.5	74	138
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	101	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106382)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	90.6	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106553)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	95.8	75	127
EP080: BTEXN (QCLot: 106382)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	91.7	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	88.7	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	85.7	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	87.5	70	124
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	90.9	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	94.9	65	129
EP080: BTEXN (QCLot: 106553)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	102	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	99.0	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	99.3	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	98.0	70	124
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.9	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	98.8	65	129

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.

Sub-Matrix: **WATER**

Matrix Spike (MS) Report		
Spike	SpikeRecovery(%)	Recovery Limits (%)

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 104129)							
ES1522169-003	V0_X_MW02	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 104130)							
ES1522169-003	V0_X_MW02	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70	130
EG020T: Total Metals by ICP-MS (QCLot: 104707)							
ES1522149-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	109	70	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	99.8	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	103	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	109	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	107	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	109	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	99.4	70	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 108843)							
EP1510211-001	Anonymous	EG093A-F: Arsenic	7440-38-2	50 µg/L	124	70	130
		EG093A-F: Cobalt	7440-48-4	50 µg/L	118	70	130
		EG093A-F: Copper	7440-50-8	50 µg/L	128	70	130
		EG093A-F: Lead	7439-92-1	50 µg/L	113	70	130
		EG093A-F: Manganese	7439-96-5	50 µg/L	120	70	130
		EG093A-F: Nickel	7440-02-0	50 µg/L	105	70	130
		EG093A-F: Zinc	7440-66-6	50 µg/L	109	70	130
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 108011)							
ES1522169-001	V0_MW05	EG094A-F: Arsenic	7440-38-2	50 µg/L	129	70	130
		EG094A-F: Cobalt	7440-48-4	50 µg/L	115	70	130
		EG094A-F: Copper	7440-50-8	50 µg/L	106	70	130
		EG094A-F: Lead	7439-92-1	50 µg/L	127	70	130
		EG094A-F: Manganese	7439-96-5	50 µg/L	# Not Determined	70	130
		EG094A-F: Nickel	7440-02-0	50 µg/L	104	70	130
		EG094A-F: Zinc	7440-66-6	50 µg/L	111	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106382)							
EB1519069-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	113	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106553)							
ES1522138-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	88.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106382)							
EB1519069-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	111	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106553)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106553) - continued							
ES1522138-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	87.7	70	130
EP080: BTEXN (QCLot: 106382)							
EB1519069-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	91.0	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	97.1	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	96.5	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	97.8	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	102	70	130
		EP080: Toluene	108-88-3	25 µg/L	88.9	70	130
EP080: BTEXN (QCLot: 106553)							
ES1522138-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	85.9	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	99.8	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	99.8	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	111	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	99.1	70	130
		EP080: Toluene	108-88-3	25 µg/L	90.7	70	130

QA/QC Compliance Assessment for DQO Reporting

Work Order	: **ES1522169**	Page	: 1 of 7
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Telephone	: +61 2 8784 8555
Project	: 0300379 VP GME	Date Samples Received	: 18-May-2015
Site	: ----	Issue Date	: 26-May-2015
Sampler	: JANENE DEVEREUX	No. of samples received	: 7
Order number	: 0300379	No. of samples analysed	: 7

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1522169--003	V0_X_MW02	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	ES1522169--003	V0_X_MW02	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG094F: Dissolved Metals in Fresh Water by ORC-ICPI	ES1522169--001	V0_MW05	**Manganese**	7439-96-5	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	15	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	11	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	15	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	11	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **WATER**

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*
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
V0_X_MW02	**18-May-2015**	**----**	----	----	**20-May-2015**	01-Jun-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
V0_X_MW02	**18-May-2015**	**----**	----	----	**20-May-2015**	15-Jun-2015	✓

Matrix: **WATER**

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
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
V0_X_MW02	**18-May-2015**	**----**	----	----	**20-May-2015**	15-Jun-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F)							
V0_X_MW02	**18-May-2015**	**----**	----	----	**20-May-2015**	25-May-2015	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
R01_180515	**18-May-2015**	**21-May-2015**	14-Nov-2015	✓	**21-May-2015**	14-Nov-2015	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093A-F)							
V0_X_MW02	**18-May-2015**	**----**	----	----	**26-May-2015**	14-Nov-2015	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F)							
V0_X_MW02	**18-May-2015**	**----**	----	----	**26-May-2015**	14-Nov-2015	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094A-F)							
V0_MW05, V0_MW04, V0_MW06	**18-May-2015**	**----**	----	----	**26-May-2015**	14-Nov-2015	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F)							
V0_MW05, V0_MW04, V0_MW06	**18-May-2015**	**----**	----	----	**26-May-2015**	14-Nov-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
R01_180515	**18-May-2015**	**20-May-2015**	25-May-2015	✓	**21-May-2015**	29-Jun-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
R01_180515	**18-May-2015**	**20-May-2015**	25-May-2015	✓	**20-May-2015**	29-Jun-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
R01_180515	**18-May-2015**	**22-May-2015**	01-Jun-2015	✓	**22-May-2015**	01-Jun-2015	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
TS1, TB1	**18-May-2015**	**22-May-2015**	01-Jun-2015	✓	**25-May-2015**	01-Jun-2015	✓

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(were) 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: **WATER**

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)							
Alkalinity by PC Titrator	ED037-P	2	10	**20.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	17	**11.76**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	10	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	8	**12.50**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	15	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	15	**13.33**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	11	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	10	**10.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	10	**10.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	**6.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	15	**6.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	11	**9.09**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	10	**10.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	8	**12.50**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	**6.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	15	**6.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	11	**9.09**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

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*	
Method Blanks (MB) - Continued							
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	15	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	15	**6.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	11	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	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
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1522254**

Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	Page	: 1 of 3
Order number	: 0300379	Quote number	: ES2014ENVRES0397 (EN/009/14)
C-O-C number	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 19-May-2015	Issue Date	: 21-May-2015
Client Requested Due Date	: 29-May-2015	Scheduled Reporting Date	: **29-May-2015**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 3.1'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 10 / 9

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) WATER No analysis requested	WATER - EG020F Dissolved Metals by ICPMS	WATER - EG094A-F Dissolved Metals in Fresh Water Suite A by	WATER - EG094B-F Dissolved Metals in fresh water Suite B by	WATER - EP080 BTEXN	WATER - EP231 Perfluorooctyl Acids and Sulfonates by	WATER - NT-01 & 02 Major Cations & Anions (Ca, Mg, Na, K, Cl, SO4,
ES1522254-001	[19-May-2015]	VN_MW10		✓					
ES1522254-002	[19-May-2015]	VV_MW15		✓					
ES1522254-003	[19-May-2015]	VL_MW02						✓	
ES1522254-004	[19-May-2015]	VO_X_MW01		✓					✓
ES1522254-005	[19-May-2015]	VO_MW12	✓						
ES1522254-006	[19-May-2015]	VO_X_MW03			✓	✓			✓
ES1522254-007	[19-May-2015]	TS 2					✓		
ES1522254-009	[19-May-2015]	VU_MW01		✓					
ES1522254-010	[19-May-2015]	VN_MW02		✓					

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EP132(PAH) Ultra Trace Polynuclear Aromatic Compounds	WATER - EP132A Phenols Ultratrace - 16 analytes	WATER - W-04 TRH/BTEXN	WATER - W-18 TRH(C6 - C9)/BTEXN
ES1522254-008	[19-May-2015]	TB 2				✓
ES1522254-009	[19-May-2015]	VU_MW01	✓	✓	✓	
ES1522254-010	[19-May-2015]	VN_MW02	✓	✓	✓	

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

JOHN EWING

- *AU Certificate of Analysis - NATA (COA)	Email	john.ewing@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	john.ewing@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	john.ewing@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	john.ewing@erm.com
- A4 - AU Tax Invoice (INV)	Email	john.ewing@erm.com
- Chain of Custody (CoC) (COC)	Email	john.ewing@erm.com
- Chromatogram (CHROM)	Email	john.ewing@erm.com
- EDI Format - ENMRG (ENMRG)	Email	john.ewing@erm.com
- EDI Format - ESDAT (ESDAT)	Email	john.ewing@erm.com

PETER LAVELLE

- *AU Certificate of Analysis - NATA (COA)	Email	peter.lavelle@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	peter.lavelle@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	peter.lavelle@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	peter.lavelle@erm.com
- A4 - AU Tax Invoice (INV)	Email	peter.lavelle@erm.com
- Chain of Custody (CoC) (COC)	Email	peter.lavelle@erm.com
- Chromatogram (CHROM)	Email	peter.lavelle@erm.com
- EDI Format - ENMRG (ENMRG)	Email	peter.lavelle@erm.com
- EDI Format - ESDAT (ESDAT)	Email	peter.lavelle@erm.com

TESS TOBIN

- *AU Certificate of Analysis - NATA (COA)	Email	tess.tobin@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	tess.tobin@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	tess.tobin@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	tess.tobin@erm.com
- A4 - AU Tax Invoice (INV)	Email	tess.tobin@erm.com
- Chain of Custody (CoC) (COC)	Email	tess.tobin@erm.com
- Chromatogram (CHROM)	Email	tess.tobin@erm.com
- EDI Format - ENMRG (ENMRG)	Email	tess.tobin@erm.com
- EDI Format - ESDAT (ESDAT)	Email	tess.tobin@erm.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES1522254**	Page	: 1 of 10
Amendment	: **1**		
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 19-May-2015 19:00
C-O-C number	: ----	Date Analysis Commenced	: 21-May-2015
Sampler	: ----	Issue Date	: 29-May-2015 16:44
Site	: ----		
		No. of samples received	: 10
Quote number	: ----	No. of samples analysed	: 10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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*
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

- This report has been amended as a result of a request to change sample identification numbers (IDs) received by ALS from <<NAME>> on <<DATE>>. All analysis results are as per the previous report.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.
- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.
- PFOS and PFOA results are reported as an aggregate of linear and branched isomers.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	VN_MW10	VU_MW15	VL_MW02	VO_X_MW01	VO_MW12
			Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit	ES1522254-001	ES1522254-002	ES1522254-003	ES1522254-004	ES1522254-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	----	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	----	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	----	**10**	----
Total Alkalinity as CaCO3	----	1	mg/L	----	----	----	**10**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	----	**16**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	----	----	**35**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	----	----	**2**	----
Magnesium	7439-95-4	1	mg/L	----	----	----	**4**	----
Sodium	7440-23-5	1	mg/L	----	----	----	**24**	----
Potassium	7440-09-7	1	mg/L	----	----	----	**2**	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	<0.001	----
Cobalt	7440-48-4	0.001	mg/L	**0.005**	**0.001**	----	**0.001**	----
Copper	7440-50-8	0.001	mg/L	**0.002**	**0.004**	----	**0.003**	----
Lead	7439-92-1	0.001	mg/L	**0.041**	**0.003**	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	**0.234**	**0.028**	----	**0.032**	----
Nickel	7440-02-0	0.001	mg/L	**0.003**	**0.002**	----	**0.002**	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	<0.01	----
Zinc	7440-66-6	0.005	mg/L	**0.044**	**0.046**	----	**0.017**	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Selenium	7782-49-2	2	µg/L	----	----	----	----	**141**
Arsenic	7440-38-2	0.5	µg/L	----	----	----	----	**51.3**
Cobalt	7440-48-4	0.1	µg/L	----	----	----	----	----
Cobalt	7440-48-4	0.2	µg/L	----	----	----	----	**6.6**
Copper	7440-50-8	1	µg/L	----	----	----	----	**1**
Lead	7439-92-1	0.2	µg/L	----	----	----	----	**9.5**
Manganese	7439-96-5	0.5	µg/L	----	----	----	----	**547**
Nickel	7440-02-0	0.5	µg/L	----	----	----	----	**26.6**
Zinc	7440-66-6	5	µg/L	----	----	----	----	**208**
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	----	----	----	**1.52**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VN_MW10	VU_MW15	VL_MW02	VO_X_MW01	VO_MW12
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522254-001	ES1522254-002	ES1522254-003	ES1522254-004	ES1522254-005
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
^ Total Cations	----	0.01	meq/L		----	----	----	1.52	----
^ Ionic Balance	----	0.01	%		----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		----	----	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		----	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		----	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	----	----	----	----
Toluene	108-88-3	2	µg/L		----	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		----	----	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L		----	----	----	----	----
^ Sum of BTEX	----	1	µg/L		----	----	----	----	----
Naphthalene	91-20-3	5	µg/L		----	----	----	----	----
EP132A: Phenolic Compounds									
2-Chlorophenol	95-57-8	0.05	µg/L		----	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.05	µg/L		----	----	----	----	----
m-Cresol	108-39-4	0.1	µg/L		----	----	----	----	----
o-Cresol	95-48-7	0.1	µg/L		----	----	----	----	----
p-Cresol	106-44-5	0.1	µg/L		----	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.1	µg/L		----	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.1	µg/L		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VN_MW10	VU_MW15	VL_MW02	VO_X_MW01	VO_MW12
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522254-001	ES1522254-002	ES1522254-003	ES1522254-004	ES1522254-005
					Result	Result	Result	Result	Result
EP132A: Phenolic Compounds - Continued									
2.4-Dimethylphenol	105-67-9	0.1	µg/L		----	----	----	----	----
Hexachlorophene	70-30-4	0.1	µg/L		----	----	----	----	----
2-Nitrophenol	88-75-5	0.1	µg/L		----	----	----	----	----
4-Nitrophenol	100-02-7	0.1	µg/L		----	----	----	----	----
Pentachlorophenol	87-86-5	0.05	µg/L		----	----	----	----	----
Phenol	108-95-2	0.1	µg/L		----	----	----	----	----
2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L		----	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.1	µg/L		----	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.1	µg/L		----	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons									
3-Methylcholanthrene	56-49-5	0.1	µg/L		----	----	----	----	----
2-Methylnaphthalene	91-57-6	0.1	µg/L		----	----	----	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L		----	----	----	----	----
Acenaphthene	83-32-9	0.1	µg/L		----	----	----	----	----
Acenaphthylene	208-96-8	0.1	µg/L		----	----	----	----	----
Anthracene	120-12-7	0.1	µg/L		----	----	----	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L		----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.05	µg/L		----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L		----	----	----	----	----
Benzo(e)pyrene	192-97-2	0.1	µg/L		----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L		----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L		----	----	----	----	----
Chrysene	218-01-9	0.1	µg/L		----	----	----	----	----
Coronene	191-07-1	0.1	µg/L		----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L		----	----	----	----	----
Fluoranthene	206-44-0	0.1	µg/L		----	----	----	----	----
Fluorene	86-73-7	0.1	µg/L		----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L		----	----	----	----	----
N-2-Fluorenyl Acetamide	53-96-3	0.1	µg/L		----	----	----	----	----
Naphthalene	91-20-3	0.1	µg/L		----	----	----	----	----
Perylene	198-55-0	0.1	µg/L		----	----	----	----	----
Phenanthrene	85-01-8	0.1	µg/L		----	----	----	----	----
Pyrene	129-00-0	0.1	µg/L		----	----	----	----	----
Sum of PAHs	----	0.05	µg/L		----	----	----	----	----
Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VN_MW10	VU_MW15	VL_MW02	VO_X_MW01	VO_MW12
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522254-001	ES1522254-002	ES1522254-003	ES1522254-004	ES1522254-005
					Result	Result	Result	Result	Result
EP231: Perfluorinated Compounds									
PFOS	1763-23-1	0.02	µg/L		----	----	**0.11**	----	----
PFOA	335-67-1	0.02	µg/L		----	----	<0.02	----	----
6:2 Fluorotelomer sulfonate (6:2 FtS)	27619-97-2	0.1	µg/L		----	----	<0.1	----	----
8:2 Fluorotelomer sulfonate	39108-34-4	0.1	µg/L		----	----	<0.1	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	----	----	----	----
Toluene-D8	2037-26-5	2	%		----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	----	----	----	----
EP132S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.1	%		----	----	----	----	----
Phenol-d6	13127-88-3	0.1	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		----	----	----	----	----
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	VO_X_MW03	TS 2	TB 2	VU_MW01	VN_MW02
			Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit	ES1522254-006	ES1522254-007	ES1522254-008	ES1522254-009	ES1522254-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**149**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**149**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**1110**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**11400**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**809**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**1040**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**5680**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**95**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	----	----	----	**0.005**	<0.001
Cobalt	7440-48-4	0.001	mg/L	----	----	----	**0.003**	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	**0.002**
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	**0.191**	**0.012**
Nickel	7440-02-0	0.001	mg/L	----	----	----	**0.001**	<0.001
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	----	----	----	**0.015**	**0.015**
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Selenium	7782-49-2	2	µg/L	<2	----	----	----	----
Arsenic	7440-38-2	0.5	µg/L	**6.0**	----	----	----	----
Cobalt	7440-48-4	0.1	µg/L	**46.8**	----	----	----	----
Cobalt	7440-48-4	0.2	µg/L	----	----	----	----	----
Copper	7440-50-8	1	µg/L	**1**	----	----	----	----
Lead	7439-92-1	0.2	µg/L	**0.2**	----	----	----	----
Manganese	7439-96-5	0.5	µg/L	**5450**	----	----	----	----
Nickel	7440-02-0	0.5	µg/L	**17.9**	----	----	----	----
Zinc	7440-66-6	5	µg/L	**18**	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	**348**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VO_X_MW03	TS 2	TB 2	VU_MW01	VN_MW02
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522254-006	ES1522254-007	ES1522254-008	ES1522254-009	ES1522254-010
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
^ Total Cations	----	0.01	meq/L		375	----	----	----	----
^ Ionic Balance	----	0.01	%		3.84	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		----	----	----	<50	<50
C15 - C28 Fraction	----	100	µg/L		----	----	----	<100	<100
C29 - C36 Fraction	----	50	µg/L		----	----	----	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		----	----	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		----	----	<20	<20	<20
>C10 - C16 Fraction	>C10_C16	100	µg/L		----	----	----	<100	<100
>C16 - C34 Fraction	----	100	µg/L		----	----	----	<100	<100
>C34 - C40 Fraction	----	100	µg/L		----	----	----	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	----	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	----	----	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	15	<1	<1	<1
Toluene	108-88-3	2	µg/L		----	15	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		----	14	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	15	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		----	15	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L		----	30	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		----	74	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		----	16	<5	<5	<5
EP132A: Phenolic Compounds									
2-Chlorophenol	95-57-8	0.05	µg/L		----	----	----	<0.05	<0.05
4-Chloro-3-methylphenol	59-50-7	0.05	µg/L		----	----	----	<0.05	<0.05
m-Cresol	108-39-4	0.1	µg/L		----	----	----	<0.1	<0.1
o-Cresol	95-48-7	0.1	µg/L		----	----	----	<0.1	<0.1
p-Cresol	106-44-5	0.1	µg/L		----	----	----	<0.1	<0.1
2.4-Dichlorophenol	120-83-2	0.1	µg/L		----	----	----	<0.1	<0.1
2.6-Dichlorophenol	87-65-0	0.1	µg/L		----	----	----	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VO_X_MW03	TS 2	TB 2	VU_MW01	VN_MW02
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522254-006	ES1522254-007	ES1522254-008	ES1522254-009	ES1522254-010
					Result	Result	Result	Result	Result
EP132A: Phenolic Compounds - Continued									
2.4-Dimethylphenol	105-67-9	0.1	µg/L		----	----	----	<0.1	<0.1
Hexachlorophene	70-30-4	0.1	µg/L		----	----	----	<0.1	<0.1
2-Nitrophenol	88-75-5	0.1	µg/L		----	----	----	<0.1	<0.1
4-Nitrophenol	100-02-7	0.1	µg/L		----	----	----	<0.1	<0.1
Pentachlorophenol	87-86-5	0.05	µg/L		----	----	----	<0.05	<0.05
Phenol	108-95-2	0.1	µg/L		----	----	----	<0.1	<0.1
2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L		----	----	----	<0.1	<0.1
2.4.5-Trichlorophenol	95-95-4	0.1	µg/L		----	----	----	<0.1	<0.1
2.4.6-Trichlorophenol	88-06-2	0.1	µg/L		----	----	----	<0.1	<0.1
EP132B: Polynuclear Aromatic Hydrocarbons									
3-Methylcholanthrene	56-49-5	0.1	µg/L		----	----	----	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L		----	----	----	<0.1	<0.1
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L		----	----	----	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L		----	----	----	<0.1	<0.1
Acenaphthylene	208-96-8	0.1	µg/L		----	----	----	<0.1	<0.1
Anthracene	120-12-7	0.1	µg/L		----	----	----	<0.1	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L		----	----	----	<0.1	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L		----	----	----	<0.05	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L		----	----	----	<0.1	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L		----	----	----	<0.1	<0.1
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L		----	----	----	<0.1	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L		----	----	----	<0.1	<0.1
Chrysene	218-01-9	0.1	µg/L		----	----	----	<0.1	<0.1
Coronene	191-07-1	0.1	µg/L		----	----	----	<0.1	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L		----	----	----	<0.1	<0.1
Fluoranthene	206-44-0	0.1	µg/L		----	----	----	<0.1	<0.1
Fluorene	86-73-7	0.1	µg/L		----	----	----	<0.1	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L		----	----	----	<0.1	<0.1
N-2-Fluorenyl Acetamide	53-96-3	0.1	µg/L		----	----	----	<0.1	<0.1
Naphthalene	91-20-3	0.1	µg/L		----	----	----	<0.1	<0.1
Perylene	198-55-0	0.1	µg/L		----	----	----	<0.1	<0.1
Phenanthrene	85-01-8	0.1	µg/L		----	----	----	<0.1	<0.1
Pyrene	129-00-0	0.1	µg/L		----	----	----	<0.1	<0.1
Sum of PAHs	----	0.05	µg/L		----	----	----	<0.05	<0.05
Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L		----	----	----	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VO_X_MW03	TS 2	TB 2	VU_MW01	VN_MW02
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522254-006	ES1522254-007	ES1522254-008	ES1522254-009	ES1522254-010
					Result	Result	Result	Result	Result
EP231: Perfluorinated Compounds									
PFOS	1763-23-1	0.02	µg/L		----	----	----	----	----
PFOA	335-67-1	0.02	µg/L		----	----	----	----	----
6:2 Fluorotelomer sulfonate (6:2 FtS)	27619-97-2	0.1	µg/L		----	----	----	----	----
8:2 Fluorotelomer sulfonate	39108-34-4	0.1	µg/L		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	97.5	93.6	90.1	91.7
Toluene-D8	2037-26-5	2	%		----	107	105	108	103
4-Bromofluorobenzene	460-00-4	2	%		----	98.3	93.2	92.0	94.3
EP132S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.1	%		----	----	----	62.3	69.6
Phenol-d6	13127-88-3	0.1	%		----	----	----	47.5	54.0
2-Chlorophenol-D4	93951-73-6	0.1	%		----	----	----	84.7	92.5
2.4.6-Tribromophenol	118-79-6	0.1	%		----	----	----	90.1	97.8
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		----	----	----	78.2	87.2
Anthracene-d10	1719-06-8	0.1	%		----	----	----	87.9	95.3
4-Terphenyl-d14	1718-51-0	0.1	%		----	----	----	90.2	97.7

QUALITY CONTROL REPORT

Work Order	: **ES1522254**	Page	: 1 of 10
Amendment	: **1**		
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
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Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 19-May-2015
C-O-C number	: ----	Date Analysis Commenced	: 21-May-2015
Sampler	: ----	Issue Date	: 29-May-2015
Site	: ----	No. of samples received	: 10
Quote number	: ----	No. of samples analysed	: 10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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 ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

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

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED037P: Alkalinity by PC Titrator (QC Lot: 106935)									
ES1522331-006	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	22	22	0.00	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	22	22	0.00	0% - 20%
ES1522175-001	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	352	353	0.335	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	352	353	0.335	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 106163)									
ES1522299-008	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2710	2770	2.40	0% - 20%
ES1522299-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2690	2760	2.82	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 106164)									
ES1522299-008	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	22800	22100	3.16	0% - 20%
ES1522299-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	21400	21900	2.46	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 105658)									
ES1522254-006	VO_X_MW03	ED093F: Calcium	7440-70-2	1	mg/L	809	827	2.18	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1040	1040	0.230	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	95	96	1.81	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	5680	5770	1.59	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 107219)									
ES1522242-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	117	120	2.06	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	95	92	3.09	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	18	18	0.00	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	623	627	0.682	0% - 20%
ES1522343-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	68	72	4.93	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	63	66	4.32	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	12	13	0.00	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	455	472	3.65	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 107218)									
ES1522242-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.098	0.098	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.032	0.032	0.00	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 107218) - continued									
ES1522242-001	Anonymous	EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.009	0.009	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1522343-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.002	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.046	0.048	4.38	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.014	0.014	0.00	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.010	0.010	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 107795)									
ES1522254-001	VN_MW10	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.041	0.041	0.00	0% - 20%
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.234	0.238	1.49	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.044	0.046	6.01	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1522474-005	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.056	0.047	16.9	0% - 50%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 108842)									
EP1510211-001	Anonymous	EG093B-F: Selenium	7782-49-2	2	µg/L	89	86	3.24	0% - 20%
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 108843)									
EP1510211-013	Anonymous	EG093A-F: Cobalt	7440-48-4	0.2	µg/L	0.5	0.5	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	1.1	0.9	16.4	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.5	1.5	0.00	No Limit
		EG093A-F: Manganese	7439-96-5	0.5	µg/L	8.6	8.8	2.56	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	3.0	3.0	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	22	28	21.8	0% - 50%
		EG093A-F: Zinc	7440-66-6	5	µg/L	40	43	7.54	No Limit
EP1510211-001	Anonymous	EG093A-F: Cobalt	7440-48-4	0.2	µg/L	1.1	1.1	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	0.8	0.7	12.7	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	<1.0	<1.0	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 108843) - continued									
EP1510211-001	Anonymous	EG093A-F: Manganese	7439-96-5	0.5	µg/L	23.4	23.6	0.830	0% - 20%
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	12.2	12.2	0.00	0% - 50%
		EG093A-F: Copper	7440-50-8	1	µg/L	35	34	0.00	0% - 50%
		EG093A-F: Zinc	7440-66-6	5	µg/L	56	53	5.40	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 107837)									
ES1522221-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1522254-009	VU_MW01	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 107837)									
ES1522221-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1522254-009	VU_MW01	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 107837)									
ES1522221-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1522254-009	VU_MW01	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP231: Perfluorinated Compounds (QC Lot: 105912)									
EB1518884-082	Anonymous	EP231: PFOA	335-67-1	0.01	µg/L	<0.02	<0.02	0.00	No Limit
		EP231: PFOS	1763-23-1	0.01	µg/L	<0.02	<0.02	0.00	No Limit
		EP231: 6:2 Fluorotelomer sulfonate (6:2 FtS)	27619-97-2	0.1	µg/L	<0.1	<0.1	0.00	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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 106935)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	107	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 106163)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	94.5	86	122
ED045G: Chloride by Discrete Analyser (QCLot: 106164)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	98.0	75	123
				<1	1000 mg/L	104	77	119
ED093F: Dissolved Major Cations (QCLot: 105658)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	97.7	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	90	110
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.2	87	117
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	101	82	118
ED093F: Dissolved Major Cations (QCLot: 107219)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	97.6	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	101	90	110
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	94.5	87	117
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	91.3	82	118
EG020F: Dissolved Metals by ICP-MS (QCLot: 107218)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.7	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	99.9	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.8	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.8	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.4	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.6	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	106	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.4	85	115
EG020F: Dissolved Metals by ICP-MS (QCLot: 107795)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.2	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	92.1	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.9	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.9	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	97.3	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.6	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	89.6	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	90.3	85	115

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 108842)								
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	111	74	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 108843)								
EG093A-F: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	98.3	76	134
EG093A-F: Cobalt	7440-48-4	0.2	µg/L	<0.2	10 µg/L	96.2	75	119
EG093A-F: Copper	7440-50-8	1	µg/L	<1	10 µg/L	97.1	71	129
EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	97.3	74	120
EG093A-F: Manganese	7439-96-5	0.5	µg/L	<0.5	10 µg/L	109	72	122
EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	107	72	124
EG093A-F: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	96.2	70	126
EP080/071: Total Petroleum Hydrocarbons (QCLot: 105311)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	118	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	104	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	91.5	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 107837)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	82.6	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 105311)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	111	59	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	100	74	138
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	87.1	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 107837)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	76.2	75	127
EP080: BTEXN (QCLot: 107837)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	109	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	92.0	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	93.3	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	80.0	70	124
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	94.6	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	99.1	65	129
EP132A: Phenolic Compounds (QCLot: 105310)								
EP132: 2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L	<0.1	2 µg/L	107	52	132
EP132: 2.4.5-Trichlorophenol	95-95-4	0.1	µg/L	<0.1	2 µg/L	111	63	125
EP132: 2.4.6-Trichlorophenol	88-06-2	0.1	µg/L	<0.1	2 µg/L	108	63	129
EP132: 2.4-Dichlorophenol	120-83-2	0.1	µg/L	<0.1	2 µg/L	110	66	126
EP132: 2.4-Dimethylphenol	105-67-9	0.1	µg/L	<0.1	2 µg/L	105	39	139
EP132: 2.6-Dichlorophenol	87-65-0	0.1	µg/L	<0.1	2 µg/L	109	66	126
EP132: 2-Chlorophenol	95-57-8	0.05	µg/L	<0.05	2 µg/L	107	74	119
EP132: 2-Nitrophenol	88-75-5	0.1	µg/L	<0.1	2 µg/L	114	47	145

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP132A: Phenolic Compounds (QCLot: 105310) - continued								
EP132: 4-Chloro-3-methylphenol	59-50-7	0.05	µg/L	<0.05	2 µg/L	98.0	64	124
EP132: 4-Nitrophenol	100-02-7	0.1	µg/L	<0.1	2 µg/L	72.0	22	142
EP132: Hexachlorophene	70-30-4	0.1	µg/L	<0.1	2 µg/L	112	34	138
EP132: m-Cresol	108-39-4	0.1	µg/L	<0.1	2 µg/L	97.4	42	118
EP132: o-Cresol	95-48-7	0.1	µg/L	<0.1	2 µg/L	90.0	50	122
EP132: p-Cresol	106-44-5	0.1	µg/L	<0.1	2 µg/L	91.6	33	119
EP132: Pentachlorophenol	87-86-5	0.05	µg/L	<0.05	2 µg/L	103	32	138
EP132: Phenol	108-95-2	0.1	µg/L	<0.1	2 µg/L	58.0	27	59
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 105310)								
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	98.5	59	123
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	116	60	120
EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	70.1	12	156
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	108	64	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	109	62	124
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	108	66	124
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	114	64	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	111	64	126
EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	2 µg/L	106	62	126
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	111	62	126
EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	108	56	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	106	63	127
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	110	64	128
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	97.9	35	133
EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	110	58	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	112	65	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	110	64	124
EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	109	57	127
EP132: N-2-Fluorenyl Acetamide	53-96-3	0.1	µg/L	<0.1	2 µg/L	92.8	54	131
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	104	60	124
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	109	64	124
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	110	65	125
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	111	66	128
EP231: Perfluorinated Compounds (QCLot: 105912)								
EP231: 6:2 Fluorotelomer sulfonate (6:2 FtS)	27619-97-2	0.1	µg/L	<0.1	2.5 µg/L	121	61	145
EP231: 8:2 Fluorotelomer sulfonate	39108-34-4	0.1	µg/L	<0.1	----	----	----	----
EP231: PFOA	335-67-1	0.01	µg/L	<0.02	0.5 µg/L	101	72	134
EP231: PFOS	1763-23-1	0.01	µg/L	<0.02	0.5 µg/L	118	70	136

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.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 106163)							
ES1522299-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 106164)							
ES1522299-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 107218)							
ES1522242-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	122	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	113	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	105	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	90.6	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	88.6	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	104	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	115	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 107795)							
ES1522254-002	VU_MW15	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	90.9	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	90.0	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	87.4	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	83.6	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	81.2	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	86.7	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	86.0	70	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 108843)							
EP1510211-001	Anonymous	EG093A-F: Arsenic	7440-38-2	50 µg/L	124	70	130
		EG093A-F: Cobalt	7440-48-4	50 µg/L	118	70	130
		EG093A-F: Copper	7440-50-8	50 µg/L	128	70	130
		EG093A-F: Lead	7439-92-1	50 µg/L	113	70	130
		EG093A-F: Manganese	7439-96-5	50 µg/L	120	70	130
		EG093A-F: Nickel	7440-02-0	50 µg/L	105	70	130
		EG093A-F: Zinc	7440-66-6	50 µg/L	109	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 107837)							
ES1522221-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	96.0	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 107837)							
ES1522221-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	90.5	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080: BTEXN (QCLot: 107837)							
ES1522221-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	85.8	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	99.9	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	99.9	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	96.2	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	99.2	70	130
		EP080: Toluene	108-88-3	25 µg/L	97.1	70	130
EP231: Perfluorinated Compounds (QCLot: 105912)							
EB1518884-082	Anonymous	EP231: 6:2 Fluorotelomer sulfonate (6:2 FtS)	27619-97-2	2.5 µg/L	121	60	145
		EP231: PFOA	335-67-1	0.5 µg/L	94.4	60	134
		EP231: PFOS	1763-23-1	0.5 µg/L	100	60	136

QA/QC Compliance Assessment for DQO Reporting

Work Order	: **ES1522254**	Page	: 1 of 7
Amendment	: **1**		
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Telephone	: +61 2 8784 8555
Project	: VALES POINT GME 2015	Date Samples Received	: 19-May-2015
Site	: ----	Issue Date	: 29-May-2015
Sampler	: ----	No. of samples received	: 10
Order number	: 0300379	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1522299--001	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	ES1522299--001	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	4	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	4	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	4	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	4	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **WATER**

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

Method / *Container / Client Sample ID(s)*		*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
VO_X_MW01,	VO_X_MW03	**19-May-2015**	**----**	----	----	**22-May-2015**	02-Jun-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
VO_X_MW01,	VO_X_MW03	**19-May-2015**	**----**	----	----	**22-May-2015**	16-Jun-2015	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
VO_X_MW01,	VO_X_MW03	**19-May-2015**	**----**	----	----	**22-May-2015**	16-Jun-2015	✓

Matrix: **WATER**

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
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F)							
VO_X_MW03	**19-May-2015**	**----**	----	----	**22-May-2015**	26-May-2015	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
VO_X_MW01	**19-May-2015**	**----**	----	----	**25-May-2015**	16-Jun-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
VN_MW10, VU_MW15, VO_X_MW01, VU_MW01, VN_MW02	**19-May-2015**	**----**	----	----	**25-May-2015**	15-Nov-2015	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093A-F)							
VO_MW12, VO_X_MW03	**19-May-2015**	**----**	----	----	**26-May-2015**	15-Nov-2015	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F)							
VO_MW12, VO_X_MW03	**19-May-2015**	**----**	----	----	**26-May-2015**	15-Nov-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
VU_MW01, VN_MW02	**19-May-2015**	**21-May-2015**	26-May-2015	✓	**22-May-2015**	30-Jun-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
TS 2, TB 2, VU_MW01, VN_MW02	**19-May-2015**	**25-May-2015**	02-Jun-2015	✓	**25-May-2015**	02-Jun-2015	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP132)							
VU_MW01, VN_MW02	**19-May-2015**	**21-May-2015**	26-May-2015	✓	**25-May-2015**	30-Jun-2015	✓
EP231: Perfluorinated Compounds							
HDPE (no PTFE) (EP231)							
VL_MW02	**19-May-2015**	**----**	----	----	**22-May-2015**	15-Nov-2015	✓

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(were) 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: **WATER**

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)							
Alkalinity by PC Titrator	ED037-P	2	17	**11.76**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	17	**11.76**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	10	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	5	**20.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PFOS and PFOA	EP231	1	4	**25.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	4	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	4	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	17	**5.88**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	10	**10.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	5	**20.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PFOS and PFOA	EP231	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	10	**10.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	5	**20.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PFOS and PFOA	EP231	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Matrix: **WATER**

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*	
Matrix Spikes (MS) - Continued							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PFOS and PFOA	EP231	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	4	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	4	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	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
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	USEPA 3640 (GPC Cleanup), 8270 GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)
PFOS and PFOA	EP231	WATER	In-house: Direct injection analysis of fresh and diluted saline waters. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1522255**

Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	Page	: 1 of 2
Order number	: 0300379	Quote number	: ES2014ENVRES0397 (EN/009/14)
C-O-C number	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
Sampler	: AMY WILLIAMS, DANE BROOKES, JANENE DEVEREUX		

Dates

Date Samples Received	: 19-May-2015	Issue Date	: 21-May-2015
Client Requested Due Date	: 29-May-2015	Scheduled Reporting Date	: **29-May-2015**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 3.1'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 5 / 5

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG020F Dissolved Metals by ICPMS	WATER - EP125 VOCs by HS GCMS in SIM Mode	WATER - EP132(PAH) Ultra Trace Polynuclear Aromatic Compounds	WATER - EP132A Phenols Ultratrace - 16 analytes	WATER - W-04 TRH/BTEXN
ES1522255-001	[19-May-2015]	VG_MW01	✓			✓	✓
ES1522255-002	[19-May-2015]	VK_MW02	✓	✓	✓	✓	✓
ES1522255-003	[19-May-2015]	VJ_MW09	✓				
ES1522255-004	[19-May-2015]	VG_MW02	✓				
ES1522255-005	[19-May-2015]	VJ_MW03				✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

JOHN EWING

- *AU Certificate of Analysis - NATA (COA)	Email	john.ewing@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	john.ewing@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	john.ewing@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	john.ewing@erm.com
- A4 - AU Tax Invoice (INV)	Email	john.ewing@erm.com
- Chain of Custody (CoC) (COC)	Email	john.ewing@erm.com
- Chromatogram (CHROM)	Email	john.ewing@erm.com
- EDI Format - ENMRG (ENMRG)	Email	john.ewing@erm.com
- EDI Format - ESDAT (ESDAT)	Email	john.ewing@erm.com

PETER LAVELLE

- *AU Certificate of Analysis - NATA (COA)	Email	peter.lavelle@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	peter.lavelle@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	peter.lavelle@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	peter.lavelle@erm.com
- A4 - AU Tax Invoice (INV)	Email	peter.lavelle@erm.com
- Chain of Custody (CoC) (COC)	Email	peter.lavelle@erm.com
- Chromatogram (CHROM)	Email	peter.lavelle@erm.com
- EDI Format - ENMRG (ENMRG)	Email	peter.lavelle@erm.com
- EDI Format - ESDAT (ESDAT)	Email	peter.lavelle@erm.com

TESS TOBIN

- *AU Certificate of Analysis - NATA (COA)	Email	tess.tobin@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	tess.tobin@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	tess.tobin@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	tess.tobin@erm.com
- A4 - AU Tax Invoice (INV)	Email	tess.tobin@erm.com
- Chain of Custody (CoC) (COC)	Email	tess.tobin@erm.com
- Chromatogram (CHROM)	Email	tess.tobin@erm.com
- EDI Format - ENMRG (ENMRG)	Email	tess.tobin@erm.com
- EDI Format - ESDAT (ESDAT)	Email	tess.tobin@erm.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES1522255**	Page	: 1 of 7
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 19-May-2015 19:00
C-O-C number	: ----	Date Analysis Commenced	: 21-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JANENE DEVEREUX	Issue Date	: 28-May-2015 16:27
Site	: ----		
		No. of samples received	: 5
Quote number	: ----	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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*
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VG_MW01	VK_MW02	VJ_MW09	VG_MW02	VJ_MW03
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522255-001	ES1522255-002	ES1522255-003	ES1522255-004	ES1522255-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	**0.002**	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	**0.003**	**0.008**	----
Copper	7440-50-8	0.001	mg/L		**0.004**	**0.003**	**0.002**	**0.038**	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	**0.029**	----
Manganese	7439-96-5	0.001	mg/L		**0.017**	**0.014**	**0.166**	**0.122**	----
Nickel	7440-02-0	0.001	mg/L		**0.002**	**0.002**	**0.002**	**0.028**	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	**0.01**	----
Zinc	7440-66-6	0.005	mg/L		**0.011**	**0.016**	**0.018**	**0.106**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	----	----	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	----	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	----	----	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	----	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	----	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	----	----	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	----	----	<20
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	<100	----	----	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	----	----	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	----	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	----	----	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	----	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	----	----	<1
Toluene	108-88-3	2	µg/L		<2	<2	----	----	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	----	----	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	----	----	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	----	----	<2
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	----	----	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	----	----	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	----	----	<5
EP125A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	0.05	µg/L		----	<0.05	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VG_MW01	VK_MW02	VJ_MW09	VG_MW02	VJ_MW03
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522255-001	ES1522255-002	ES1522255-003	ES1522255-004	ES1522255-005
					Result	Result	Result	Result	Result
EP125A: Monocyclic Aromatic Hydrocarbons - Continued									
Toluene	108-88-3	0.5	µg/L		----	<0.5	----	----	----
Ethylbenzene	100-41-4	0.05	µg/L		----	<0.05	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.05	µg/L		----	**0.11**	----	----	----
Styrene	100-42-5	0.05	µg/L		----	<0.05	----	----	----
ortho-Xylene	95-47-6	0.05	µg/L		----	**0.07**	----	----	----
1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L		----	<0.05	----	----	----
1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L		----	**0.11**	----	----	----
EP125D: Fumigants									
1.2-Dichloropropane	78-87-5	0.1	µg/L		----	<0.1	----	----	----
cis-1.3-Dichloropropylene	10061-01-5	0.1	µg/L		----	<0.1	----	----	----
trans-1.3-Dichloropropylene	10061-02-6	0.1	µg/L		----	<0.1	----	----	----
1.2-Dibromoethane (EDB)	106-93-4	0.1	µg/L		----	<0.1	----	----	----
EP125E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	0.5	µg/L		----	<0.5	----	----	----
Vinyl chloride	75-01-4	0.3	µg/L		----	<0.3	----	----	----
Bromomethane	74-83-9	0.5	µg/L		----	<0.5	----	----	----
Chloroethane	75-00-3	0.5	µg/L		----	<0.5	----	----	----
Trichlorofluoromethane	75-69-4	0.5	µg/L		----	<0.5	----	----	----
1.1-Dichloroethene	75-35-4	0.1	µg/L		----	<0.1	----	----	----
Dichloromethane	75-09-2	1	µg/L		----	<1.0	----	----	----
trans-1.2-Dichloroethene	156-60-5	0.1	µg/L		----	<0.1	----	----	----
1.1-Dichloroethane	75-34-3	0.1	µg/L		----	<0.1	----	----	----
cis-1.2-Dichloroethene	156-59-2	0.1	µg/L		----	<0.1	----	----	----
Bromochloromethane	74-97-5	0.5	µg/L		----	<0.5	----	----	----
1.2-Dichloroethane	107-06-2	0.1	µg/L		----	<0.1	----	----	----
1.1.1-Trichloroethane	71-55-6	0.1	µg/L		----	<0.1	----	----	----
Carbon Tetrachloride	56-23-5	0.05	µg/L		----	<0.05	----	----	----
Trichloroethene	79-01-6	0.05	µg/L		----	<0.05	----	----	----
Tetrachloroethene	127-18-4	0.05	µg/L		----	<0.05	----	----	----
Hexachlorobutadiene	87-68-3	0.04	µg/L		----	<0.04	----	----	----
EP125F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	0.1	µg/L		----	<0.10	----	----	----
Bromobenzene	108-86-1	0.1	µg/L		----	<0.10	----	----	----
Benzylchloride	100-44-7	0.2	µg/L		----	<0.2	----	----	----
1.3-Dichlorobenzene	541-73-1	0.1	µg/L		----	<0.10	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VG_MW01	VK_MW02	VJ_MW09	VG_MW02	VJ_MW03
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522255-001	ES1522255-002	ES1522255-003	ES1522255-004	ES1522255-005
					Result	Result	Result	Result	Result
EP125F: Halogenated Aromatic Compounds - Continued									
1.4-Dichlorobenzene	106-46-7	0.1	µg/L		----	<0.10	----	----	----
1.2-Dichlorobenzene	95-50-1	0.1	µg/L		----	<0.10	----	----	----
2-Chlorotoluene	95-49-8	0.1	µg/L		----	<0.1	----	----	----
4-Chlorotoluene	106-43-4	0.1	µg/L		----	<0.1	----	----	----
1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L		----	<0.1	----	----	----
1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L		----	<0.1	----	----	----
^ Trichlorobenzenes (Sum)	----	0.1	µg/L		----	<0.1	----	----	----
EP125G: Trihalomethanes									
Chloroform	67-66-3	0.1	µg/L		----	<0.10	----	----	----
Bromodichloromethane	75-27-4	0.1	µg/L		----	<0.10	----	----	----
Dibromochloromethane	124-48-1	0.1	µg/L		----	<0.10	----	----	----
Bromoform	75-25-2	0.1	µg/L		----	<0.10	----	----	----
^ Total Trihalomethanes	----	0.1	µg/L		----	<0.10	----	----	----
EP125H: Naphthalene									
Naphthalene	91-20-3	0.05	µg/L		----	**0.07**	----	----	----
EP125L: Methyl t-butyl ether									
Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L		----	<0.1	----	----	----
EP132A: Phenolic Compounds									
2-Chlorophenol	95-57-8	0.05	µg/L		----	<0.05	----	----	<0.05
4-Chloro-3-methylphenol	59-50-7	0.05	µg/L		----	<0.05	----	----	<0.05
m-Cresol	108-39-4	0.1	µg/L		----	<0.1	----	----	<0.1
o-Cresol	95-48-7	0.1	µg/L		----	<0.1	----	----	<0.1
p-Cresol	106-44-5	0.1	µg/L		----	<0.1	----	----	**0.9**
2.4-Dichlorophenol	120-83-2	0.1	µg/L		----	<0.1	----	----	<0.1
2.6-Dichlorophenol	87-65-0	0.1	µg/L		----	<0.1	----	----	<0.1
2.4-Dimethylphenol	105-67-9	0.1	µg/L		----	<0.1	----	----	<0.1
Hexachlorophene	70-30-4	0.1	µg/L		----	<0.1	----	----	<0.1
2-Nitrophenol	88-75-5	0.1	µg/L		----	<0.1	----	----	<0.1
4-Nitrophenol	100-02-7	0.1	µg/L		----	<0.1	----	----	<0.1
Pentachlorophenol	87-86-5	0.05	µg/L		----	<0.05	----	----	<0.05
Phenol	108-95-2	0.1	µg/L		----	<0.1	----	----	**0.2**
2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L		----	<0.1	----	----	<0.1
2.4.5-Trichlorophenol	95-95-4	0.1	µg/L		----	<0.1	----	----	<0.1
2.4.6-Trichlorophenol	88-06-2	0.1	µg/L		----	<0.1	----	----	<0.1
EP132B: Polynuclear Aromatic Hydrocarbons									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VG_MW01	VK_MW02	VJ_MW09	VG_MW02	VJ_MW03
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522255-001	ES1522255-002	ES1522255-003	ES1522255-004	ES1522255-005
					Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
3-Methylcholanthrene	56-49-5	0.1	µg/L		----	<0.1	----	----	----
2-Methylnaphthalene	91-57-6	0.1	µg/L		----	<0.1	----	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L		----	<0.1	----	----	----
Acenaphthene	83-32-9	0.1	µg/L		----	<0.1	----	----	----
Acenaphthylene	208-96-8	0.1	µg/L		----	<0.1	----	----	----
Anthracene	120-12-7	0.1	µg/L		----	<0.1	----	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L		----	<0.1	----	----	----
Benzo(a)pyrene	50-32-8	0.05	µg/L		----	<0.05	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L		----	<0.1	----	----	----
Benzo(e)pyrene	192-97-2	0.1	µg/L		----	<0.1	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L		----	<0.1	----	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L		----	<0.1	----	----	----
Chrysene	218-01-9	0.1	µg/L		----	<0.1	----	----	----
Coronene	191-07-1	0.1	µg/L		----	<0.1	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L		----	<0.1	----	----	----
Fluoranthene	206-44-0	0.1	µg/L		----	<0.1	----	----	----
Fluorene	86-73-7	0.1	µg/L		----	<0.1	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L		----	<0.1	----	----	----
N-2-Fluorenyl Acetamide	53-96-3	0.1	µg/L		----	<0.1	----	----	----
Naphthalene	91-20-3	0.1	µg/L		----	<0.1	----	----	----
Perylene	198-55-0	0.1	µg/L		----	<0.1	----	----	----
Phenanthrene	85-01-8	0.1	µg/L		----	<0.1	----	----	----
Pyrene	129-00-0	0.1	µg/L		----	<0.1	----	----	----
Sum of PAHs	----	0.05	µg/L		----	<0.05	----	----	----
Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L		----	<0.05	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**98.1**	**92.9**	----	----	**87.7**
Toluene-D8	2037-26-5	2	%		**107**	**102**	----	----	**103**
4-Bromofluorobenzene	460-00-4	2	%		**96.3**	**92.5**	----	----	**89.9**
EP125S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		----	**115**	----	----	----
Toluene-D8	2037-26-5	0.1	%		----	**115**	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		----	**110**	----	----	----
EP132S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.1	%		----	**60.2**	----	----	**52.8**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VG_MW01	VK_MW02	VJ_MW09	VG_MW02	VJ_MW03
				Client sampling date / time	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]	[19-May-2015]
Compound	CAS Number	LOR	Unit		ES1522255-001	ES1522255-002	ES1522255-003	ES1522255-004	ES1522255-005
					Result	Result	Result	Result	Result
EP132S: Acid Extractable Surrogates - Continued									
Phenol-d6	13127-88-3	0.1	%		----	**47.0**	----	----	**41.5**
2-Chlorophenol-D4	93951-73-6	0.1	%		----	**82.8**	----	----	**74.0**
2.4.6-Tribromophenol	118-79-6	0.1	%		----	**89.6**	----	----	**80.9**
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		----	**72.3**	----	----	**68.2**
Anthracene-d10	1719-06-8	0.1	%		----	**86.3**	----	----	**76.2**
4-Terphenyl-d14	1718-51-0	0.1	%		----	**88.2**	----	----	**79.4**

QUALITY CONTROL REPORT

Work Order	: **ES1522255**	Page	: 1 of 12
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 19-May-2015
C-O-C number	: ----	Date Analysis Commenced	: 21-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JANENE DEVEREUX	Issue Date	: 28-May-2015
Site	: ----	No. of samples received	: 5
Quote number	: ----	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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 ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

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

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 107795)									
ES1522254-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.041	0.041	0.00	0% - 20%
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.234	0.238	1.49	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.044	0.046	6.01	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1522474-005	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.056	0.047	16.9	0% - 50%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 107837)									
ES1522221-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1522254-009	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 107837)									
ES1522221-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1522254-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 107837)									
ES1522221-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1522254-009	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 107837) - continued									
ES1522254-009	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP125A: Monocyclic Aromatic Hydrocarbons (QC Lot: 106988)									
ES1522418-004	Anonymous	EP125: 1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L	2.48	2.52	1.50	0% - 20%
		EP125: 1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L	0.57	0.60	5.56	0% - 50%
		EP125: Benzene	71-43-2	0.05	µg/L	133	130	2.12	0% - 20%
		EP125: Ethylbenzene	100-41-4	0.05	µg/L	8.98	8.91	0.790	0% - 20%
		EP125: meta- & para-Xylene	108-38-3 106-42-3	0.05	µg/L	7.84	7.70	1.86	0% - 20%
		EP125: ortho-Xylene	95-47-6	0.05	µg/L	5.13	5.09	0.757	0% - 20%
		EP125: Styrene	100-42-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Toluene	108-88-3	0.5	µg/L	12.3	12.2	0.867	0% - 20%
ES1522255-002	VK_MW02	EP125: 1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L	0.11	0.12	0.00	No Limit
		EP125: 1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Benzene	71-43-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Ethylbenzene	100-41-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: meta- & para-Xylene	108-38-3 106-42-3	0.05	µg/L	0.11	0.12	0.00	No Limit
		EP125: ortho-Xylene	95-47-6	0.05	µg/L	0.07	0.07	0.00	No Limit
		EP125: Styrene	100-42-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Toluene	108-88-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
EP125D: Fumigants (QC Lot: 106988)									
ES1522418-004	Anonymous	EP125: 1.2-Dibromoethane (EDB)	106-93-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichloropropane	78-87-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: cis-1.3-Dichloropropylene	10061-01-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: trans-1.3-Dichloropropylene	10061-02-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1522255-002	VK_MW02	EP125: 1.2-Dibromoethane (EDB)	106-93-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichloropropane	78-87-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: cis-1.3-Dichloropropylene	10061-01-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: trans-1.3-Dichloropropylene	10061-02-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP125E: Halogenated Aliphatic Compounds (QC Lot: 106988)									
ES1522418-004	Anonymous	EP125: Hexachlorobutadiene	87-68-3	0.04	µg/L	<0.04	<0.04	0.00	No Limit
		EP125: Carbon Tetrachloride	56-23-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Tetrachloroethene	127-18-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Trichloroethene	79-01-6	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: 1.1.1-Trichloroethane	71-55-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.1-Dichloroethane	75-34-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.1-Dichloroethene	75-35-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichloroethane	107-06-2	0.1	µg/L	0.2	0.2	0.00	No Limit
		EP125: cis-1.2-Dichloroethene	156-59-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: trans-1.2-Dichloroethene	156-60-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP125E: Halogenated Aliphatic Compounds (QC Lot: 106988) - continued									
ES1522418-004	Anonymous	EP125: Bromochloromethane	74-97-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Chloroethane	75-00-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Dichlorodifluoromethane	75-71-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Trichlorofluoromethane	75-69-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Vinyl chloride	75-01-4	0.5	µg/L	<0.3	<0.3	50.0	No Limit
		EP125: Dichloromethane	75-09-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP125: Bromomethane	74-83-9	2	µg/L	<0.5	<0.5	120	No Limit
ES1522255-002	VK_MW02	EP125: Hexachlorobutadiene	87-68-3	0.04	µg/L	<0.04	<0.04	0.00	No Limit
		EP125: Carbon Tetrachloride	56-23-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Tetrachloroethene	127-18-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Trichloroethene	79-01-6	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: 1.1.1-Trichloroethane	71-55-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.1-Dichloroethane	75-34-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.1-Dichloroethene	75-35-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichloroethane	107-06-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: cis-1.2-Dichloroethene	156-59-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: trans-1.2-Dichloroethene	156-60-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: Bromochloromethane	74-97-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Chloroethane	75-00-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Dichlorodifluoromethane	75-71-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Trichlorofluoromethane	75-69-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Vinyl chloride	75-01-4	0.5	µg/L	<0.3	<0.3	50.0	No Limit
		EP125: Dichloromethane	75-09-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP125: Bromomethane	74-83-9	2	µg/L	<0.5	<0.5	120	No Limit
EP125F: Halogenated Aromatic Compounds (QC Lot: 106988)									
ES1522418-004	Anonymous	EP125: 1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichlorobenzene	95-50-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 1.3-Dichlorobenzene	541-73-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 1.4-Dichlorobenzene	106-46-7	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 2-Chlorotoluene	95-49-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 4-Chlorotoluene	106-43-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: Bromobenzene	108-86-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Chlorobenzene	108-90-7	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Benzylchloride	100-44-7	0.2	µg/L	<0.2	<0.2	0.00	No Limit
ES1522255-002	VK_MW02	EP125: 1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichlorobenzene	95-50-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 1.3-Dichlorobenzene	541-73-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 1.4-Dichlorobenzene	106-46-7	0.1	µg/L	<0.10	<0.10	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP125F: Halogenated Aromatic Compounds (QC Lot: 106988) - continued									
ES1522255-002	VK_MW02	EP125: 2-Chlorotoluene	95-49-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 4-Chlorotoluene	106-43-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: Bromobenzene	108-86-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Chlorobenzene	108-90-7	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Benzylchloride	100-44-7	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EP125G: Trihalomethanes (QC Lot: 106988)									
ES1522418-004	Anonymous	EP125: Bromodichloromethane	75-27-4	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Bromoform	75-25-2	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Chloroform	67-66-3	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Dibromochloromethane	124-48-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
ES1522255-002	VK_MW02	EP125: Bromodichloromethane	75-27-4	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Bromoform	75-25-2	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Chloroform	67-66-3	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Dibromochloromethane	124-48-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
EP125H: Naphthalene (QC Lot: 106988)									
ES1522418-004	Anonymous	EP125: Naphthalene	91-20-3	0.05	µg/L	1.00	0.95	4.78	0% - 50%
ES1522255-002	VK_MW02	EP125: Naphthalene	91-20-3	0.05	µg/L	0.07	0.07	0.00	No Limit
EP125L: Methyl t-butyl ether (QC Lot: 106988)									
ES1522418-004	Anonymous	EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L	0.6	0.6	0.00	No Limit
ES1522255-002	VK_MW02	EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L	<0.1	<0.1	0.00	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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 107795)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.2	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	92.1	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.9	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.9	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	97.3	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.6	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	89.6	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	90.3	85	115
EP080/071: Total Petroleum Hydrocarbons (QCLot: 105311)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	118	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	104	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	91.5	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106208)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	95.8	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	94.0	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	90.5	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 107837)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	82.6	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 105311)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	111	59	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	100	74	138
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	87.1	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106208)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	103	59	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	98.0	74	138
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	103	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 107837)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	76.2	75	127
EP080: BTEXN (QCLot: 107837)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	109	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	92.0	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	93.3	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	80.0	70	124

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP080: BTEXN (QCLot: 107837) - continued								
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	94.6	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	99.1	65	129
EP125A: Monocyclic Aromatic Hydrocarbons (QCLot: 106988)								
EP125: 1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L	<0.05	1 µg/L	99.3	69	129
EP125: 1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L	<0.05	1 µg/L	99.6	68	124
EP125: Benzene	71-43-2	0.05	µg/L	<0.05	1 µg/L	98.9	76	120
EP125: Ethylbenzene	100-41-4	0.05	µg/L	<0.05	1 µg/L	98.6	73	121
EP125: meta- & para-Xylene	108-38-3 106-42-3	0.05	µg/L	<0.05	1 µg/L	97.6	74	120
EP125: ortho-Xylene	95-47-6	0.05	µg/L	<0.05	1 µg/L	98.0	71	121
EP125: Styrene	100-42-5	0.05	µg/L	<0.05	1 µg/L	100	68	128
EP125: Toluene	108-88-3	0.5	µg/L	<0.5	1 µg/L	97.9	73	121
EP125D: Fumigants (QCLot: 106988)								
EP125: 1.2-Dibromoethane (EDB)	106-93-4	0.1	µg/L	<0.1	1 µg/L	101	76	124
EP125: 1.2-Dichloropropane	78-87-5	0.1	µg/L	<0.1	1 µg/L	96.8	75	127
EP125: cis-1.3-Dichloropropylene	10061-01-5	0.1	µg/L	<0.1	1 µg/L	101	74	124
EP125: trans-1.3-Dichloropropylene	10061-02-6	0.1	µg/L	<0.1	1 µg/L	105	74	122
EP125E: Halogenated Aliphatic Compounds (QCLot: 106988)								
EP125: 1.1.1-Trichloroethane	71-55-6	0.1	µg/L	<0.1	1 µg/L	99.0	76	122
EP125: 1.1-Dichloroethane	75-34-3	0.1	µg/L	<0.1	1 µg/L	97.8	77	123
EP125: 1.1-Dichloroethene	75-35-4	0.1	µg/L	<0.1	1 µg/L	92.7	75	121
EP125: 1.2-Dichloroethane	107-06-2	0.1	µg/L	<0.1	1 µg/L	97.2	70	132
EP125: Bromochloromethane	74-97-5	0.5	µg/L	<0.5	1 µg/L	96.6	80	124
EP125: Bromomethane	74-83-9	2	µg/L	<2.0	10 µg/L	104	62	126
EP125: Carbon Tetrachloride	56-23-5	0.05	µg/L	<0.05	1 µg/L	95.2	77	121
EP125: Chloroethane	75-00-3	0.5	µg/L	<0.5	10 µg/L	86.3	71	125
EP125: cis-1.2-Dichloroethene	156-59-2	0.1	µg/L	<0.1	1 µg/L	99.5	77	121
EP125: Dichlorodifluoromethane	75-71-8	0.5	µg/L	<0.5	10 µg/L	79.3	69	127
EP125: Dichloromethane	75-09-2	1	µg/L	<1.0	1 µg/L	96.7	73	129
EP125: Hexachlorobutadiene	87-68-3	0.04	µg/L	<0.04	1 µg/L	93.5	65	129
EP125: Tetrachloroethene	127-18-4	0.05	µg/L	<0.05	1 µg/L	101	76	126
EP125: trans-1.2-Dichloroethene	156-60-5	0.1	µg/L	<0.1	1 µg/L	96.0	77	121
EP125: Trichloroethene	79-01-6	0.05	µg/L	<0.05	1 µg/L	99.5	78	122
EP125: Trichlorofluoromethane	75-69-4	0.5	µg/L	<0.5	10 µg/L	92.2	66	128
EP125: Vinyl chloride	75-01-4	0.5	µg/L	<0.5	10 µg/L	89.6	72	124
EP125F: Halogenated Aromatic Compounds (QCLot: 106988)								
EP125: 1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L	<0.1	1 µg/L	104	71	123
EP125: 1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L	<0.1	1 µg/L	107	71	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP125F: Halogenated Aromatic Compounds (QCLot: 106988) - continued								
EP125: 1.2-Dichlorobenzene	95-50-1	0.1	µg/L	<0.10	1 µg/L	101	72	122
EP125: 1.3-Dichlorobenzene	541-73-1	0.1	µg/L	<0.10	1 µg/L	96.1	66	128
EP125: 1.4-Dichlorobenzene	106-46-7	0.1	µg/L	<0.10	1 µg/L	102	72	122
EP125: 2-Chlorotoluene	95-49-8	0.1	µg/L	<0.1	1 µg/L	102	68	128
EP125: 4-Chlorotoluene	106-43-4	0.1	µg/L	<0.1	1 µg/L	103	71	123
EP125: Benzylchloride	100-44-7	0.2	µg/L	<0.2	1 µg/L	122	66	126
EP125: Bromobenzene	108-86-1	0.1	µg/L	<0.10	1 µg/L	100.0	74	122
EP125: Chlorobenzene	108-90-7	0.1	µg/L	<0.10	1 µg/L	101	74	122
EP125G: Trihalomethanes (QCLot: 106988)								
EP125: Bromodichloromethane	75-27-4	0.1	µg/L	<0.10	1 µg/L	101	77	125
EP125: Bromoform	75-25-2	0.1	µg/L	<0.10	1 µg/L	101	75	127
EP125: Chloroform	67-66-3	0.1	µg/L	<0.10	1 µg/L	99.8	80	120
EP125: Dibromochloromethane	124-48-1	0.1	µg/L	<0.10	1 µg/L	99.7	78	122
EP125H: Naphthalene (QCLot: 106988)								
EP125: Naphthalene	91-20-3	0.05	µg/L	<0.05	1 µg/L	103	70	122
EP125L: Methyl t-butyl ether (QCLot: 106988)								
EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L	<0.1	1 µg/L	99.4	74	124
EP132A: Phenolic Compounds (QCLot: 105310)								
EP132: 2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L	<0.1	2 µg/L	107	52	132
EP132: 2.4.5-Trichlorophenol	95-95-4	0.1	µg/L	<0.1	2 µg/L	111	63	125
EP132: 2.4.6-Trichlorophenol	88-06-2	0.1	µg/L	<0.1	2 µg/L	108	63	129
EP132: 2.4-Dichlorophenol	120-83-2	0.1	µg/L	<0.1	2 µg/L	110	66	126
EP132: 2.4-Dimethylphenol	105-67-9	0.1	µg/L	<0.1	2 µg/L	105	39	139
EP132: 2.6-Dichlorophenol	87-65-0	0.1	µg/L	<0.1	2 µg/L	109	66	126
EP132: 2-Chlorophenol	95-57-8	0.05	µg/L	<0.05	2 µg/L	107	74	119
EP132: 2-Nitrophenol	88-75-5	0.1	µg/L	<0.1	2 µg/L	114	47	145
EP132: 4-Chloro-3-methylphenol	59-50-7	0.05	µg/L	<0.05	2 µg/L	98.0	64	124
EP132: 4-Nitrophenol	100-02-7	0.1	µg/L	<0.1	2 µg/L	72.0	22	142
EP132: Hexachlorophene	70-30-4	0.1	µg/L	<0.1	2 µg/L	112	34	138
EP132: m-Cresol	108-39-4	0.1	µg/L	<0.1	2 µg/L	97.4	42	118
EP132: o-Cresol	95-48-7	0.1	µg/L	<0.1	2 µg/L	90.0	50	122
EP132: p-Cresol	106-44-5	0.1	µg/L	<0.1	2 µg/L	91.6	33	119
EP132: Pentachlorophenol	87-86-5	0.05	µg/L	<0.05	2 µg/L	103	32	138
EP132: Phenol	108-95-2	0.1	µg/L	<0.1	2 µg/L	58.0	27	59
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 105310)								
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	98.5	59	123
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	116	60	120
EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	70.1	12	156

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 105310) - continued								
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	108	64	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	109	62	124
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	108	66	124
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	114	64	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	111	64	126
EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	2 µg/L	106	62	126
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	111	62	126
EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	108	56	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	106	63	127
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	110	64	128
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	97.9	35	133
EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	110	58	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	112	65	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	110	64	124
EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	109	57	127
EP132: N-2-Fluorenyl Acetamide	53-96-3	0.1	µg/L	<0.1	2 µg/L	92.8	54	131
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	104	60	124
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	109	64	124
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	110	65	125
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	111	66	128

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.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 107795)							
ES1522254-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	90.9	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	90.0	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	87.4	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	83.6	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	81.2	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	86.7	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	86.0	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 107837)							
ES1522221-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	96.0	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 107837)							
ES1522221-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	90.5	70	130
EP080: BTEXN (QCLot: 107837)							
ES1522221-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	85.8	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	99.9	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	99.9	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	96.2	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	99.2	70	130
		EP080: Toluene	108-88-3	25 µg/L	97.1	70	130
EP125A: Monocyclic Aromatic Hydrocarbons (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: 1.2.4-Trimethylbenzene	95-63-6	1 µg/L	78.5	70	130
		EP125: 1.3.5-Trimethylbenzene	108-67-8	1 µg/L	84.0	70	130
		EP125: Benzene	71-43-2	1 µg/L	99.5	70	130
		EP125: Ethylbenzene	100-41-4	1 µg/L	94.7	70	130
		EP125: meta- & para-Xylene	108-38-3 106-42-3	1 µg/L	90.3	70	130
		EP125: ortho-Xylene	95-47-6	1 µg/L	81.7	70	130
		EP125: Styrene	100-42-5	1 µg/L	74.6	70	130
		EP125: Toluene	108-88-3	1 µg/L	93.9	70	130
EP125D: Fumigants (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: 1.2-Dibromoethane (EDB)	106-93-4	1 µg/L	95.7	70	130
		EP125: 1.2-Dichloropropane	78-87-5	1 µg/L	112	70	130
		EP125: cis-1.3-Dichloropropylene	10061-01-5	1 µg/L	103	70	130
		EP125: trans-1.3-Dichloropropylene	10061-02-6	1 µg/L	102	70	130
EP125E: Halogenated Aliphatic Compounds (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: 1.1.1-Trichloroethane	71-55-6	1 µg/L	100	70	130
		EP125: 1.1-Dichloroethane	75-34-3	1 µg/L	105	70	130
		EP125: 1.1-Dichloroethene	75-35-4	1 µg/L	93.1	70	130
		EP125: 1.2-Dichloroethane	107-06-2	1 µg/L	109	70	130
		EP125: Bromochloromethane	74-97-5	1 µg/L	107	70	130
		EP125: Bromomethane	74-83-9	10 µg/L	74.4	70	130
		EP125: Carbon Tetrachloride	56-23-5	1 µg/L	100	70	130
		EP125: Chloroethane	75-00-3	10 µg/L	98.0	70	130
		EP125: cis-1.2-Dichloroethene	156-59-2	1 µg/L	104	70	130
		EP125: Dichlorodifluoromethane	75-71-8	10 µg/L	77.7	70	130
		EP125: Dichloromethane	75-09-2	1 µg/L	70.2	70	130
		EP125: Hexachlorobutadiene	87-68-3	1 µg/L	94.2	70	130
		EP125: Tetrachloroethene	127-18-4	1 µg/L	74.8	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP125E: Halogenated Aliphatic Compounds (QCLot: 106988) - continued							
ES1522428-004	Anonymous	EP125: trans-1.2-Dichloroethene	156-60-5	1 µg/L	101	70	130
		EP125: Trichloroethene	79-01-6	1 µg/L	82.9	70	130
		EP125: Trichlorofluoromethane	75-69-4	10 µg/L	94.5	70	130
		EP125: Vinyl chloride	75-01-4	10 µg/L	88.3	70	130
EP125F: Halogenated Aromatic Compounds (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: 1.2.3-Trichlorobenzene	87-61-6	1 µg/L	93.5	70	130
		EP125: 1.2.4-Trichlorobenzene	120-82-1	1 µg/L	95.8	70	130
		EP125: 1.2-Dichlorobenzene	95-50-1	1 µg/L	97.3	70	130
		EP125: 1.3-Dichlorobenzene	541-73-1	1 µg/L	94.5	70	130
		EP125: 1.4-Dichlorobenzene	106-46-7	1 µg/L	91.8	70	130
		EP125: 2-Chlorotoluene	95-49-8	1 µg/L	108	70	130
		EP125: 4-Chlorotoluene	106-43-4	1 µg/L	100	70	130
		EP125: Benzylchloride	100-44-7	1 µg/L	71.4	70	130
		EP125: Bromobenzene	108-86-1	1 µg/L	100	70	130
		EP125: Chlorobenzene	108-90-7	1 µg/L	97.6	70	130
EP125G: Trihalomethanes (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: Bromodichloromethane	75-27-4	1 µg/L	106	70	130
		EP125: Bromoform	75-25-2	1 µg/L	101	70	130
		EP125: Chloroform	67-66-3	1 µg/L	101	70	130
		EP125: Dibromochloromethane	124-48-1	1 µg/L	102	70	130
EP125H: Naphthalene (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: Naphthalene	91-20-3	1 µg/L	88.0	70	130
EP125L: Methyl t-butyl ether (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	1 µg/L	75.5	70	130

QA/QC Compliance Assessment for DQO Reporting

Work Order	: **ES1522255**	Page	: 1 of 4
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Telephone	: +61 2 8784 8555
Project	: VALES POINT GME 2015	Date Samples Received	: 19-May-2015
Site	: ----	Issue Date	: 28-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JANENE DEVEREUX	No. of samples received	: 5
Order number	: 0300379	No. of samples analysed	: 5

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	4	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	4	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	4	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	4	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **WATER**

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*
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
VG_MW01, VK_MW02, VJ_MW09, VG_MW02	**19-May-2015**	**----**	----	----	**25-May-2015**	15-Nov-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
VK_MW02, VJ_MW03	**19-May-2015**	**21-May-2015**	26-May-2015	✓	**22-May-2015**	30-Jun-2015	✓
Amber Glass Bottle - Unpreserved (EP071)							
VG_MW01	**19-May-2015**	**22-May-2015**	26-May-2015	✓	**25-May-2015**	01-Jul-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
VG_MW01, VK_MW02, VJ_MW03	**19-May-2015**	**25-May-2015**	02-Jun-2015	✓	**25-May-2015**	02-Jun-2015	✓
EP125E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP125)							
VK_MW02	**19-May-2015**	**----**	----	----	**23-May-2015**	02-Jun-2015	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP132)							
VK_MW02, VJ_MW03	**19-May-2015**	**21-May-2015**	26-May-2015	✓	**25-May-2015**	30-Jun-2015	✓

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(were) 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: **WATER**

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)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	4	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	4	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	2	4	**50.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	4	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	4	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	1	4	**25.00**	**5.00**	✓	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
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
VOC by HS GCMS in SIM Mode	EP125	WATER	In-house: A sample is saturated with sodium chloride and achieving thermodynamic equilibrium between the water and gas phase in a closed thermostatted vessel. A reproducible headspace gas is extracted from the vial and injected into a gas chromatograph and the analyte of interest is seperated by means of gas/liquid partition chromatography and quantified using automated static headspace GCMS in SIM mode.
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	USEPA 3640 (GPC Cleanup), 8270 GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1522415**

Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	Page	: 1 of 2
Order number	: 0300379	Quote number	: ES2014ENVRES0397 (EN/009/14)
C-O-C number	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX		

Dates

Date Samples Received	: 21-May-2015	Issue Date	: 22-May-2015
Client Requested Due Date	: 01-Jun-2015	Scheduled Reporting Date	: **01-Jun-2015**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not intact.
No. of coolers/boxes	: 1	Temperature	: 3'c - Ice present
Receipt Detail	:	No. of samples received / analysed	: 7 / 7

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Sample T02_200515 will be forwarded to Envirolab as per COC.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG094A-F Dissolved Metals in Fresh Water Suite A by	WATER - EG094B-F Dissolved Metals in fresh water Suite B by	WATER - EP071-SV TRH - SV Fractions only	WATER - EP132A Phenols Ultratrace - 16 analytes	WATER - W-18 TRH(C6 - C9)/BTEXN
ES1522415-001	[20-May-2015]	VH_X_MW03	✓	✓			
ES1522415-002	[20-May-2015]	VH_X_MW04	✓	✓			
ES1522415-003	[20-May-2015]	VH_X_MW06	✓	✓			✓
ES1522415-004	[20-May-2015]	D02_200515	✓	✓			✓
ES1522415-006	[20-May-2015]	VD_MW03				✓	
ES1522415-007	[20-May-2015]	VB_MW05			✓		
ES1522415-008	[20-May-2015]	VB_MW02			✓		

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

JOHN EWING

- *AU Certificate of Analysis - NATA (COA)	Email	john.ewing@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	john.ewing@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	john.ewing@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	john.ewing@erm.com
- A4 - AU Tax Invoice (INV)	Email	john.ewing@erm.com
- Chain of Custody (CoC) (COC)	Email	john.ewing@erm.com
- EDI Format - ENMRG (ENMRG)	Email	john.ewing@erm.com
- EDI Format - ESDAT (ESDAT)	Email	john.ewing@erm.com

PETER LAVELLE

- *AU Certificate of Analysis - NATA (COA)	Email	peter.lavelle@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	peter.lavelle@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	peter.lavelle@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	peter.lavelle@erm.com
- A4 - AU Tax Invoice (INV)	Email	peter.lavelle@erm.com
- Chain of Custody (CoC) (COC)	Email	peter.lavelle@erm.com
- EDI Format - ENMRG (ENMRG)	Email	peter.lavelle@erm.com
- EDI Format - ESDAT (ESDAT)	Email	peter.lavelle@erm.com

TESS TOBIN

- *AU Certificate of Analysis - NATA (COA)	Email	tess.tobin@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	tess.tobin@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	tess.tobin@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	tess.tobin@erm.com
- A4 - AU Tax Invoice (INV)	Email	tess.tobin@erm.com
- Chain of Custody (CoC) (COC)	Email	tess.tobin@erm.com
- EDI Format - ENMRG (ENMRG)	Email	tess.tobin@erm.com
- EDI Format - ESDAT (ESDAT)	Email	tess.tobin@erm.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES1522415**	Page	: 1 of 6
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 21-May-2015 12:09
C-O-C number	: ----	Date Analysis Commenced	: 22-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	Issue Date	: 29-May-2015 12:04
Site	: ----		
		No. of samples received	: 7
Quote number	: ----	No. of samples analysed	: 7

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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*
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	VH_X_MW03	VH_X_MW04	VH_X_MW06	D02_200515	VD_MW03
			Client sampling date / time	[20-May-2015]	[20-May-2015]	[20-May-2015]	[20-May-2015]	[20-May-2015]
Compound	CAS Number	LOR	Unit	ES1522415-001	ES1522415-002	ES1522415-003	ES1522415-004	ES1522415-006
				Result	Result	Result	Result	Result
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	**2.0**	**1.9**	**2.0**	**2.0**	----
Arsenic	7440-38-2	0.2	µg/L	**1.7**	**2.1**	**2.2**	**2.1**	----
Cobalt	7440-48-4	0.1	µg/L	**15.8**	**16.4**	**11.4**	**10.9**	----
Copper	7440-50-8	0.5	µg/L	**23.9**	**36.7**	**28.9**	**27.4**	----
Lead	7439-92-1	0.1	µg/L	**10.1**	**15.4**	**14.2**	**13.8**	----
Manganese	7439-96-5	0.5	µg/L	**512**	**406**	**341**	**366**	----
Nickel	7440-02-0	0.5	µg/L	**35.3**	**43.0**	**26.5**	**25.3**	----
Zinc	7440-66-6	1	µg/L	**102**	**118**	**114**	**83**	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	----	----	<20	<20	----
C10 - C14 Fraction	----	50	µg/L	----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	----	----	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	<20	<20	----
>C10 - C16 Fraction	>C10_C16	100	µg/L	----	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	----	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	----	----	**1**	**1**	----
Toluene	108-88-3	2	µg/L	----	----	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L	----	----	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L	----	----	<2	<2	----
^ Total Xylenes	1330-20-7	2	µg/L	----	----	<2	<2	----
^ Sum of BTEX	----	1	µg/L	----	----	**1**	**1**	----
Naphthalene	91-20-3	5	µg/L	----	----	<5	<5	----
EP132A: Phenolic Compounds								
2-Chlorophenol	95-57-8	0.05	µg/L	----	----	----	----	<0.05
4-Chloro-3-methylphenol	59-50-7	0.05	µg/L	----	----	----	----	<0.05
m-Cresol	108-39-4	0.1	µg/L	----	----	----	----	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VH_X_MW03	VH_X_MW04	VH_X_MW06	D02_200515	VD_MW03
				Client sampling date / time	[20-May-2015]	[20-May-2015]	[20-May-2015]	[20-May-2015]	[20-May-2015]
Compound	CAS Number	LOR	Unit		ES1522415-001	ES1522415-002	ES1522415-003	ES1522415-004	ES1522415-006
					Result	Result	Result	Result	Result
EP132A: Phenolic Compounds - Continued									
o-Cresol	95-48-7	0.1	µg/L		----	----	----	----	<0.1
p-Cresol	106-44-5	0.1	µg/L		----	----	----	----	<0.1
2.4-Dichlorophenol	120-83-2	0.1	µg/L		----	----	----	----	<0.1
2.6-Dichlorophenol	87-65-0	0.1	µg/L		----	----	----	----	<0.1
2.4-Dimethylphenol	105-67-9	0.1	µg/L		----	----	----	----	<0.1
Hexachlorophene	70-30-4	0.1	µg/L		----	----	----	----	<0.1
2-Nitrophenol	88-75-5	0.1	µg/L		----	----	----	----	<0.1
4-Nitrophenol	100-02-7	0.1	µg/L		----	----	----	----	<0.1
Pentachlorophenol	87-86-5	0.05	µg/L		----	----	----	----	<0.05
Phenol	108-95-2	0.1	µg/L		----	----	----	----	<0.1
2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L		----	----	----	----	<0.1
2.4.5-Trichlorophenol	95-95-4	0.1	µg/L		----	----	----	----	<0.1
2.4.6-Trichlorophenol	88-06-2	0.1	µg/L		----	----	----	----	<0.1
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	----	**87.9**	**89.5**	----
Toluene-D8	2037-26-5	2	%		----	----	**130**	**122**	----
4-Bromofluorobenzene	460-00-4	2	%		----	----	**125**	**120**	----
EP132S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.1	%		----	----	----	----	**63.0**
Phenol-d6	13127-88-3	0.1	%		----	----	----	----	**48.4**
2-Chlorophenol-D4	93951-73-6	0.1	%		----	----	----	----	**82.9**
2.4.6-Tribromophenol	118-79-6	0.1	%		----	----	----	----	**89.2**
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		----	----	----	----	**80.4**
Anthracene-d10	1719-06-8	0.1	%		----	----	----	----	**88.5**
4-Terphenyl-d14	1718-51-0	0.1	%		----	----	----	----	**90.6**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	VB_MW05	VB_MW02	----	----	----
			Client sampling date / time	[20-May-2015]	[20-May-2015]	----	----	----
Compound	CAS Number	LOR	Unit	ES1522415-007	ES1522415-008	--------	--------	--------
				Result	Result	Result	Result	Result
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	----	----	----	----	----
Arsenic	7440-38-2	0.2	µg/L	----	----	----	----	----
Cobalt	7440-48-4	0.1	µg/L	----	----	----	----	----
Copper	7440-50-8	0.5	µg/L	----	----	----	----	----
Lead	7439-92-1	0.1	µg/L	----	----	----	----	----
Manganese	7439-96-5	0.5	µg/L	----	----	----	----	----
Nickel	7440-02-0	0.5	µg/L	----	----	----	----	----
Zinc	7440-66-6	1	µg/L	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	----	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	----	----	----	----	----
Toluene	108-88-3	2	µg/L	----	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	----	----	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L	----	----	----	----	----
^ Sum of BTEX	----	1	µg/L	----	----	----	----	----
Naphthalene	91-20-3	5	µg/L	----	----	----	----	----
EP132A: Phenolic Compounds								
2-Chlorophenol	95-57-8	0.05	µg/L	----	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.05	µg/L	----	----	----	----	----
m-Cresol	108-39-4	0.1	µg/L	----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VB_MW05	VB_MW02	----	----	----
				Client sampling date / time	[20-May-2015]	[20-May-2015]	----	----	----
Compound	CAS Number	LOR	Unit		ES1522415-007	ES1522415-008	--------	--------	--------
					Result	Result	Result	Result	Result
EP132A: Phenolic Compounds - Continued									
o-Cresol	95-48-7	0.1	µg/L		----	----	----	----	----
p-Cresol	106-44-5	0.1	µg/L		----	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.1	µg/L		----	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.1	µg/L		----	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.1	µg/L		----	----	----	----	----
Hexachlorophene	70-30-4	0.1	µg/L		----	----	----	----	----
2-Nitrophenol	88-75-5	0.1	µg/L		----	----	----	----	----
4-Nitrophenol	100-02-7	0.1	µg/L		----	----	----	----	----
Pentachlorophenol	87-86-5	0.05	µg/L		----	----	----	----	----
Phenol	108-95-2	0.1	µg/L		----	----	----	----	----
2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L		----	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.1	µg/L		----	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.1	µg/L		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	----	----	----	----
Toluene-D8	2037-26-5	2	%		----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	----	----	----	----
EP132S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.1	%		----	----	----	----	----
Phenol-d6	13127-88-3	0.1	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		----	----	----	----	----
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		----	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: **ES1522415**	Page	: 1 of 7
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
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Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 21-May-2015
C-O-C number	: ----	Date Analysis Commenced	: 22-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	Issue Date	: 29-May-2015
Site	: ----	No. of samples received	: 7
Quote number	: ----	No. of samples analysed	: 7

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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 ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

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

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 107564)									
EP1510227-008	Anonymous	EG094A-F: Cobalt	7440-48-4	0.1	µg/L	0.2	0.2	0.00	No Limit
		EG094A-F: Lead	7439-92-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EG094A-F: Arsenic	7440-38-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG094A-F: Copper	7440-50-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG094A-F: Manganese	7439-96-5	0.5	µg/L	46.8	46.9	0.304	0% - 20%
		EG094A-F: Nickel	7440-02-0	0.5	µg/L	0.6	0.6	0.00	No Limit
		EG094A-F: Zinc	7440-66-6	1	µg/L	4	4	0.00	No Limit
ES1522415-002	VH_X_MW04	EG094A-F: Cobalt	7440-48-4	0.1	µg/L	16.4	16.7	1.99	0% - 20%
		EG094A-F: Lead	7439-92-1	0.1	µg/L	15.4	15.8	2.78	0% - 20%
		EG094A-F: Arsenic	7440-38-2	0.2	µg/L	2.1	2.2	0.00	0% - 50%
		EG094A-F: Copper	7440-50-8	0.5	µg/L	36.7	36.9	0.665	0% - 20%
		EG094A-F: Manganese	7439-96-5	0.5	µg/L	406	403	0.742	0% - 20%
		EG094A-F: Nickel	7440-02-0	0.5	µg/L	43.0	43.5	1.23	0% - 20%
		EG094A-F: Zinc	7440-66-6	1	µg/L	118	120	1.97	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 107565)									
EP1510227-008	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
ES1522415-002	VH_X_MW04	EG094B-F: Selenium	7782-49-2	0.2	µg/L	1.9	1.8	5.73	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 110366)									
ES1522415-003	VH_X_MW06	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1522573-018	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 110366)									
ES1522415-003	VH_X_MW06	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1522573-018	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 110366)									
ES1522415-003	VH_X_MW06	EP080: Benzene	71-43-2	1	µg/L	1	2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1522573-018	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 110366) - continued									
ES1522573-018	Anonymous	EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 107564)								
EG094A-F: Arsenic	7440-38-2	0.2	µg/L	<0.2	10 µg/L	94.8	75	129
EG094A-F: Cobalt	7440-48-4	0.1	µg/L	<0.1	10 µg/L	87.8	81	119
EG094A-F: Copper	7440-50-8	0.5	µg/L	<0.5	10 µg/L	94.2	84	114
EG094A-F: Lead	7439-92-1	0.1	µg/L	<0.1	10 µg/L	92.1	74	118
EG094A-F: Manganese	7439-96-5	0.5	µg/L	<0.5	10 µg/L	98.0	84	114
EG094A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	95.4	85	117
EG094A-F: Zinc	7440-66-6	1	µg/L	<1	10 µg/L	89.8	83	121
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 107565)								
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	96.9	70	122
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106395)								
EP071-SV: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	100	59	129
EP071-SV: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	95.9	71	131
EP071-SV: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	97.4	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 110366)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	103	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106395)								
EP071-SV: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	97.6	59	131
EP071-SV: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	95.7	74	138
EP071-SV: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	104	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 110366)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	103	75	127
EP080: BTEXN (QCLot: 110366)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	117	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	98.6	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	99.5	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	107	70	124
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.8	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	97.9	65	129
EP132A: Phenolic Compounds (QCLot: 106435)								
EP132: 2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L	<0.1	2 µg/L	97.6	52	132
EP132: 2.4.5-Trichlorophenol	95-95-4	0.1	µg/L	<0.1	2 µg/L	100	63	125
EP132: 2.4.6-Trichlorophenol	88-06-2	0.1	µg/L	<0.1	2 µg/L	99.8	63	129
EP132: 2.4-Dichlorophenol	120-83-2	0.1	µg/L	<0.1	2 µg/L	98.8	66	126

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP132A: Phenolic Compounds (QCLot: 106435) - continued								
EP132: 2.4-Dimethylphenol	105-67-9	0.1	µg/L	<0.1	2 µg/L	94.2	39	139
EP132: 2.6-Dichlorophenol	87-65-0	0.1	µg/L	<0.1	2 µg/L	96.8	66	126
EP132: 2-Chlorophenol	95-57-8	0.05	µg/L	<0.05	2 µg/L	101	74	119
EP132: 2-Nitrophenol	88-75-5	0.1	µg/L	<0.1	2 µg/L	103	47	145
EP132: 4-Chloro-3-methylphenol	59-50-7	0.05	µg/L	<0.05	2 µg/L	93.4	64	124
EP132: 4-Nitrophenol	100-02-7	0.1	µg/L	<0.1	2 µg/L	59.6	22	142
EP132: Hexachlorophene	70-30-4	0.1	µg/L	<0.1	2 µg/L	102	34	138
EP132: m-Cresol	108-39-4	0.1	µg/L	<0.1	2 µg/L	77.1	42	118
EP132: o-Cresol	95-48-7	0.1	µg/L	<0.1	2 µg/L	73.3	50	122
EP132: p-Cresol	106-44-5	0.1	µg/L	<0.1	2 µg/L	74.6	33	119
EP132: Pentachlorophenol	87-86-5	0.05	µg/L	<0.05	2 µg/L	89.4	32	138
EP132: Phenol	108-95-2	0.1	µg/L	<0.1	2 µg/L	56.8	27	59

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.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 107564)							
EP1510227-008	Anonymous	EG094A-F: Arsenic	7440-38-2	50 µg/L	108	70	130
		EG094A-F: Cobalt	7440-48-4	50 µg/L	102	70	130
		EG094A-F: Copper	7440-50-8	50 µg/L	108	70	130
		EG094A-F: Lead	7439-92-1	50 µg/L	113	70	130
		EG094A-F: Manganese	7439-96-5	50 µg/L	118	70	130
		EG094A-F: Nickel	7440-02-0	50 µg/L	106	70	130
		EG094A-F: Zinc	7440-66-6	50 µg/L	106	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 110366)							
ES1522415-003	VH_X_MW06	EP080: C6 - C9 Fraction	----	325 µg/L	# 133	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 110366)							
ES1522415-003	VH_X_MW06	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	128	70	130
EP080: BTEXN (QCLot: 110366)							
ES1522415-003	VH_X_MW06	EP080: Benzene	71-43-2	25 µg/L	89.3	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	104	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	104	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	115	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080: BTEXN (QCLot: 110366) - continued							
ES1522415-003	VH_X_MW06	EP080: ortho-Xylene	95-47-6	25 µg/L	103	70	130
		EP080: Toluene	108-88-3	25 µg/L	103	70	130

QA/QC Compliance Assessment for DQO Reporting

Work Order	: **ES1522415**	Page	: 1 of 5
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Telephone	: +61 2 8784 8555
Project	: VALES POINT GME 2015	Date Samples Received	: 21-May-2015
Site	: ----	Issue Date	: 29-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	No. of samples received	: 7
Order number	: 0300379	No. of samples analysed	: 7

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP080/071: Total Petroleum Hydrocarbons	ES1522415--003	VH_X_MW06	**C6 - C9 Fraction**	----	133 %	70-130%	**Recovery greater than upper data quality objective**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	6	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	0	6	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	6	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	0	6	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **WATER**

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*
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094A-F)								
VH_X_MW03,	VH_X_MW04,	**20-May-2015**	**----**	----	----	**25-May-2015**	16-Nov-2015	✓
VH_X_MW06,	D02_200515							
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F)								
VH_X_MW03,	VH_X_MW04,	**20-May-2015**	**----**	----	----	**25-May-2015**	16-Nov-2015	✓
VH_X_MW06,	D02_200515							
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071-SV)								
VB_MW05,	VB_MW02	**20-May-2015**	**22-May-2015**	27-May-2015	✓	**25-May-2015**	01-Jul-2015	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)								
VH_X_MW06,	D02_200515	**20-May-2015**	**28-May-2015**	03-Jun-2015	✓	**28-May-2015**	03-Jun-2015	✓

Matrix: **WATER**

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
EP132B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP132)							
VD_MW03	**20-May-2015**	**22-May-2015**	27-May-2015	✓	**25-May-2015**	01-Jul-2015	✓

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(were) 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: **WATER**

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)							
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	6	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	EP071-SV	0	6	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	EP071-SV	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	EP071-SV	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	6	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	EP071-SV	0	6	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	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
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fractions Only	EP071-SV	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	USEPA 3640 (GPC Cleanup), 8270 GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1522416**

Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	Page	: 1 of 2
Order number	: 0300379	Quote number	: ES2014ENVRES0397 (EN/009/14)
C-O-C number	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX		

Dates

Date Samples Received	: 21-May-2015	Issue Date	: 22-May-2015
Client Requested Due Date	: 01-Jun-2015	Scheduled Reporting Date	: **01-Jun-2015**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: K3 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 5 / 5

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Sample T03_200515 will be forwarded to Envirolab as per COC.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG020F Dissolved Metals by ICPMS	WATER - EG094A-F Dissolved Metals in Fresh Water Suite A by	WATER - EG094B-F Dissolved Metals in fresh water Suite B by	WATER - NT-01 & 02 Major Cations & Anions (Ca, Mg, Na, K, Cl, SO4,	WATER - W-04 TRH/BTEXN
ES1522416-001	[20-May-2015]	VPGM/D10	✓			✓	
ES1522416-002	[20-May-2015]	VP_MW01					✓
ES1522416-003	[20-May-2015]	VO_MW17	✓				
ES1522416-004	[20-May-2015]	VO_MW18		✓	✓		
ES1522416-005	[20-May-2015]	DO4_200515					✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

JOHN EWING

- *AU Certificate of Analysis - NATA (COA)	Email	john.ewing@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	john.ewing@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	john.ewing@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	john.ewing@erm.com
- A4 - AU Tax Invoice (INV)	Email	john.ewing@erm.com
- Chain of Custody (CoC) (COC)	Email	john.ewing@erm.com
- EDI Format - ENMRG (ENMRG)	Email	john.ewing@erm.com
- EDI Format - ESDAT (ESDAT)	Email	john.ewing@erm.com

PETER LAVELLE

- *AU Certificate of Analysis - NATA (COA)	Email	peter.lavelle@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	peter.lavelle@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	peter.lavelle@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	peter.lavelle@erm.com
- A4 - AU Tax Invoice (INV)	Email	peter.lavelle@erm.com
- Chain of Custody (CoC) (COC)	Email	peter.lavelle@erm.com
- EDI Format - ENMRG (ENMRG)	Email	peter.lavelle@erm.com
- EDI Format - ESDAT (ESDAT)	Email	peter.lavelle@erm.com

TESS TOBIN

- *AU Certificate of Analysis - NATA (COA)	Email	tess.tobin@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	tess.tobin@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	tess.tobin@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	tess.tobin@erm.com
- A4 - AU Tax Invoice (INV)	Email	tess.tobin@erm.com
- Chain of Custody (CoC) (COC)	Email	tess.tobin@erm.com
- EDI Format - ENMRG (ENMRG)	Email	tess.tobin@erm.com
- EDI Format - ESDAT (ESDAT)	Email	tess.tobin@erm.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES1522416**	Page	: 1 of 4
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 21-May-2015 12:09
C-O-C number	: ----	Date Analysis Commenced	: 22-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	Issue Date	: 29-May-2015 11:44
Site	: ----		
		No. of samples received	: 5
Quote number	: ----	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	VPGM/D10	VP_MW01	VO_MW17	VO_MW18	DO4_200515
			Client sampling date / time	[20-May-2015]	[20-May-2015]	[20-May-2015]	[20-May-2015]	[20-May-2015]
Compound	CAS Number	LOR	Unit	ES1522416-001	ES1522416-002	ES1522416-003	ES1522416-004	ES1522416-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	2	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	2	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	33	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	248	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	3	----	----	----	----
Magnesium	7439-95-4	1	mg/L	14	----	----	----	----
Sodium	7440-23-5	1	mg/L	120	----	----	----	----
Potassium	7440-09-7	1	mg/L	3	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	0.006	----	----
Cobalt	7440-48-4	0.001	mg/L	0.002	----	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	0.002	----	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	<0.001	----	----
Manganese	7439-96-5	0.001	mg/L	0.092	----	2.53	----	----
Nickel	7440-02-0	0.001	mg/L	0.006	----	0.002	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L	0.029	----	0.014	----	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	----	----	----	0.9	----
Arsenic	7440-38-2	0.2	µg/L	----	----	----	1.2	----
Cobalt	7440-48-4	0.1	µg/L	----	----	----	3.3	----
Copper	7440-50-8	0.5	µg/L	----	----	----	4.3	----
Lead	7439-92-1	0.1	µg/L	----	----	----	6.4	----
Manganese	7439-96-5	0.5	µg/L	----	----	----	40.7	----
Nickel	7440-02-0	0.5	µg/L	----	----	----	4.0	----
Zinc	7440-66-6	1	µg/L	----	----	----	48	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	7.72	----	----	----	----
^ Total Cations	----	0.01	meq/L	6.60	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VPGM/D10	VP_MW01	VO_MW17	VO_MW18	DO4_200515
				Client sampling date / time	[20-May-2015]	[20-May-2015]	[20-May-2015]	[20-May-2015]	[20-May-2015]
Compound	CAS Number	LOR	Unit		ES1522416-001	ES1522416-002	ES1522416-003	ES1522416-004	ES1522416-005
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
^ Ionic Balance	----	0.01	%		7.87	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	<20	----	----	<20
C10 - C14 Fraction	----	50	µg/L		----	<50	----	----	<50
C15 - C28 Fraction	----	100	µg/L		----	<100	----	----	<100
C29 - C36 Fraction	----	50	µg/L		----	<50	----	----	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		----	<50	----	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	<20	----	----	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		----	<20	----	----	<20
>C10 - C16 Fraction	>C10_C16	100	µg/L		----	<100	----	----	<100
>C16 - C34 Fraction	----	100	µg/L		----	<100	----	----	<100
>C34 - C40 Fraction	----	100	µg/L		----	<100	----	----	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	<100	----	----	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	<100	----	----	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	1	----	----	1
Toluene	108-88-3	2	µg/L		----	<2	----	----	<2
Ethylbenzene	100-41-4	2	µg/L		----	<2	----	----	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	<2	----	----	<2
ortho-Xylene	95-47-6	2	µg/L		----	<2	----	----	<2
^ Total Xylenes	1330-20-7	2	µg/L		----	<2	----	----	<2
^ Sum of BTEX	----	1	µg/L		----	1	----	----	1
Naphthalene	91-20-3	5	µg/L		----	<5	----	----	<5
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	75.6	----	----	89.1
Toluene-D8	2037-26-5	2	%		----	97.6	----	----	106
4-Bromofluorobenzene	460-00-4	2	%		----	99.0	----	----	110

QUALITY CONTROL REPORT

Work Order	: **ES1522416**	Page	: 1 of 8
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 21-May-2015
C-O-C number	: ----	Date Analysis Commenced	: 22-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	Issue Date	: 29-May-2015
Site	: ----	No. of samples received	: 5
Quote number	: ----	No. of samples analysed	: 5

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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 ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

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

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 106935)									
ES1522331-006	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	22	22	0.00	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	22	22	0.00	0% - 20%
ES1522175-001	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	352	353	0.335	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	352	353	0.335	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 106744)									
ES1522331-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	148	146	1.22	0% - 20%
ES1522410-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	12	11	0.00	0% - 50%
ED045G: Chloride by Discrete Analyser (QC Lot: 106745)									
ES1522331-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	108	105	2.58	0% - 20%
ES1522410-003	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	143	143	0.00	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 109385)									
ES1522416-001	VPGM/D10	ED093F: Calcium	7440-70-2	1	mg/L	3	3	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	14	14	0.00	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	3	3	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	120	122	1.18	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 109384)									
ES1522554-006	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.005	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.010	0.009	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1522416-001	VPGM/D10	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.003	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.092	0.093	1.64	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.029	0.029	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 109384) - continued									
ES1522416-001	VPGM/D10	EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 107564)									
EP1510227-008	Anonymous	EG094A-F: Cobalt	7440-48-4	0.1	µg/L	0.2	0.2	0.00	No Limit
		EG094A-F: Lead	7439-92-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EG094A-F: Arsenic	7440-38-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG094A-F: Copper	7440-50-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG094A-F: Manganese	7439-96-5	0.5	µg/L	46.8	46.9	0.304	0% - 20%
		EG094A-F: Nickel	7440-02-0	0.5	µg/L	0.6	0.6	0.00	No Limit
		EG094A-F: Zinc	7440-66-6	1	µg/L	4	4	0.00	No Limit
ES1522415-002	Anonymous	EG094A-F: Cobalt	7440-48-4	0.1	µg/L	16.4	16.7	1.99	0% - 20%
		EG094A-F: Lead	7439-92-1	0.1	µg/L	15.4	15.8	2.78	0% - 20%
		EG094A-F: Arsenic	7440-38-2	0.2	µg/L	2.1	2.2	0.00	0% - 50%
		EG094A-F: Copper	7440-50-8	0.5	µg/L	36.7	36.9	0.665	0% - 20%
		EG094A-F: Manganese	7439-96-5	0.5	µg/L	406	403	0.742	0% - 20%
		EG094A-F: Nickel	7440-02-0	0.5	µg/L	43.0	43.5	1.23	0% - 20%
		EG094A-F: Zinc	7440-66-6	1	µg/L	118	120	1.97	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 107565)									
EP1510227-008	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
ES1522415-002	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	1.9	1.8	5.73	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 110201)									
ES1522416-002	VP_MW01	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1522741-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 110201)									
ES1522416-002	VP_MW01	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1522741-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 110201)									
ES1522416-002	VP_MW01	EP080: Benzene	71-43-2	1	µg/L	1	1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1522741-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 106935)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	107	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 106744)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	96.0	86	122
ED045G: Chloride by Discrete Analyser (QCLot: 106745)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	108	75	123
				<1	1000 mg/L	115	77	119
ED093F: Dissolved Major Cations (QCLot: 109385)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	94.8	90	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	103	90	110
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	103	87	117
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	93.1	82	118
EG020F: Dissolved Metals by ICP-MS (QCLot: 109384)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.5	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	92.2	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	89.7	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	86.0	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	87.0	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	88.2	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	95.6	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	88.0	85	115
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 107564)								
EG094A-F: Arsenic	7440-38-2	0.2	µg/L	<0.2	10 µg/L	94.8	75	129
EG094A-F: Cobalt	7440-48-4	0.1	µg/L	<0.1	10 µg/L	87.8	81	119
EG094A-F: Copper	7440-50-8	0.5	µg/L	<0.5	10 µg/L	94.2	84	114
EG094A-F: Lead	7439-92-1	0.1	µg/L	<0.1	10 µg/L	92.1	74	118
EG094A-F: Manganese	7439-96-5	0.5	µg/L	<0.5	10 µg/L	98.0	84	114
EG094A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	95.4	85	117
EG094A-F: Zinc	7440-66-6	1	µg/L	<1	10 µg/L	89.8	83	121
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 107565)								
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	96.9	70	122
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106394)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	98.4	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	93.5	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	102	62	120

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 110201)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	79.3	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106394)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	99.3	59	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	101	74	138
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	97.6	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 110201)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	78.3	75	127
EP080: BTEXN (QCLot: 110201)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	92.4	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	102	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	102	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	100	70	124
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.6	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	104	65	129

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.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 106744)							
ES1522331-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 106745)							
ES1522331-001	Anonymous	ED045G: Chloride	16887-00-6	250 mg/L	112	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 109384)							
ES1522416-003	VO_MW17	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	110	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	105	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	100	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	90.3	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	# Not Determined	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	99.5	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	102	70	130
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 107564)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 107564) - continued							
EP1510227-008	Anonymous	EG094A-F: Arsenic	7440-38-2	50 µg/L	108	70	130
		EG094A-F: Cobalt	7440-48-4	50 µg/L	102	70	130
		EG094A-F: Copper	7440-50-8	50 µg/L	108	70	130
		EG094A-F: Lead	7439-92-1	50 µg/L	113	70	130
		EG094A-F: Manganese	7439-96-5	50 µg/L	118	70	130
		EG094A-F: Nickel	7440-02-0	50 µg/L	106	70	130
		EG094A-F: Zinc	7440-66-6	50 µg/L	106	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 110201)							
ES1522416-002	VP_MW01	EP080: C6 - C9 Fraction	----	325 µg/L	96.2	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 110201)							
ES1522416-002	VP_MW01	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	93.2	70	130
EP080: BTEXN (QCLot: 110201)							
ES1522416-002	VP_MW01	EP080: Benzene	71-43-2	25 µg/L	86.0	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	111	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	111	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	113	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	109	70	130
		EP080: Toluene	108-88-3	25 µg/L	106	70	130

QA/QC Compliance Assessment for DQO Reporting

Work Order	: **ES1522416**	Page	: 1 of 6
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Telephone	: +61 2 8784 8555
Project	: VALES POINT GME 2015	Date Samples Received	: 21-May-2015
Site	: ----	Issue Date	: 29-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	No. of samples received	: 5
Order number	: 0300379	No. of samples analysed	: 5

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1522331--001	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG020F: Dissolved Metals by ICP-MS	ES1522416--003	VO_MW17	**Manganese**	7439-96-5	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	6	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	6	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **WATER** Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) VPGM/D10	**20-May-2015**	**----**	----	----	**22-May-2015**	03-Jun-2015	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) VPGM/D10	**20-May-2015**	**----**	----	----	**22-May-2015**	17-Jun-2015	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) VPGM/D10	**20-May-2015**	**----**	----	----	**22-May-2015**	17-Jun-2015	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) VPGM/D10	**20-May-2015**	**----**	----	----	**26-May-2015**	17-Jun-2015	✓

Matrix: **WATER**

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
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)								
VPGM/D10,	VO_MW17	**20-May-2015**	**----**	----	----	**26-May-2015**	16-Nov-2015	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094A-F)								
VO_MW18		**20-May-2015**	**----**	----	----	**25-May-2015**	16-Nov-2015	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F)								
VO_MW18		**20-May-2015**	**----**	----	----	**25-May-2015**	16-Nov-2015	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
VP_MW01,	DO4_200515	**20-May-2015**	**22-May-2015**	27-May-2015	✓	**25-May-2015**	01-Jul-2015	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)								
VP_MW01,	DO4_200515	**20-May-2015**	**27-May-2015**	03-Jun-2015	✓	**27-May-2015**	03-Jun-2015	✓

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(were) 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: **WATER**

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)							
Alkalinity by PC Titrator	ED037-P	2	17	**11.76**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	18	**11.11**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	1	**100.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	6	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	18	**11.11**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	17	**5.88**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	1	**100.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	1	1	**100.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	6	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	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
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1522417**

Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	Page	: 1 of 2
Order number	: 0300379	Quote number	: ES2014ENVRES0397 (EN/009/14)
C-O-C number	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX		

Dates

Date Samples Received	: 21-May-2015	Issue Date	: 21-May-2015
Client Requested Due Date	: 01-Jun-2015	Scheduled Reporting Date	: **01-Jun-2015**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 3'c - Ice present
Receipt Detail	:	No. of samples received / analysed	: 3 / 3

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG020F Dissolved Metals by ICPMS	WATER - UTO-5W Ultratrace PAH/Phenols	WATER - W-04 TRH/BTEXN
ES1522417-001	[20-May-2015]	VU_MW12	✓	✓	✓
ES1522417-002	[20-May-2015]	VU_MW09	✓	✓	✓
ES1522417-003	[20-May-2015]	VO_MW09	✓		

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

JOHN EWING

- *AU Certificate of Analysis - NATA (COA)	Email	john.ewing@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	john.ewing@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	john.ewing@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	john.ewing@erm.com
- A4 - AU Tax Invoice (INV)	Email	john.ewing@erm.com
- Chain of Custody (CoC) (COC)	Email	john.ewing@erm.com
- EDI Format - ENMRG (ENMRG)	Email	john.ewing@erm.com
- EDI Format - ESDAT (ESDAT)	Email	john.ewing@erm.com

PETER LAVELLE

- *AU Certificate of Analysis - NATA (COA)	Email	peter.lavelle@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	peter.lavelle@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	peter.lavelle@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	peter.lavelle@erm.com
- A4 - AU Tax Invoice (INV)	Email	peter.lavelle@erm.com
- Chain of Custody (CoC) (COC)	Email	peter.lavelle@erm.com
- EDI Format - ENMRG (ENMRG)	Email	peter.lavelle@erm.com
- EDI Format - ESDAT (ESDAT)	Email	peter.lavelle@erm.com

TESS TOBIN

- *AU Certificate of Analysis - NATA (COA)	Email	tess.tobin@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	tess.tobin@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	tess.tobin@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	tess.tobin@erm.com
- A4 - AU Tax Invoice (INV)	Email	tess.tobin@erm.com
- Chain of Custody (CoC) (COC)	Email	tess.tobin@erm.com
- EDI Format - ENMRG (ENMRG)	Email	tess.tobin@erm.com
- EDI Format - ESDAT (ESDAT)	Email	tess.tobin@erm.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES1522417**	Page	: 1 of 5
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 21-May-2015 12:09
C-O-C number	: ----	Date Analysis Commenced	: 22-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	Issue Date	: 28-May-2015 16:31
Site	: ----		
		No. of samples received	: 3
Quote number	: ----	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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*
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	VU_MW12	VU_MW09	VO_MW09	----	----
			Client sampling date / time	[20-May-2015]	[20-May-2015]	[20-May-2015]	----	----
Compound	CAS Number	LOR	Unit	ES1522417-001	ES1522417-002	ES1522417-003	--------	--------
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	**0.002**	<0.001	----	----
Cobalt	7440-48-4	0.001	mg/L	**0.002**	**0.013**	**0.002**	----	----
Copper	7440-50-8	0.001	mg/L	**0.005**	<0.001	**0.001**	----	----
Lead	7439-92-1	0.001	mg/L	**0.002**	<0.001	<0.001	----	----
Manganese	7439-96-5	0.001	mg/L	**0.097**	**0.886**	**1.06**	----	----
Nickel	7440-02-0	0.001	mg/L	**0.003**	**0.008**	**0.002**	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L	**0.020**	**0.024**	**0.019**	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L	<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----
EP132A: Phenolic Compounds								
2-Chlorophenol	95-57-8	0.05	µg/L	<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VU_MW12	VU_MW09	VO_MW09	----	----
				Client sampling date / time	[20-May-2015]	[20-May-2015]	[20-May-2015]	----	----
Compound	CAS Number	LOR	Unit		ES1522417-001	ES1522417-002	ES1522417-003	--------	--------
					Result	Result	Result	Result	Result
EP132A: Phenolic Compounds - Continued									
4-Chloro-3-methylphenol	59-50-7	0.05	µg/L		<0.05	<0.05	----	----	----
m-Cresol	108-39-4	0.1	µg/L		<0.1	<0.1	----	----	----
o-Cresol	95-48-7	0.1	µg/L		<0.1	<0.1	----	----	----
p-Cresol	106-44-5	0.1	µg/L		<0.1	<0.1	----	----	----
2.4-Dichlorophenol	120-83-2	0.1	µg/L		<0.1	<0.1	----	----	----
2.6-Dichlorophenol	87-65-0	0.1	µg/L		<0.1	<0.1	----	----	----
2.4-Dimethylphenol	105-67-9	0.1	µg/L		<0.1	<0.1	----	----	----
Hexachlorophene	70-30-4	0.1	µg/L		<0.1	<0.1	----	----	----
2-Nitrophenol	88-75-5	0.1	µg/L		<0.1	<0.1	----	----	----
4-Nitrophenol	100-02-7	0.1	µg/L		<0.1	<0.1	----	----	----
Pentachlorophenol	87-86-5	0.05	µg/L		<0.05	<0.05	----	----	----
Phenol	108-95-2	0.1	µg/L		<0.1	<0.1	----	----	----
2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L		<0.1	<0.1	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.1	µg/L		<0.1	<0.1	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.1	µg/L		<0.1	<0.1	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons									
3-Methylcholanthrene	56-49-5	0.1	µg/L		<0.1	<0.1	----	----	----
2-Methylnaphthalene	91-57-6	0.1	µg/L		<0.1	<0.1	----	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L		<0.1	<0.1	----	----	----
Acenaphthene	83-32-9	0.1	µg/L		<0.1	<0.1	----	----	----
Acenaphthylene	208-96-8	0.1	µg/L		<0.1	<0.1	----	----	----
Anthracene	120-12-7	0.1	µg/L		<0.1	<0.1	----	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L		<0.1	<0.1	----	----	----
Benzo(a)pyrene	50-32-8	0.05	µg/L		<0.05	<0.05	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L		<0.1	<0.1	----	----	----
Benzo(e)pyrene	192-97-2	0.1	µg/L		<0.1	<0.1	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L		<0.1	<0.1	----	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L		<0.1	<0.1	----	----	----
Chrysene	218-01-9	0.1	µg/L		<0.1	<0.1	----	----	----
Coronene	191-07-1	0.1	µg/L		<0.1	<0.1	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L		<0.1	<0.1	----	----	----
Fluoranthene	206-44-0	0.1	µg/L		<0.1	<0.1	----	----	----
Fluorene	86-73-7	0.1	µg/L		<0.1	<0.1	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L		<0.1	<0.1	----	----	----
N-2-Fluorenyl Acetamide	53-96-3	0.1	µg/L		<0.1	<0.1	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VU_MW12	VU_MW09	VO_MW09	----	----
				Client sampling date / time	[20-May-2015]	[20-May-2015]	[20-May-2015]	----	----
Compound	CAS Number	LOR	Unit		ES1522417-001	ES1522417-002	ES1522417-003	--------	--------
					Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
Naphthalene	91-20-3	0.1	µg/L		<0.1	<0.1	----	----	----
Perylene	198-55-0	0.1	µg/L		<0.1	<0.1	----	----	----
Phenanthrene	85-01-8	0.1	µg/L		<0.1	<0.1	----	----	----
Pyrene	129-00-0	0.1	µg/L		<0.1	<0.1	----	----	----
Sum of PAHs	----	0.05	µg/L		<0.05	<0.05	----	----	----
Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L		<0.05	<0.05	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		94.3	96.9	----	----	----
Toluene-D8	2037-26-5	2	%		103	105	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		90.2	90.1	----	----	----
EP132S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.1	%		61.3	66.4	----	----	----
Phenol-d6	13127-88-3	0.1	%		47.2	51.5	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		82.6	89.1	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		91.1	98.3	----	----	----
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		79.4	85.9	----	----	----
Anthracene-d10	1719-06-8	0.1	%		84.4	95.8	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		91.4	99.6	----	----	----

QUALITY CONTROL REPORT

Work Order	: **ES1522417**	Page	: 1 of 7
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 21-May-2015
C-O-C number	: ----	Date Analysis Commenced	: 22-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	Issue Date	: 28-May-2015
Site	: ----	No. of samples received	: 3
Quote number	: ----	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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 ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

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

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 109384)									
ES1522554-006	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.005	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.010	0.009	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1522416-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.003	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.092	0.093	1.64	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.029	0.029	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 109294)									
EB1519330-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EB1519389-005	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 109294)									
EB1519330-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EB1519389-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 109294)									
EB1519330-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EB1519389-005	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 109294) - continued									
EB1519389-005	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 109384)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.5	85	115
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	92.2	85	115
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	89.7	85	115
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	86.0	85	115
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	87.0	85	115
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	88.2	85	115
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	95.6	85	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	88.0	85	115
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106457)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	112	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	101	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	88.2	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 109294)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	104	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106457)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	106	59	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	97.2	74	138
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	83.5	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 109294)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	105	75	127
EP080: BTEXN (QCLot: 109294)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	96.9	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	95.3	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	91.2	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	92.7	70	124
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	95.6	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	97.0	65	129
EP132A: Phenolic Compounds (QCLot: 106435)								
EP132: 2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L	<0.1	2 µg/L	97.6	52	132
EP132: 2.4.5-Trichlorophenol	95-95-4	0.1	µg/L	<0.1	2 µg/L	100	63	125
EP132: 2.4.6-Trichlorophenol	88-06-2	0.1	µg/L	<0.1	2 µg/L	99.8	63	129
EP132: 2.4-Dichlorophenol	120-83-2	0.1	µg/L	<0.1	2 µg/L	98.8	66	126
EP132: 2.4-Dimethylphenol	105-67-9	0.1	µg/L	<0.1	2 µg/L	94.2	39	139

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP132A: Phenolic Compounds (QCLot: 106435) - continued								
EP132: 2.6-Dichlorophenol	87-65-0	0.1	µg/L	<0.1	2 µg/L	96.8	66	126
EP132: 2-Chlorophenol	95-57-8	0.05	µg/L	<0.05	2 µg/L	101	74	119
EP132: 2-Nitrophenol	88-75-5	0.1	µg/L	<0.1	2 µg/L	103	47	145
EP132: 4-Chloro-3-methylphenol	59-50-7	0.05	µg/L	<0.05	2 µg/L	93.4	64	124
EP132: 4-Nitrophenol	100-02-7	0.1	µg/L	<0.1	2 µg/L	59.6	22	142
EP132: Hexachlorophene	70-30-4	0.1	µg/L	<0.1	2 µg/L	102	34	138
EP132: m-Cresol	108-39-4	0.1	µg/L	<0.1	2 µg/L	77.1	42	118
EP132: o-Cresol	95-48-7	0.1	µg/L	<0.1	2 µg/L	73.3	50	122
EP132: p-Cresol	106-44-5	0.1	µg/L	<0.1	2 µg/L	74.6	33	119
EP132: Pentachlorophenol	87-86-5	0.05	µg/L	<0.05	2 µg/L	89.4	32	138
EP132: Phenol	108-95-2	0.1	µg/L	<0.1	2 µg/L	56.8	27	59
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 106435)								
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	83.9	59	123
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	109	60	120
EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	76.2	12	156
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	95.4	64	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	95.0	62	124
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	99.5	66	124
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	107	64	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	101	64	126
EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	2 µg/L	108	62	126
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	99.8	62	126
EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	92.7	56	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	103	63	127
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	103	64	128
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	81.2	35	133
EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	90.8	58	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	101	65	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	98.6	64	124
EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	92.5	57	127
EP132: N-2-Fluorenyl Acetamide	53-96-3	0.1	µg/L	<0.1	2 µg/L	88.3	54	131
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	86.9	60	124
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	99.7	64	124
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	97.2	65	125
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	101	66	128

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.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 109384)							
ES1522416-003	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	110	70	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	105	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	100	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	90.3	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	# Not Determined	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	99.5	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	102	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 109294)							
EB1519330-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	115	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 109294)							
EB1519330-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	116	70	130
EP080: BTEXN (QCLot: 109294)							
EB1519330-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	89.5	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	103	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	102	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	118	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	103	70	130
		EP080: Toluene	108-88-3	25 µg/L	97.0	70	130

QA/QC Compliance Assessment for DQO Reporting

Work Order	: **ES1522417**	Page	: 1 of 4
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Telephone	: +61 2 8784 8555
Project	: VALES POINT GME 2015	Date Samples Received	: 21-May-2015
Site	: ----	Issue Date	: 28-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	No. of samples received	: 3
Order number	: 0300379	No. of samples analysed	: 3

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG020F: Dissolved Metals by ICP-MS	ES1522416--003	Anonymous	**Manganese**	7439-96-5	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	6	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	5	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	6	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	5	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **WATER**

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

Method / *Container* / Client Sample ID(s)	*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
VU_MW12, VU_MW09, VO_MW09	**20-May-2015**	**----**	----	----	**26-May-2015**	16-Nov-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
VU_MW12, VU_MW09	**20-May-2015**	**22-May-2015**	27-May-2015	✓	**25-May-2015**	01-Jul-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
VU_MW12, VU_MW09	**20-May-2015**	**27-May-2015**	03-Jun-2015	✓	**27-May-2015**	03-Jun-2015	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP132)							
VU_MW12, VU_MW09	**20-May-2015**	**22-May-2015**	27-May-2015	✓	**25-May-2015**	01-Jul-2015	✓

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(were) 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: **WATER**

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)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	18	**11.11**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	6	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	5	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	6	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	5	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	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
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	USEPA 3640 (GPC Cleanup), 8270 GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1522418**

Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	Page	: 1 of 3
Order number	: 0300379	Quote number	: ES2014ENVRES0397 (EN/009/14)
C-O-C number	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX		

Dates

Date Samples Received	: 21-May-2015	Issue Date	: 22-May-2015
Client Requested Due Date	: 01-Jun-2015	Scheduled Reporting Date	: **01-Jun-2015**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 3'c - Ice present
Receipt Detail	:	No. of samples received / analysed	: 10 / 10

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG020T Total Recoverable Metals by ICPMS (including	WATER - EG094A-F Dissolved Metals in Fresh Water Suite A by	WATER - EG094B-F Dissolved Metals in fresh water Suite B by	WATER - EP071-SV TRH - SV Fractions only	WATER - EP125 VOCs by HS GCMS in SIM Mode	WATER - EP132A Phenols Ultratrace - 16 analytes	WATER - W-04 TRH/BTEXN
ES1522418-001	[21-May-2015]	R01_190515_AW	✓					✓	✓
ES1522418-002	[21-May-2015]	R01_200515_AW	✓					✓	✓
ES1522418-003	[21-May-2015]	VH_X_MW03		✓	✓				
ES1522418-004	[21-May-2015]	VH_X_MW08		✓	✓		✓	✓	✓
ES1522418-005	[21-May-2015]	VI_MW01				✓			
ES1522418-006	[21-May-2015]	VM_MW04				✓			
ES1522418-007	[21-May-2015]	D01_202515_AW				✓			
ES1522418-008	[21-May-2015]	VB_MW01				✓			

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - W-18 TRH(C6 - C9)/BTEXN
ES1522418-009	[18-May-2015]	TRIP BLANK	✓
ES1522418-010	[18-May-2015]	TRIP SPIKE	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

JOHN EWING

- *AU Certificate of Analysis - NATA (COA)	Email	john.ewing@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	john.ewing@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	john.ewing@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	john.ewing@erm.com
- A4 - AU Tax Invoice (INV)	Email	john.ewing@erm.com
- Chain of Custody (CoC) (COC)	Email	john.ewing@erm.com
- EDI Format - ENMRG (ENMRG)	Email	john.ewing@erm.com
- EDI Format - ESDAT (ESDAT)	Email	john.ewing@erm.com

PETER LAVELLE

- *AU Certificate of Analysis - NATA (COA)	Email	peter.lavelle@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	peter.lavelle@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	peter.lavelle@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	peter.lavelle@erm.com
- A4 - AU Tax Invoice (INV)	Email	peter.lavelle@erm.com
- Chain of Custody (CoC) (COC)	Email	peter.lavelle@erm.com
- EDI Format - ENMRG (ENMRG)	Email	peter.lavelle@erm.com
- EDI Format - ESDAT (ESDAT)	Email	peter.lavelle@erm.com

TESS TOBIN

- *AU Certificate of Analysis - NATA (COA)	Email	tess.tobin@erm.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	tess.tobin@erm.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	tess.tobin@erm.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	tess.tobin@erm.com
- A4 - AU Tax Invoice (INV)	Email	tess.tobin@erm.com
- Chain of Custody (CoC) (COC)	Email	tess.tobin@erm.com
- EDI Format - ENMRG (ENMRG)	Email	tess.tobin@erm.com
- EDI Format - ESDAT (ESDAT)	Email	tess.tobin@erm.com

CERTIFICATE OF ANALYSIS

Work Order	: **ES1522418**	Page	: 1 of 10
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 21-May-2015 12:09
C-O-C number	: ----	Date Analysis Commenced	: 22-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	Issue Date	: 29-May-2015 12:04
Site	: ----		
		No. of samples received	: 10
Quote number	: ----	No. of samples analysed	: 10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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*
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

- EG020: Positive result for sample ES1522418 - #001 & #002 has been confirmed by reanalysis.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.
- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	R01_190515_AW	R01_200515_AW	VH_X_MW01	VH_X_MW08	VI_MW01
				Client sampling date / time	[21-May-2015]	[21-May-2015]	[21-May-2015]	[21-May-2015]	[21-May-2015]
Compound	CAS Number	LOR	Unit		ES1522418-001	ES1522418-002	ES1522418-003	ES1522418-004	ES1522418-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	----	----	----
Cobalt	7440-48-4	0.001	mg/L		<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L		**0.004**	**0.004**	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	----	----	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L		----	----	**3.0**	**1.9**	----
Arsenic	7440-38-2	0.2	µg/L		----	----	**4.1**	**1.7**	----
Cobalt	7440-48-4	0.1	µg/L		----	----	**16.8**	**14.9**	----
Copper	7440-50-8	0.5	µg/L		----	----	**56.6**	**8.9**	----
Lead	7439-92-1	0.1	µg/L		----	----	**22.3**	**2.3**	----
Manganese	7439-96-5	0.5	µg/L		----	----	**392**	**447**	----
Nickel	7440-02-0	0.5	µg/L		----	----	**47.3**	**32.0**	----
Zinc	7440-66-6	1	µg/L		----	----	**126**	**94**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	----	**180**	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	<50	----
C10 - C14 Fraction	----	50	µg/L		----	----	----	----	**80**
C15 - C28 Fraction	----	100	µg/L		<100	<100	----	<100	----
C15 - C28 Fraction	----	100	µg/L		----	----	----	----	**600**
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	<50	----
C29 - C36 Fraction	----	50	µg/L		----	----	----	----	<50
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	<50	----	<50	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		----	----	----	----	**680**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	----	**180**	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	----	**20**	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	<100	----	<100	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		----	----	----	----	**170**
>C16 - C34 Fraction	----	100	µg/L		<100	<100	----	<100	----
>C16 - C34 Fraction	----	100	µg/L		----	----	----	----	**480**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	R01_190515_AW	R01_200515_AW	VH_X_MW01	VH_X_MW08	VI_MW01
				Client sampling date / time	[21-May-2015]	[21-May-2015]	[21-May-2015]	[21-May-2015]	[21-May-2015]
Compound	CAS Number	LOR	Unit		ES1522418-001	ES1522418-002	ES1522418-003	ES1522418-004	ES1522418-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	<100	----
>C34 - C40 Fraction	----	100	µg/L		----	----	----	----	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	----	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	----	----	**650**
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	----	**124**	----
Toluene	108-88-3	2	µg/L		<2	<2	----	**12**	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	----	**8**	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	----	**7**	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	----	**5**	----
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	----	**12**	----
^ Sum of BTEX	----	1	µg/L		<1	<1	----	**156**	----
Naphthalene	91-20-3	5	µg/L		<5	<5	----	<5	----
EP125A: Monocyclic Aromatic Hydrocarbons									
Styrene	100-42-5	0.05	µg/L		----	----	----	<0.05	----
1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L		----	----	----	**0.57**	----
1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L		----	----	----	**2.48**	----
EP125E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	0.5	µg/L		----	----	----	<0.5	----
Vinyl chloride	75-01-4	0.3	µg/L		----	----	----	<0.3	----
Bromomethane	74-83-9	0.5	µg/L		----	----	----	<0.5	----
Chloroethane	75-00-3	0.5	µg/L		----	----	----	<0.5	----
Trichlorofluoromethane	75-69-4	0.5	µg/L		----	----	----	<0.5	----
1.1-Dichloroethene	75-35-4	0.1	µg/L		----	----	----	<0.1	----
Dichloromethane	75-09-2	1	µg/L		----	----	----	<1.0	----
trans-1.2-Dichloroethene	156-60-5	0.1	µg/L		----	----	----	<0.1	----
1.1-Dichloroethane	75-34-3	0.1	µg/L		----	----	----	<0.1	----
cis-1.2-Dichloroethene	156-59-2	0.1	µg/L		----	----	----	<0.1	----
Bromochloromethane	74-97-5	0.5	µg/L		----	----	----	<0.5	----
1.2-Dichloroethane	107-06-2	0.1	µg/L		----	----	----	**0.2**	----
1.1.1-Trichloroethane	71-55-6	0.1	µg/L		----	----	----	<0.1	----
Carbon Tetrachloride	56-23-5	0.05	µg/L		----	----	----	<0.05	----
Trichloroethene	79-01-6	0.05	µg/L		----	----	----	<0.05	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	R01_190515_AW	R01_200515_AW	VH_X_MW01	VH_X_MW08	VI_MW01
				Client sampling date / time	[21-May-2015]	[21-May-2015]	[21-May-2015]	[21-May-2015]	[21-May-2015]
Compound	CAS Number	LOR	Unit		ES1522418-001	ES1522418-002	ES1522418-003	ES1522418-004	ES1522418-005
					Result	Result	Result	Result	Result
EP125E: Halogenated Aliphatic Compounds - Continued									
Tetrachloroethene	127-18-4	0.05	µg/L		----	----	----	<0.05	----
Hexachlorobutadiene	87-68-3	0.04	µg/L		----	----	----	<0.04	----
EP125F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	0.1	µg/L		----	----	----	<0.10	----
Bromobenzene	108-86-1	0.1	µg/L		----	----	----	<0.10	----
Benzylchloride	100-44-7	0.2	µg/L		----	----	----	<0.2	----
1.3-Dichlorobenzene	541-73-1	0.1	µg/L		----	----	----	<0.10	----
1.4-Dichlorobenzene	106-46-7	0.1	µg/L		----	----	----	<0.10	----
1.2-Dichlorobenzene	95-50-1	0.1	µg/L		----	----	----	<0.10	----
2-Chlorotoluene	95-49-8	0.1	µg/L		----	----	----	<0.1	----
4-Chlorotoluene	106-43-4	0.1	µg/L		----	----	----	<0.1	----
1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L		----	----	----	<0.1	----
1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L		----	----	----	<0.1	----
^ Trichlorobenzenes (Sum)	----	0.1	µg/L		----	----	----	<0.1	----
EP125G: Trihalomethanes									
Chloroform	67-66-3	0.1	µg/L		----	----	----	<0.10	----
Bromodichloromethane	75-27-4	0.1	µg/L		----	----	----	<0.10	----
Dibromochloromethane	124-48-1	0.1	µg/L		----	----	----	<0.10	----
Bromoform	75-25-2	0.1	µg/L		----	----	----	<0.10	----
^ Total Trihalomethanes	----	0.1	µg/L		----	----	----	<0.10	----
EP125H: Naphthalene									
Naphthalene	91-20-3	0.05	µg/L		----	----	----	**1.00**	----
EP125L: Methyl t-butyl ether									
Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L		----	----	----	**0.6**	----
EP132A: Phenolic Compounds									
2-Chlorophenol	95-57-8	0.05	µg/L		<0.05	<0.05	----	<0.05	----
4-Chloro-3-methylphenol	59-50-7	0.05	µg/L		<0.05	<0.05	----	<0.05	----
m-Cresol	108-39-4	0.1	µg/L		<0.1	<0.1	----	**4.5**	----
o-Cresol	95-48-7	0.1	µg/L		<0.1	<0.1	----	**0.1**	----
p-Cresol	106-44-5	0.1	µg/L		<0.1	<0.1	----	<0.1	----
2.4-Dichlorophenol	120-83-2	0.1	µg/L		<0.1	<0.1	----	<0.1	----
2.6-Dichlorophenol	87-65-0	0.1	µg/L		<0.1	<0.1	----	<0.1	----
2.4-Dimethylphenol	105-67-9	0.1	µg/L		<0.1	<0.1	----	**0.1**	----
Hexachlorophene	70-30-4	0.1	µg/L		<0.1	<0.1	----	<0.1	----
2-Nitrophenol	88-75-5	0.1	µg/L		<0.1	<0.1	----	<0.1	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	R01_190515_AW	R01_200515_AW	VH_X_MW01	VH_X_MW08	VI_MW01
				Client sampling date / time	[21-May-2015]	[21-May-2015]	[21-May-2015]	[21-May-2015]	[21-May-2015]
Compound	CAS Number	LOR	Unit		ES1522418-001	ES1522418-002	ES1522418-003	ES1522418-004	ES1522418-005
					Result	Result	Result	Result	Result
EP132A: Phenolic Compounds - Continued									
4-Nitrophenol	100-02-7	0.1	µg/L		<0.1	<0.1	----	<0.1	----
Pentachlorophenol	87-86-5	0.05	µg/L		<0.05	<0.05	----	<0.05	----
Phenol	108-95-2	0.1	µg/L		<0.1	<0.1	----	1.8	----
2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L		<0.1	<0.1	----	<0.1	----
2.4.5-Trichlorophenol	95-95-4	0.1	µg/L		<0.1	<0.1	----	<0.1	----
2.4.6-Trichlorophenol	88-06-2	0.1	µg/L		<0.1	<0.1	----	<0.1	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		99.4	95.3	----	92.4	----
Toluene-D8	2037-26-5	2	%		110	104	----	108	----
4-Bromofluorobenzene	460-00-4	2	%		113	110	----	112	----
EP125S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		----	----	----	113	----
Toluene-D8	2037-26-5	0.1	%		----	----	----	108	----
4-Bromofluorobenzene	460-00-4	0.1	%		----	----	----	101	----
EP132S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.1	%		58.6	62.4	----	50.3	----
Phenol-d6	13127-88-3	0.1	%		44.4	47.1	----	39.1	----
2-Chlorophenol-D4	93951-73-6	0.1	%		78.5	85.0	----	65.7	----
2.4.6-Tribromophenol	118-79-6	0.1	%		84.0	92.8	----	71.1	----
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		74.8	83.0	----	61.9	----
Anthracene-d10	1719-06-8	0.1	%		82.8	90.6	----	69.9	----
4-Terphenyl-d14	1718-51-0	0.1	%		86.5	95.8	----	73.9	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VM_MW04	D01_202515_AW	VB_MW01	TRIP BLANK	TRIP SPIKE
				Client sampling date / time	[21-May-2015]	[21-May-2015]	[21-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522418-006	ES1522418-007	ES1522418-008	ES1522418-009	ES1522418-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		----	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L		----	----	----	----	----
Copper	7440-50-8	0.001	mg/L		----	----	----	----	----
Lead	7439-92-1	0.001	mg/L		----	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		----	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		----	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		----	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		----	----	----	----	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L		----	----	----	----	----
Arsenic	7440-38-2	0.2	µg/L		----	----	----	----	----
Cobalt	7440-48-4	0.1	µg/L		----	----	----	----	----
Copper	7440-50-8	0.5	µg/L		----	----	----	----	----
Lead	7439-92-1	0.1	µg/L		----	----	----	----	----
Manganese	7439-96-5	0.5	µg/L		----	----	----	----	----
Nickel	7440-02-0	0.5	µg/L		----	----	----	----	----
Zinc	7440-66-6	1	µg/L		----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		----	----	----	<20	----
C10 - C14 Fraction	----	50	µg/L		----	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	**90**	----	----
C15 - C28 Fraction	----	100	µg/L		----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	**660**	----	----
C29 - C36 Fraction	----	50	µg/L		----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		----	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	<50	**750**	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		----	----	----	<20	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		----	----	----	<20	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		----	----	----	----	----
>C10 - C16 Fraction	>C10_C16	100	µg/L		<100	<100	**250**	----	----
>C16 - C34 Fraction	----	100	µg/L		----	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	**470**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VM_MW04	D01_202515_AW	VB_MW01	TRIP BLANK	TRIP SPIKE
				Client sampling date / time	[21-May-2015]	[21-May-2015]	[21-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522418-006	ES1522418-007	ES1522418-008	ES1522418-009	ES1522418-010
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C34 - C40 Fraction	----	100	µg/L		----	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	720	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	----	----	<1	14
Toluene	108-88-3	2	µg/L		----	----	----	<2	15
Ethylbenzene	100-41-4	2	µg/L		----	----	----	<2	15
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	----	----	<2	15
ortho-Xylene	95-47-6	2	µg/L		----	----	----	<2	15
^ Total Xylenes	1330-20-7	2	µg/L		----	----	----	<2	30
^ Sum of BTEX	----	1	µg/L		----	----	----	<1	74
Naphthalene	91-20-3	5	µg/L		----	----	----	<5	19
EP125A: Monocyclic Aromatic Hydrocarbons									
Styrene	100-42-5	0.05	µg/L		----	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L		----	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L		----	----	----	----	----
EP125E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	0.5	µg/L		----	----	----	----	----
Vinyl chloride	75-01-4	0.3	µg/L		----	----	----	----	----
Bromomethane	74-83-9	0.5	µg/L		----	----	----	----	----
Chloroethane	75-00-3	0.5	µg/L		----	----	----	----	----
Trichlorofluoromethane	75-69-4	0.5	µg/L		----	----	----	----	----
1.1-Dichloroethene	75-35-4	0.1	µg/L		----	----	----	----	----
Dichloromethane	75-09-2	1	µg/L		----	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	0.1	µg/L		----	----	----	----	----
1.1-Dichloroethane	75-34-3	0.1	µg/L		----	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	0.1	µg/L		----	----	----	----	----
Bromochloromethane	74-97-5	0.5	µg/L		----	----	----	----	----
1.2-Dichloroethane	107-06-2	0.1	µg/L		----	----	----	----	----
1.1.1-Trichloroethane	71-55-6	0.1	µg/L		----	----	----	----	----
Carbon Tetrachloride	56-23-5	0.05	µg/L		----	----	----	----	----
Trichloroethene	79-01-6	0.05	µg/L		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VM_MW04	D01_202515_AW	VB_MW01	TRIP BLANK	TRIP SPIKE
				Client sampling date / time	[21-May-2015]	[21-May-2015]	[21-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522418-006	ES1522418-007	ES1522418-008	ES1522418-009	ES1522418-010
					Result	Result	Result	Result	Result
EP125E: Halogenated Aliphatic Compounds - Continued									
Tetrachloroethene	127-18-4	0.05	µg/L		----	----	----	----	----
Hexachlorobutadiene	87-68-3	0.04	µg/L		----	----	----	----	----
EP125F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	0.1	µg/L		----	----	----	----	----
Bromobenzene	108-86-1	0.1	µg/L		----	----	----	----	----
Benzylchloride	100-44-7	0.2	µg/L		----	----	----	----	----
1.3-Dichlorobenzene	541-73-1	0.1	µg/L		----	----	----	----	----
1.4-Dichlorobenzene	106-46-7	0.1	µg/L		----	----	----	----	----
1.2-Dichlorobenzene	95-50-1	0.1	µg/L		----	----	----	----	----
2-Chlorotoluene	95-49-8	0.1	µg/L		----	----	----	----	----
4-Chlorotoluene	106-43-4	0.1	µg/L		----	----	----	----	----
1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L		----	----	----	----	----
1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L		----	----	----	----	----
^ Trichlorobenzenes (Sum)	----	0.1	µg/L		----	----	----	----	----
EP125G: Trihalomethanes									
Chloroform	67-66-3	0.1	µg/L		----	----	----	----	----
Bromodichloromethane	75-27-4	0.1	µg/L		----	----	----	----	----
Dibromochloromethane	124-48-1	0.1	µg/L		----	----	----	----	----
Bromoform	75-25-2	0.1	µg/L		----	----	----	----	----
^ Total Trihalomethanes	----	0.1	µg/L		----	----	----	----	----
EP125H: Naphthalene									
Naphthalene	91-20-3	0.05	µg/L		----	----	----	----	----
EP125L: Methyl t-butyl ether									
Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L		----	----	----	----	----
EP132A: Phenolic Compounds									
2-Chlorophenol	95-57-8	0.05	µg/L		----	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.05	µg/L		----	----	----	----	----
m-Cresol	108-39-4	0.1	µg/L		----	----	----	----	----
o-Cresol	95-48-7	0.1	µg/L		----	----	----	----	----
p-Cresol	106-44-5	0.1	µg/L		----	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.1	µg/L		----	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.1	µg/L		----	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.1	µg/L		----	----	----	----	----
Hexachlorophene	70-30-4	0.1	µg/L		----	----	----	----	----
2-Nitrophenol	88-75-5	0.1	µg/L		----	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	VM_MW04	D01_202515_AW	VB_MW01	TRIP BLANK	TRIP SPIKE
				Client sampling date / time	[21-May-2015]	[21-May-2015]	[21-May-2015]	[18-May-2015]	[18-May-2015]
Compound	CAS Number	LOR	Unit		ES1522418-006	ES1522418-007	ES1522418-008	ES1522418-009	ES1522418-010
					Result	Result	Result	Result	Result
EP132A: Phenolic Compounds - Continued									
4-Nitrophenol	100-02-7	0.1	µg/L		----	----	----	----	----
Pentachlorophenol	87-86-5	0.05	µg/L		----	----	----	----	----
Phenol	108-95-2	0.1	µg/L		----	----	----	----	----
2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L		----	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.1	µg/L		----	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.1	µg/L		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		----	----	----	100	100
Toluene-D8	2037-26-5	2	%		----	----	----	114	119
4-Bromofluorobenzene	460-00-4	2	%		----	----	----	106	106
EP125S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		----	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		----	----	----	----	----
EP132S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.1	%		----	----	----	----	----
Phenol-d6	13127-88-3	0.1	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		----	----	----	----	----
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		----	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: **ES1522418**	Page	: 1 of 12
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Contact	: Barbara Hanna
Address	: Level 4, 45 Watt Street Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: john.ewing@erm.com	E-mail	: Barbara.Hanna@alsglobal.com
Telephone	: +61 02 8584 8888	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 8584 8800	Facsimile	: +61-2-8784 8500
Project	: VALES POINT GME 2015	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 0300379	Date Samples Received	: 21-May-2015
C-O-C number	: ----	Date Analysis Commenced	: 22-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	Issue Date	: 29-May-2015
Site	: ----	No. of samples received	: 10
Quote number	: ----	No. of samples analysed	: 10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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 ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Pabi Subba	Senior Organic Chemist	Sydney Organics
Shobhna Chandra	Metals Coordinator	Sydney Inorganics

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

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 108454)									
ES1522511-004	Anonymous	EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.018	0.018	0.00	0% - 50%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.979	1.01	2.97	0% - 20%
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1522365-001	Anonymous	EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.010	0.010	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.041	0.039	4.16	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 107564)									
EP1510227-008	Anonymous	EG094A-F: Cobalt	7440-48-4	0.1	µg/L	0.2	0.2	0.00	No Limit
		EG094A-F: Lead	7439-92-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EG094A-F: Arsenic	7440-38-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG094A-F: Copper	7440-50-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG094A-F: Manganese	7439-96-5	0.5	µg/L	46.8	46.9	0.304	0% - 20%
		EG094A-F: Nickel	7440-02-0	0.5	µg/L	0.6	0.6	0.00	No Limit
		EG094A-F: Zinc	7440-66-6	1	µg/L	4	4	0.00	No Limit
ES1522415-002	Anonymous	EG094A-F: Cobalt	7440-48-4	0.1	µg/L	16.4	16.7	1.99	0% - 20%
		EG094A-F: Lead	7439-92-1	0.1	µg/L	15.4	15.8	2.78	0% - 20%
		EG094A-F: Arsenic	7440-38-2	0.2	µg/L	2.1	2.2	0.00	0% - 50%
		EG094A-F: Copper	7440-50-8	0.5	µg/L	36.7	36.9	0.665	0% - 20%
		EG094A-F: Manganese	7439-96-5	0.5	µg/L	406	403	0.742	0% - 20%
		EG094A-F: Nickel	7440-02-0	0.5	µg/L	43.0	43.5	1.23	0% - 20%
		EG094A-F: Zinc	7440-66-6	1	µg/L	118	120	1.97	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 107565)									
EP1510227-008	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
ES1522415-002	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	1.9	1.8	5.73	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 110201)									
ES1522416-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 110201) - continued									
ES1522741-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 110366)									
ES1522415-003	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1522573-018	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 110201)									
ES1522416-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1522741-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 110366)									
ES1522415-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1522573-018	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 110201)									
ES1522416-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	1	1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1522741-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP080: BTEXN (QC Lot: 110366)									
ES1522415-003	Anonymous	EP080: Benzene	71-43-2	1	µg/L	1	2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1522573-018	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP125A: Monocyclic Aromatic Hydrocarbons (QC Lot: 106988)									
ES1522418-004	VH_X_MW08	EP125: 1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L	2.48	2.52	1.50	0% - 20%
		EP125: 1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L	0.57	0.60	5.56	0% - 50%
		EP125: Styrene	100-42-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1522255-002	Anonymous	EP125: 1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L	0.11	0.12	0.00	No Limit
		EP125: 1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Styrene	100-42-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP125E: Halogenated Aliphatic Compounds (QC Lot: 106988)									
ES1522418-004	VH_X_MW08	EP125: Hexachlorobutadiene	87-68-3	0.04	µg/L	<0.04	<0.04	0.00	No Limit
		EP125: Carbon Tetrachloride	56-23-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Tetrachloroethene	127-18-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Trichloroethene	79-01-6	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: 1.1.1-Trichloroethane	71-55-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.1-Dichloroethane	75-34-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.1-Dichloroethene	75-35-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichloroethane	107-06-2	0.1	µg/L	0.2	0.2	0.00	No Limit
		EP125: cis-1.2-Dichloroethene	156-59-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: trans-1.2-Dichloroethene	156-60-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: Bromochloromethane	74-97-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Chloroethane	75-00-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Dichlorodifluoromethane	75-71-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Trichlorofluoromethane	75-69-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Vinyl chloride	75-01-4	0.5	µg/L	<0.3	<0.3	50.0	No Limit
		EP125: Dichloromethane	75-09-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP125: Bromomethane	74-83-9	2	µg/L	<0.5	<0.5	120	No Limit
ES1522255-002	Anonymous	EP125: Hexachlorobutadiene	87-68-3	0.04	µg/L	<0.04	<0.04	0.00	No Limit
		EP125: Carbon Tetrachloride	56-23-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Tetrachloroethene	127-18-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: Trichloroethene	79-01-6	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP125: 1.1.1-Trichloroethane	71-55-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.1-Dichloroethane	75-34-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.1-Dichloroethene	75-35-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichloroethane	107-06-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: cis-1.2-Dichloroethene	156-59-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: trans-1.2-Dichloroethene	156-60-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: Bromochloromethane	74-97-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Chloroethane	75-00-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Dichlorodifluoromethane	75-71-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Trichlorofluoromethane	75-69-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP125: Vinyl chloride	75-01-4	0.5	µg/L	<0.3	<0.3	50.0	No Limit
		EP125: Dichloromethane	75-09-2	1	µg/L	<1.0	<1.0	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP125E: Halogenated Aliphatic Compounds (QC Lot: 106988) - continued									
ES1522255-002	Anonymous	EP125: Bromomethane	74-83-9	2	µg/L	<0.5	<0.5	120	No Limit
EP125F: Halogenated Aromatic Compounds (QC Lot: 106988)									
ES1522418-004	VH_X_MW08	EP125: 1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichlorobenzene	95-50-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 1.3-Dichlorobenzene	541-73-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 1.4-Dichlorobenzene	106-46-7	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 2-Chlorotoluene	95-49-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 4-Chlorotoluene	106-43-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: Bromobenzene	108-86-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Chlorobenzene	108-90-7	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Benzylchloride	100-44-7	0.2	µg/L	<0.2	<0.2	0.00	No Limit
ES1522255-002	Anonymous	EP125: 1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 1.2-Dichlorobenzene	95-50-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 1.3-Dichlorobenzene	541-73-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 1.4-Dichlorobenzene	106-46-7	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: 2-Chlorotoluene	95-49-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: 4-Chlorotoluene	106-43-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP125: Bromobenzene	108-86-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Chlorobenzene	108-90-7	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Benzylchloride	100-44-7	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EP125G: Trihalomethanes (QC Lot: 106988)									
ES1522418-004	VH_X_MW08	EP125: Bromodichloromethane	75-27-4	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Bromoform	75-25-2	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Chloroform	67-66-3	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Dibromochloromethane	124-48-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
ES1522255-002	Anonymous	EP125: Bromodichloromethane	75-27-4	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Bromoform	75-25-2	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Chloroform	67-66-3	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP125: Dibromochloromethane	124-48-1	0.1	µg/L	<0.10	<0.10	0.00	No Limit
EP125H: Naphthalene (QC Lot: 106988)									
ES1522418-004	VH_X_MW08	EP125: Naphthalene	91-20-3	0.05	µg/L	1.00	0.95	4.78	0% - 50%
ES1522255-002	Anonymous	EP125: Naphthalene	91-20-3	0.05	µg/L	0.07	0.07	0.00	No Limit
EP125L: Methyl t-butyl ether (QC Lot: 106988)									
ES1522418-004	VH_X_MW08	EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L	0.6	0.6	0.00	No Limit
ES1522255-002	Anonymous	EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L	<0.1	<0.1	0.00	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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 108454)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	87.6	79	121
EG020A-T: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	92.7	84	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	102	83	117
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.0	84	116
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	94.4	85	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.2	84	116
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	93.1	68	128
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	90.6	77	117
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 107564)								
EG094A-F: Arsenic	7440-38-2	0.2	µg/L	<0.2	10 µg/L	94.8	75	129
EG094A-F: Cobalt	7440-48-4	0.1	µg/L	<0.1	10 µg/L	87.8	81	119
EG094A-F: Copper	7440-50-8	0.5	µg/L	<0.5	10 µg/L	94.2	84	114
EG094A-F: Lead	7439-92-1	0.1	µg/L	<0.1	10 µg/L	92.1	74	118
EG094A-F: Manganese	7439-96-5	0.5	µg/L	<0.5	10 µg/L	98.0	84	114
EG094A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	95.4	85	117
EG094A-F: Zinc	7440-66-6	1	µg/L	<1	10 µg/L	89.8	83	121
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 107565)								
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	96.9	70	122
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106395)								
EP071-SV: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	100	59	129
EP071-SV: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	95.9	71	131
EP071-SV: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	97.4	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 106457)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	112	59	129
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	101	71	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	88.2	62	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 110201)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	79.3	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 110366)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	103	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106395)								
EP071-SV: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	97.6	59	131
EP071-SV: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	95.7	74	138
EP071-SV: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	104	67	127

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 106457)								
EP071: >C10 - C16 Fraction	>C10_C16	100	µg/L	<100	2500 µg/L	106	59	131
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	97.2	74	138
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	83.5	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 110201)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	78.3	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 110366)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	103	75	127
EP080: BTEXN (QCLot: 110201)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	92.4	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	102	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	102	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	100	70	124
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.6	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	104	65	129
EP080: BTEXN (QCLot: 110366)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	117	70	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	98.6	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	99.5	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	107	70	124
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.8	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	97.9	65	129
EP125A: Monocyclic Aromatic Hydrocarbons (QCLot: 106988)								
EP125: 1.2.4-Trimethylbenzene	95-63-6	0.05	µg/L	<0.05	1 µg/L	99.3	69	129
EP125: 1.3.5-Trimethylbenzene	108-67-8	0.05	µg/L	<0.05	1 µg/L	99.6	68	124
EP125: Styrene	100-42-5	0.05	µg/L	<0.05	1 µg/L	100	68	128
EP125E: Halogenated Aliphatic Compounds (QCLot: 106988)								
EP125: 1.1.1-Trichloroethane	71-55-6	0.1	µg/L	<0.1	1 µg/L	99.0	76	122
EP125: 1.1-Dichloroethane	75-34-3	0.1	µg/L	<0.1	1 µg/L	97.8	77	123
EP125: 1.1-Dichloroethene	75-35-4	0.1	µg/L	<0.1	1 µg/L	92.7	75	121
EP125: 1.2-Dichloroethane	107-06-2	0.1	µg/L	<0.1	1 µg/L	97.2	70	132
EP125: Bromochloromethane	74-97-5	0.5	µg/L	<0.5	1 µg/L	96.6	80	124
EP125: Bromomethane	74-83-9	2	µg/L	<2.0	10 µg/L	104	62	126
EP125: Carbon Tetrachloride	56-23-5	0.05	µg/L	<0.05	1 µg/L	95.2	77	121
EP125: Chloroethane	75-00-3	0.5	µg/L	<0.5	10 µg/L	86.3	71	125
EP125: cis-1.2-Dichloroethene	156-59-2	0.1	µg/L	<0.1	1 µg/L	99.5	77	121
EP125: Dichlorodifluoromethane	75-71-8	0.5	µg/L	<0.5	10 µg/L	79.3	69	127

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP125E: Halogenated Aliphatic Compounds (QCLot: 106988) - continued								
EP125: Dichloromethane	75-09-2	1	µg/L	<1.0	1 µg/L	96.7	73	129
EP125: Hexachlorobutadiene	87-68-3	0.04	µg/L	<0.04	1 µg/L	93.5	65	129
EP125: Tetrachloroethene	127-18-4	0.05	µg/L	<0.05	1 µg/L	101	76	126
EP125: trans-1.2-Dichloroethene	156-60-5	0.1	µg/L	<0.1	1 µg/L	96.0	77	121
EP125: Trichloroethene	79-01-6	0.05	µg/L	<0.05	1 µg/L	99.5	78	122
EP125: Trichlorofluoromethane	75-69-4	0.5	µg/L	<0.5	10 µg/L	92.2	66	128
EP125: Vinyl chloride	75-01-4	0.5	µg/L	<0.5	10 µg/L	89.6	72	124
EP125F: Halogenated Aromatic Compounds (QCLot: 106988)								
EP125: 1.2.3-Trichlorobenzene	87-61-6	0.1	µg/L	<0.1	1 µg/L	104	71	123
EP125: 1.2.4-Trichlorobenzene	120-82-1	0.1	µg/L	<0.1	1 µg/L	107	71	123
EP125: 1.2-Dichlorobenzene	95-50-1	0.1	µg/L	<0.10	1 µg/L	101	72	122
EP125: 1.3-Dichlorobenzene	541-73-1	0.1	µg/L	<0.10	1 µg/L	96.1	66	128
EP125: 1.4-Dichlorobenzene	106-46-7	0.1	µg/L	<0.10	1 µg/L	102	72	122
EP125: 2-Chlorotoluene	95-49-8	0.1	µg/L	<0.1	1 µg/L	102	68	128
EP125: 4-Chlorotoluene	106-43-4	0.1	µg/L	<0.1	1 µg/L	103	71	123
EP125: Benzylchloride	100-44-7	0.2	µg/L	<0.2	1 µg/L	122	66	126
EP125: Bromobenzene	108-86-1	0.1	µg/L	<0.10	1 µg/L	100.0	74	122
EP125: Chlorobenzene	108-90-7	0.1	µg/L	<0.10	1 µg/L	101	74	122
EP125G: Trihalomethanes (QCLot: 106988)								
EP125: Bromodichloromethane	75-27-4	0.1	µg/L	<0.10	1 µg/L	101	77	125
EP125: Bromoform	75-25-2	0.1	µg/L	<0.10	1 µg/L	101	75	127
EP125: Chloroform	67-66-3	0.1	µg/L	<0.10	1 µg/L	99.8	80	120
EP125: Dibromochloromethane	124-48-1	0.1	µg/L	<0.10	1 µg/L	99.7	78	122
EP125H: Naphthalene (QCLot: 106988)								
EP125: Naphthalene	91-20-3	0.05	µg/L	<0.05	1 µg/L	103	70	122
EP125L: Methyl t-butyl ether (QCLot: 106988)								
EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	0.1	µg/L	<0.1	1 µg/L	99.4	74	124
EP132A: Phenolic Compounds (QCLot: 106435)								
EP132: 2.3.4.6-Tetrachlorophenol	58-90-2	0.1	µg/L	<0.1	2 µg/L	97.6	52	132
EP132: 2.4.5-Trichlorophenol	95-95-4	0.1	µg/L	<0.1	2 µg/L	100	63	125
EP132: 2.4.6-Trichlorophenol	88-06-2	0.1	µg/L	<0.1	2 µg/L	99.8	63	129
EP132: 2.4-Dichlorophenol	120-83-2	0.1	µg/L	<0.1	2 µg/L	98.8	66	126
EP132: 2.4-Dimethylphenol	105-67-9	0.1	µg/L	<0.1	2 µg/L	94.2	39	139
EP132: 2.6-Dichlorophenol	87-65-0	0.1	µg/L	<0.1	2 µg/L	96.8	66	126
EP132: 2-Chlorophenol	95-57-8	0.05	µg/L	<0.05	2 µg/L	101	74	119
EP132: 2-Nitrophenol	88-75-5	0.1	µg/L	<0.1	2 µg/L	103	47	145
EP132: 4-Chloro-3-methylphenol	59-50-7	0.05	µg/L	<0.05	2 µg/L	93.4	64	124
EP132: 4-Nitrophenol	100-02-7	0.1	µg/L	<0.1	2 µg/L	59.6	22	142

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP132A: Phenolic Compounds (QCLot: 106435) - continued								
EP132: Hexachlorophene	70-30-4	0.1	µg/L	<0.1	2 µg/L	102	34	138
EP132: m-Cresol	108-39-4	0.1	µg/L	<0.1	2 µg/L	77.1	42	118
EP132: o-Cresol	95-48-7	0.1	µg/L	<0.1	2 µg/L	73.3	50	122
EP132: p-Cresol	106-44-5	0.1	µg/L	<0.1	2 µg/L	74.6	33	119
EP132: Pentachlorophenol	87-86-5	0.05	µg/L	<0.05	2 µg/L	89.4	32	138
EP132: Phenol	108-95-2	0.1	µg/L	<0.1	2 µg/L	56.8	27	59

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.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG020T: Total Metals by ICP-MS (QCLot: 108454)							
ES1522388-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	111	70	130
		EG020A-T: Cobalt	7440-48-4	1 mg/L	115	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	111	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	112	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	112	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	119	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	109	70	130
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 107564)							
EP1510227-008	Anonymous	EG094A-F: Arsenic	7440-38-2	50 µg/L	108	70	130
		EG094A-F: Cobalt	7440-48-4	50 µg/L	102	70	130
		EG094A-F: Copper	7440-50-8	50 µg/L	108	70	130
		EG094A-F: Lead	7439-92-1	50 µg/L	113	70	130
		EG094A-F: Manganese	7439-96-5	50 µg/L	118	70	130
		EG094A-F: Nickel	7440-02-0	50 µg/L	106	70	130
		EG094A-F: Zinc	7440-66-6	50 µg/L	106	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 110201)							
ES1522416-002	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	96.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 110366)							
ES1522415-003	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	# 133	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 110201)							
ES1522416-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	93.2	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 110366)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 110366) - continued							
ES1522415-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	128	70	130
EP080: BTEXN (QCLot: 110201)							
ES1522416-002	Anonymous	EP080: Benzene	71-43-2	25 µg/L	86.0	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	111	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	111	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	113	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	109	70	130
		EP080: Toluene	108-88-3	25 µg/L	106	70	130
EP080: BTEXN (QCLot: 110366)							
ES1522415-003	Anonymous	EP080: Benzene	71-43-2	25 µg/L	89.3	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	104	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	104	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	115	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	103	70	130
		EP080: Toluene	108-88-3	25 µg/L	103	70	130
EP125A: Monocyclic Aromatic Hydrocarbons (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: 1.2.4-Trimethylbenzene	95-63-6	1 µg/L	78.5	70	130
		EP125: 1.3.5-Trimethylbenzene	108-67-8	1 µg/L	84.0	70	130
		EP125: Styrene	100-42-5	1 µg/L	74.6	70	130
EP125E: Halogenated Aliphatic Compounds (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: 1.1.1-Trichloroethane	71-55-6	1 µg/L	100	70	130
		EP125: 1.1-Dichloroethane	75-34-3	1 µg/L	105	70	130
		EP125: 1.1-Dichloroethene	75-35-4	1 µg/L	93.1	70	130
		EP125: 1.2-Dichloroethane	107-06-2	1 µg/L	109	70	130
		EP125: Bromochloromethane	74-97-5	1 µg/L	107	70	130
		EP125: Bromomethane	74-83-9	10 µg/L	74.4	70	130
		EP125: Carbon Tetrachloride	56-23-5	1 µg/L	100	70	130
		EP125: Chloroethane	75-00-3	10 µg/L	98.0	70	130
		EP125: cis-1.2-Dichloroethene	156-59-2	1 µg/L	104	70	130
		EP125: Dichlorodifluoromethane	75-71-8	10 µg/L	77.7	70	130
		EP125: Dichloromethane	75-09-2	1 µg/L	70.2	70	130
		EP125: Hexachlorobutadiene	87-68-3	1 µg/L	94.2	70	130
		EP125: Tetrachloroethene	127-18-4	1 µg/L	74.8	70	130
		EP125: trans-1.2-Dichloroethene	156-60-5	1 µg/L	101	70	130
		EP125: Trichloroethene	79-01-6	1 µg/L	82.9	70	130
		EP125: Trichlorofluoromethane	75-69-4	10 µg/L	94.5	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP125E: Halogenated Aliphatic Compounds (QCLot: 106988) - continued							
ES1522428-004	Anonymous	EP125: Vinyl chloride	75-01-4	10 µg/L	88.3	70	130
EP125F: Halogenated Aromatic Compounds (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: 1.2.3-Trichlorobenzene	87-61-6	1 µg/L	93.5	70	130
		EP125: 1.2.4-Trichlorobenzene	120-82-1	1 µg/L	95.8	70	130
		EP125: 1.2-Dichlorobenzene	95-50-1	1 µg/L	97.3	70	130
		EP125: 1.3-Dichlorobenzene	541-73-1	1 µg/L	94.5	70	130
		EP125: 1.4-Dichlorobenzene	106-46-7	1 µg/L	91.8	70	130
		EP125: 2-Chlorotoluene	95-49-8	1 µg/L	108	70	130
		EP125: 4-Chlorotoluene	106-43-4	1 µg/L	100	70	130
		EP125: Benzylchloride	100-44-7	1 µg/L	71.4	70	130
		EP125: Bromobenzene	108-86-1	1 µg/L	100	70	130
		EP125: Chlorobenzene	108-90-7	1 µg/L	97.6	70	130
EP125G: Trihalomethanes (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: Bromodichloromethane	75-27-4	1 µg/L	106	70	130
		EP125: Bromoform	75-25-2	1 µg/L	101	70	130
		EP125: Chloroform	67-66-3	1 µg/L	101	70	130
		EP125: Dibromochloromethane	124-48-1	1 µg/L	102	70	130
EP125H: Naphthalene (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: Naphthalene	91-20-3	1 µg/L	88.0	70	130
EP125L: Methyl t-butyl ether (QCLot: 106988)							
ES1522428-004	Anonymous	EP125: Methyl tert-butyl ether (MTBE)	1634-04-4	1 µg/L	75.5	70	130

QA/QC Compliance Assessment for DQO Reporting

Work Order	: **ES1522418**	Page	: 1 of 5
Client	: **ENVIRO RESOURCES MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: MR JOHN EWING	Telephone	: +61 2 8784 8555
Project	: VALES POINT GME 2015	Date Samples Received	: 21-May-2015
Site	: ----	Issue Date	: 29-May-2015
Sampler	: AMY WILLIAMS, DANE BROOKES, JACK GRANT, JANENE DEVEREUX	No. of samples received	: 10
Order number	: 0300379	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP080/071: Total Petroleum Hydrocarbons	ES1522415--003	Anonymous	**C6 - C9 Fraction**	----	133 %	70-130%	**Recovery greater than upper data quality objective**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	6	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	5	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	0	6	0.00	10.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)					
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	0	6	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	0	5	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	0	6	0.00	5.00	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing 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: **WATER**

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

Method / *Container* / Client Sample ID(s)		*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)								
R01_190515_AW,	R01_200515_AW	**21-May-2015**	**26-May-2015**	17-Nov-2015	✓	**26-May-2015**	17-Nov-2015	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094A-F)								
VH_X_MW01,	VH_X_MW08	**21-May-2015**	**----**	----	----	**25-May-2015**	17-Nov-2015	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F)								
VH_X_MW01,	VH_X_MW08	**21-May-2015**	**----**	----	----	**25-May-2015**	17-Nov-2015	✓

Matrix: **WATER**

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
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
R01_190515_AW, R01_200515_AW, VH_X_MW08	**21-May-2015**	**22-May-2015**	28-May-2015	✓	**25-May-2015**	01-Jul-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071-SV)							
VI_MW01, VM_MW04, D01_202515_AW, VB_MW01	**21-May-2015**	**22-May-2015**	28-May-2015	✓	**25-May-2015**	01-Jul-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
TRIP BLANK, TRIP SPIKE	**18-May-2015**	**28-May-2015**	01-Jun-2015	✓	**28-May-2015**	01-Jun-2015	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
R01_190515_AW, R01_200515_AW, VH_X_MW08	**21-May-2015**	**27-May-2015**	04-Jun-2015	✓	**27-May-2015**	04-Jun-2015	✓
EP125E: Halogenated Aliphatic Compounds							
Amber VOC Vial - Sulfuric Acid (EP125)							
VH_X_MW08	**21-May-2015**	**----**	----	----	**23-May-2015**	04-Jun-2015	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP132)							
R01_190515_AW, R01_200515_AW, VH_X_MW08	**21-May-2015**	**22-May-2015**	28-May-2015	✓	**25-May-2015**	01-Jul-2015	✓

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(were) 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: **WATER**

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)							
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	6	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	**10.53**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	5	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	EP071-SV	0	6	**0.00**	**10.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	18	**11.11**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	2	4	**50.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	EP071-SV	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	EP071-SV	1	6	**16.67**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	1	4	**25.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	0	6	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	**5.26**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	0	5	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fractions Only	EP071-SV	0	6	**0.00**	**5.00**	×	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
VOC by HS GCMS in SIM Mode	EP125	1	4	**25.00**	**5.00**	✓	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
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45 um filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH - Semivolatile Fractions Only	EP071-SV	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
VOC by HS GCMS in SIM Mode	EP125	WATER	In-house: A sample is saturated with sodium chloride and achieving thermodynamic equilibrium between the water and gas phase in a closed thermostatted vessel. A reproducible headspace gas is extracted from the vial and injected into a gas chromatograph and the analyte of interest is seperated by means of gas/liquid partition chromatography and quantified using automated static headspace GCMS in SIM mode.
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	USEPA 3640 (GPC Cleanup), 8270 GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)

Annex F

Incident Register

ENVINC	60246240	VPSENV	Oil leak. Leaking pressure gauge on U5 jacking oil tank failed, >20l leaked into green drain.	Leaking gauge isolated to prevent further spilling, WO 60246216 raised for repairs, completed 17.07.14. A/Environment Manager CC conducted inspection of Oil & Grit Pit B, oil present and is being extracted from the pit. No excessive oil in Pit A. No discharge to canal system, no environmental impacts.	8/7/2014	17/7/2014	007	Event Type	EI3
							009	Time	10:30 AM
ENVINC	60249519	VPSENV	Fuel spill. Escape of approximately 20L of fuel oil at the start of unloading from tanker.	The tanker driver stopped unloading immediately and isolated spill from green drain using spill kit material. Clean up of the area started immediately by warehouse staff, spill kit to be replenished by warehouse staff. There is currently valve replacement taking place at the fuel oil tanks and it appears that a flange was not fully tightened or checked before being placed in service. Incident Notification Report no.304162 has been raised.	3/9/2014	3/9/2014	007	Event Type	EI3
							009	Time	2:00PM
ENVINC	60249810	VPSENV	Boiler fuel oil leak. The Boiler Fuel Tank unloading line train 'A' purge valve was faulty resulting in a discharge of fuel oil to the fuel oil trap. The discharge was contained in the oil trap	Incident Notification Report No. 304167 raised. Corrective recommendations adopted, Incident report complete 24.10.2014	3/9/2014	10/9/2014	007	Event Type	EI3
							009	Time	12:00
ENVINC	60250184	VPSENV	Lube oil leak. Outage contract employees noticed that oil was draining from 6A ID Fan, at the non-drive end. A bleed/drain valve was open, it was closed and Operating staff notified and the lube oil pump was stopped.	Incident Notification Report No. 304174 raised. Corrective recommendations adopted, Incident Report complete 19.09.2014.	12/9/2014	15/9/2014	007	Event Type	EI3
							009	Time	10:15
ENVINC	60250746	VPSENV	Oil leak. Pressure fitting blew off Unit 5 Main Turbine aux oil pump pressure transmitter. The system had been in service for a number of hours before it failed. Maintenance staff heard it happen and the system was shut down. A small quantity of	Incident Notification Report No. 304196 raised. Corrective recommendations adopted, Incident Report complete 24.10.2014.	26/9/2014	26/9/2014	007	Event Type	EI3
							009	Time	18:00
ENVINC	60253092	VPSENV	Dust escape from silo. At the Morgan Ash facitity located within the station site. A truck with safety rails up, was manouvering under a fly ash silo. The truck filling sock was struck by the safety rails cracking open the bottom section of the pipework	Emergency Services responded, The situation was assessed, The fly ash was contained on site, Clean-up operations completed, Incident Notification Report 304211 raised. Work Orders raised 19/11/2014 as a result of Incident Notification recommendations: 60254472 Contract Manager, 60254474 Commercial Manager and 60254475 Environment Manager, (complete 16/01/15).	30/10/2014	13/3/2015	007	Event Type	EI3
							009	Time	05:50AM

Annex G

EPA Correspondence

10 February 2015

Head Regional Operations Unit - Hunter
NSW Environment Protection Authority
PO Box 488G
NEWCASTLE NSW 2300

By email: hunter.region@epa.nsw.gov.au

Attention: Ms Rebecca Scrivener

RE: VALES POINT POWER STATION ENVIRONMENTAL SITE ASSESSMENT

Dear Rebecca

I refer to our recent conversation regarding the environmental site assessment (ESA) undertaken by consultants ERM at the Vales Point power station. The primary objective of the ESA was to gather soil, sediment, surface water and groundwater data in order to develop a baseline assessment of environmental conditions at the Vales Point site, and within surrounding receiving environments, as due diligence for the potential sale of the power station owned and operated by Delta Electricity (Delta).

Now that the sale process for the Delta electricity generating assets has been completed, with the ownership of Vales Point Power Station remaining with Delta for the foreseeable future, Delta takes this opportunity to provide the EPA a summary of the ESA findings and Delta's decision regarding the duty to notify in accordance with the "*Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*" (the Guidelines), which have been published under section 105 of the *Contaminated Land management Act 1997* (the CLM Act).

Summary of ESA findings at Vales Point

The key issues identified by the ESA conducted at the Vales Point site and surrounding environment included:

1. traces of benzene in groundwater in the Vales Point vehicle refuelling area (VRA) and down gradient of an old asbestos landfill at Vales Point ash dam;
2. firefighting chemical traces in groundwater along the old A-Station boundary and the chlorine plant;
3. slight traces of total recoverable hydrocarbons, polycyclic aromatic hydrocarbons and metals in some individual soil samples across the site; and
4. slight traces of asbestos detected in individual shallow soil samples collected from within the transformer area, chlorine plant and the old asbestos landfill at concentrations slightly in excess of the adopted human health screening values in the Guidelines.

The ESA also identified existing known issues regarding the slightly elevated selenium in sediments of Wyee Creek and Mannering Bay and the slightly elevated metal concentrations in some of the groundwater wells possibly above 'background', which may be potentially associated with the Vales Point ash dam and is currently being managed through a pollution reduction program (PRP) that is an existing condition of the Vales Point environment protection licence (EPL 761).

The levels of the pollutants identified above marginally exceeded the CLM Act & Guidelines screening levels adopted for the baseline contamination study, which are considered unlikely to represent a significant risk to human health and/or the environment given the continued use of the Vales Point site as a power station and the ongoing management of the site as required by the *Protection of the Operations Environment Act 1997* (the POEO Act) and the Vales Point EPL.

With respect to the asbestos findings, Delta has included the locations of asbestos detected by ERM in its Asbestos Register for future management as per the Delta procedure for asbestos management.

With respect to the assessment of onsite soils at Vales Point, the measured concentrations of hydrocarbons and metals in excess of the screening levels were all located in fenced and operational areas either covered with hardstand or in areas with only limited vegetation.

With respect to the assessment of onsite groundwater at the Vales Point site, the groundwater beneath the site is not extracted for potable use and the impacts are not considered to represent a significant potential risk to human health under the ongoing use of the site as a Power Station.

The CLM Act Notification Requirements

The CLM Act establishes a legal framework that gives the EPA powers to require the assessment and remediation of sites where contamination is significant enough to warrant regulation. The EPA published the current Guidelines in 2009, which provide information on key aspects of the duty to report contamination under section 60 of the CLM Act.

According to the Guidelines, the EPA *"uses its powers under the CLM Act to deal with sites where the contamination is significant enough to warrant regulation. The contamination of these sites is generally posing an unacceptable risk to human health or the environment, given the site's current or approved use, and needs to be addressed immediately."*

For groundwater, the Guidelines suggest notification to the EPA is required where:

- the contaminant has entered the groundwater; and
- the contaminant is above the specified concentration in the guidelines; and
- the concentration of the contaminant will foreseeably continue to remain above the specified concentration.

The Guidelines also state that the duty to report is not intended to capture the notification of sites without off-site contamination where:

- the on-site contamination is not likely to migrate to an adjoining property; and
- any on-site contamination has been adequately addressed by the planning process under *the Environment Planning and Assessment Act 1979* (the EP&A Act).

In addition, the Guidelines provide specific examples of where *"a person would not be expected to seek advice"* for the purposes of section 60 of the CLM Act, being the duty to report. The example in the Guidelines relevant to the Vales Point site is provided in Example 7 and reproduced in the text box below.

Example 7:

- The site is currently used for industrial purposes.
- There are aboveground and underground storage systems at the site.
- Contamination is present in the groundwater at concentrations above the triggers but is confined within the boundaries of the site.
- A detailed site investigation has been conducted and the nature, degree and extent of contamination have thoroughly been defined.
- An appropriate OH&S Plan and EMP are being implemented for site users and visiting maintenance workers.
- The contaminants have been found not to pose on-site risks (for example, from vapour inhalation).
- Site investigations have confirmed that because the soils are of low permeability the contaminated groundwater is unlikely to move off site.
- Groundwater monitoring close to, or at, the hydraulic down-gradient site boundary continues to confirm that the contaminated groundwater will not migrate off site.

In July 2014, the EPA published draft Guidelines for comment, with the intent to replace the 2009 version. It is understood the EPA intends to gazette the new Guidelines in early 2015 and the revised Guidelines are not expected to impact Delta's findings regarding the duty to notify.

Duty to Report at the Vales Point Sites

Analysis of the ESA data by Delta suggests that there is no duty to report the contamination identified at the Vales Point sites under the CLM Act, as determined by reference to Example 7 from the Guidelines, whereby notification of the contamination is <u>not</u> required based on the following:

- the site is currently used for industrial purposes with above and below ground underground petroleum storage systems (UPSS) and this will continue to be the case for the foreseeable future;
- the findings from the ESA study identified that, even though some contamination has been found in wells above the trigger level for benzene, there is no on-site risk and the contamination is unlikely to move off-site based on the site boundary conditions evidenced in the ESA;
- it is believed the source of contamination at the Vales Point VRA is associated with an old UPSS, which has since been decommissioned, and the existing UPSS is being managed and monitored in accordance with the Vales Point EPL and POEO UPSS regulations;
- the benzene impacts are not considered significant enough to warrant remedial action and the contamination may naturally attenuate in time given the source has largely been removed;
- the soil and groundwater contamination identified is unlikely to represent a significant risk to human health and/or the environment; and
- management, monitoring and reporting of the Vales Point site will continue as required by the Vales Point EPL, as well as the Delta safety and environmental management systems.

Delta would welcome an opportunity to meet with the EPA, if requested, to discuss the findings in this letter. Thank you in anticipation of your consideration of this matter and if you have any questions or require further information please do not hesitate to contact me on (02) 9285 2776.

Yours sincerely

10/2/2015

Bryan Beudeker
Manager Environment

From: Davis, Kerrie <Kerrie.Davis@de.com.au>
Sent: Tuesday, 12 May 2015 10:15 AM
To: Peter Lavelle
Subject: FW: Delta advice on Environmental Site Assessments at Vales Point, Munmorah & Colongra

---

From: John Coffey [mailto:John.Coffey@epa.nsw.gov.au]
Sent: Wednesday, 4 March 2015 4:11 PM
To: Beudeker, Bryan
Cc: Rebecca Scrivener; Mitchell Bennett; Flood, Justin; Giselle Goloy
Subject: RE: Delta advice on Environmental Site Assessments at Vales Point, Munmorah & Colongra

Bryan

In response to your email, I can advise you as follows:

Vales Point Power Station
Your assessment of the duty to notify this site under provisions of s60 of the CLM Act are noted and your decision to not notify is accepted. No notification will be made on our EPA register is notified sites.

Munmorah Power Station
As with the Vales Point site, your assessment of the duty to notify this site under provisions of s60 of the CLM Act is you decision to not notify. Having said that, Delta has already notified this site under s60 in 2010 and this notification is recorded on our public web site. Based on our assessment, the identified contamination was to be managed under a PRP in the POEO EPL.

We will be following up with our Regional Operations colleagues and following on from that, we will draft a formal response.

Rgds

John Coffey
Major Projects Manager | Contaminated Sites | **NSW Environment Protection Authority** |
: (02) 9995 5621 |Mobile : 0411 722 674| : (02) 9995 6603| :John.Coffey@epa.nsw.gov.au |P.O. Box A290 Sydney South NSW 1232 |

From: Beudeker, Bryan [mailto:Bryan.Beudeker@de.com.au]
Sent: Wednesday, 4 March 2015 2:41 PM
To: Coffey John
Cc: Scrivener Rebecca; Bennett Mitchell; Flood, Justin
Subject: FW: Delta advice on Environmental Site Assessments at Vales Point, Munmorah & Colongra

Hi John

I am following up on our conversation yesterday, as suggested, regarding the attached the letters on the Vales Point and Munmorah site assessments and Delta's decision not to notify under the CLM Act.

Firstly, thank you for the positive feedback yesterday in relation to the advice provided by Delta in the attached correspondence. As discussed though, in order to close of this matter at our end, can you please confirm that the EPA is satisfied with the advice provided regarding the site assessments and what further action, if any, is required.

I look forward to your response and if you have any further questions, please do not hesitate to contact me.

Best regards

Bryan Beudeker
Manager Environment - Strategy & Compliance
T: 02 9285 2776 M: 0408 015 185
E: Bryan.Beudeker@de.com.au

From: Beudeker, Bryan
Sent: Tuesday, 10 February 2015 2:51 PM
To: hunter.region@epa.nsw.gov.au; rebecca.scrivener@EPA.NSW.GOV.AU
Cc: Flood, Justin (justin.flood@de.com.au); Callen, Anthony; Morris, David (David.Morris@de.com.au)
Subject: Delta advice on Environmental Site Assessments at Vales Point, Munmorah & Colongra

Attention: Rebecca Scrivener

Hi Rebecca

Further to our earlier discussion, please find attached Delta's advice regarding environmental site assessments conducted at the Central Coast power stations and our assessment on notification in accordance with the CLM Act Guidelines. Please note that while Delta believes there is not a duty to notify additional sites as detailed in the respective letters, Delta understands that Snowy Hydro intends to notify the EPA Site Contamination Group of the contamination at the old Munmorah fleet servicing area, which is on the parcel of land transferred to Snowy Hydro with the sale of Colongra.

Please don't hesitate to call if you have any questions or would like to discuss these letters further.

Regards
Bryan

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