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Eden Breakwater Wharf Extension Project Baseline Water Quality Data Collection



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Cover image: from www.edenmarina.com.au – View over Cocora Beach and Cattle Bay towards Snug Cove (Port of Eden)

EXECUTIVE SUMMARY

Baseline water quality monitoring was undertaken at six sites in Twofold Bay to describe ambient water quality conditions of Snug Cove to address potential water quality impacts by the construction and dredging works for the Eden Breakwater Wharf Extension project.

The six sites included the project site at Port of Eden (site W1), sensitive environmental receptors adjacent to the project site with the potential to be impacted by dredge plumes, and inner and outer Twofold Bay reference sites (sites BAY1 and BAY2). Sensitive environmental receptors include seagrass meadows at Cattle Bay (site CB1), mussel farm (site MU1) and rocky reef habitat (site W2) below middle head.

Based on the results of the water quality-monitoring program are the following conclusions and recommendations:

- Baseline water quality was characterised over eight monitoring rounds for a range of parameters, including turbidity, temperature, salinity, dissolved oxygen, electrical conductivity, pH, chlorophyll-*a*, total suspended solids, total and dissolved metals, nutrients, TPH, TRH, PAHs, BTEX and tributyltin.
 - Chlorophyll-*a* levels ranged between 1-6 µg/L
 - Water clarity as assessed by secchi depth had a median secchi depth of 4.3m and 80th percentile secchi depth of 3.0m;
 - Turbidity levels ranged between 0.3 – 0.9 ntu, with median turbidity of 0.6 ntu and 80th percentile turbidity of 1.7 ntu. Turbidity during the post-event storm sampling was up to four to ten times higher, ranging between 0.5-7.4 ntu.
 - Total suspended solids (TSS) ranged between 0.5 to 0.8 mg/L. Higher TSS concentrations between 2-3 mg/L were observed during post-event sampling.
 - Tributyltin was not detected.
 - Detected metals included arsenic, chromium, copper, nickel, lead and zinc. A small percentage of results for copper, lead and zinc exceeded ANZECC guidelines for ecosystem protection and/or aquaculture. This included detection of zinc, lead and copper above the ANZECC aquaculture guideline at the MU1 sampling site adjacent to the mussel aquaculture farm, and it is recommended that relevant stakeholders in this mussel farm be informed of these results.
 - Cadmium and mercury were not detected.
 - Organic parameters TPH, TRH, PAHs and BTEX were not detected, except for the 17/1/17 sampling round where PAHs and heavy end TRH and TPH fractions were reported at sites W1 and W2. The origin of the PAH, TRH and TPH results reported on 17/1/17 is currently unknown.
 - Total nitrogen (TN) generally exceeded the ANZECC guideline (<0.12 mg/L) with median values ranging between 0.13 – 0.145 mg/L. The 80th percentile TN value calculated for the dataset is 0.17 mg/L.

EXECUTIVE SUMMARY

- One of the eight rounds included post-event storm sampling, which provided some understanding of how water quality in Twofold Bay responds to stormy wind and sea conditions. The disturbance to water quality was most evident on color and clarity of water with green, cloudy waters observed at all monitoring sites. Water clarity was impacted at all sites as indicated by reduced secchi depth ranging between 1.4m at Cattle Bay (site CB1) to 4.5m at outer Twofold Bay (site BAY2), turbidity levels four to ten times greater than measured during the routine monitoring events, and generally higher TSS concentrations. All other parameters were relatively unaffected by the disturbance event in that parameter concentrations were reported at levels similar to the routine monitoring events, which were typically conducted in calm to moderate weather conditions.
- Other environmental events that occurred during the monitoring program include a bloom of the toxic dinoflagellate *Alexandrium fundyense*.

A summary of median values output for each analytical parameter is provided in **Table 9** (attached). It is recommended the water quality data be used to inform the development and implementation of mitigation measures to reduce potential water quality impacts from the project.

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LIST OF ABBREVIATIONS AND ACRONYMS

AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
As	Arsenic
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
Cd	Cadmium
COC	Chain of Custody
Cr	Chromium
Cu	Copper
DPI	NSW Department of Primary Industries
DI-Lands	NSW Department of Industry – Lands
EPA	Environment Protection Authority
GPS	Geographical Positioning System
Hg	Mercury
km	Kilometres
LOR	Limit Of Reporting
m	Metres
m ²	Metres squared
MHL	Manly Hydraulics Laboratory
MHWS	Mean High Water Springs
N/A	Not Applicable
NATA	National Association of Testing Authorities
Ni	Nickel
NTU	Nephelometric turbidity unit
OEH	Office of Environment and Heritage
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
QAQC	Quality Assurance Quality Control
RPD	Relative Percentage Difference
SAP	Sampling Analytical Plan
TN	Total Nitrogen
TP	Total Phosphorous
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
TSS	Total Suspended Solids
Zn	Zinc
WQ	Water Quality
WQOs	Water Quality Objectives

INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

Eden is an active working port, a premier location for whale watching and an emerging cruise ship destination (DI-Lands 2017). DI-Lands have identified the need to extend the existing Eden Breakwater Wharf and dredge the approach channel and berth pocket to allow cruise ships up to 325m in length to dock at the port. Before construction works or dredging can commence it is necessary to obtain regulatory approvals. An Environmental Impact Statement (EIS) was prepared in 2016 assessing potential impacts that the Breakwater Wharf Extension Project may have on the local environment (Advisian 2016). A requirement of the EIS included the need to assess potential impacts on water quality. However, during preparation of the EIS, it was noted that no historical or recent water quality data for Snug Cove was available and describing existing water quality conditions was reliant on limited datasets from other locations in Twofold Bay. Therefore, a baseline water quality-monitoring program was needed to address this data gap and inform the water quality assessment component of the EIS.

Specifically, the objectives of the baseline water quality data collection include:

- Undertake water quality monitoring (field sampling, analysis and reporting) to provide an understanding of the background ambient water quality conditions in the receiving waters relevant to the Eden Breakwater Wharf Extension Project;
- Understand the effect of weather events (e.g. heavy rainfall and metocean conditions) on local water quality conditions;
- Understand the effect of existing port operations on local water quality conditions; and
- Inform the development of a water quality monitoring program (by others) that will be implemented during dredging phases of the Eden Breakwater Wharf Extension Project. The monitoring program (by others) will be used to monitor potential environmental impacts relating to turbidity and other potential contaminants associated with re-suspended sediment and the use of construction equipment/vessels.

The monitoring program collected data from six sites including from the project site at Port of Eden (site W1), sensitive environmental receptors adjacent to the project site with the potential to be impacted by dredge plumes, and inner and outer Twofold Bay reference sites (sites BAY1 and BAY2). Sensitive environmental receptors include seagrass meadows at Cattle Bay (site CB1), mussel farm (site MU1) and rocky reef habitat (site W2) below middle head.

1.2 SCOPE OF WORK

The following scope of work was undertaken to meet project objectives:

- Preliminary project planning that included:
 - Preparation of Sampling and Analytical Plan (SAP) and Health, Safety Environment Plan (HSEP); and
 - Review of proposed sampling sites and SAP with DPI-Fisheries, DI-Lands and NSW EPA.

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- Six fortnightly routine WQ monitoring rounds and two 'Event Specific' monitoring rounds at six (6) sites over a 12-week period for a total of eight monitoring events that includes:
 - Vertical depth profiling with multi-parameter WQ sonde for *In-situ* measurement of physico-chemical WQ parameters (depth, temperature, salinity, turbidity, chlorophyll-*a*, dissolved oxygen, electrical conductivity, and pH); and
 - Collection of discrete water samples from two (2) targeted depths - surface (-1m depth) and bottom waters (1m above benthos) at each site.
- Laboratory analysis of marine water samples for a range of organic and inorganic parameters; and
- Preparation of this report that summarises data trends and presents key findings.

1.3 ENVIRONMENTAL GUIDELINES AND STANDARDS

The monitoring program was designed and conducted in accordance with guidance provided in *Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales* (DEC 2004) and AS 5667.1:1998 *Water Quality Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples* (Standards Australia 1998). The monitoring program was reviewed by NSW EPA and DPI-Fisheries prior to commencing works.

1.4 WATER QUALITY GUIDELINES AND OBJECTIVES

Relevant water quality guidelines and objectives that apply to coastal waters of Twofold Bay include *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC/ARMCANZ 2000) and *Marine Water Quality Objectives for NSW Ocean Waters - South Coast* (DEC 2005). Water quality data collected in this monitoring program was assessed against criteria set out in the following water quality objectives (WQOs):

- *Protection of Marine Aquatic Ecosystems in SE Australia* (Table 3.3.2 in ANZECC 2000);
- *Toxicant Levels for 95% Species Protection in Marine Waters* (Table 3.4.1 in ANZECC 2000);
- *Physico-chemical Stressor and Toxicant guidelines for the protection of aquaculture species* (Tables 4.4.2 & 4.4.3 in ANZECC 2000); and
- *Primary Contact Recreation* (DEC 2005).

A summary of the analytical parameters, limits of reporting and assessment criteria for each of the WQOs where relevant is provided in **Table 1**.

JN16149 Baseline WQ Data Collection - Eden Wharf Extension Project
Table 1. Summary of analytical parameters, limits of reporting and assessment criteria

Parameter	Unit	Limit of Reporting (LOR)	Aquatic Ecosystems ¹	Toxicants in Marine Waters - 95% species protection ²	Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species ³	Primary Contact Recreation ⁴
PHYSICO-CHEMICAL - Field Measured Parameters						
DO	%	0.1	90 - 110	-	-	-
DO	mg/L	0.01	-	-	>5	-
Turbidity	ntu	0.1	0.5-10	-	-	-
Secchi Depth	m	0.1	-	-	-	≥1.6
pH	pH unit	0.01	8.0 - 8.4	-	6.0-9.0	-
Salinity	ppt	-	-	-	-	-
Conductivity	µS/cm	-	-	-	-	-
Temperature	°C	0.01	-	-	-	-
PHYSICO-CHEMICAL - Lab Measured Parameters						
Suspended Solids (SS)	mg/L	2	-	-	-	-
Turbidity	ntu	0.1	0.5-10	-	-	-
NUTRIENTS						
Ammonia as N	mg/L	0.02	-	0.91	<0.1	-
Ammonium (NH ₄ ⁺) ⁶	mg/L	0.02	0.02	-	-	-
Total Nitrogen	mg/L	0.05	0.12	-	-	-
Total Phosphorus	mg/L	0.005	0.025	-	-	-
Chlorophyll a	µg/L	1	1	-	-	-
METALS						
Arsenic (As)	µg/L	0.5	-	-	<30	-
Cadmium (Cd)	µg/L	0.2	-	5.5	<0.5-5	-
Chromium (Cr)	µg/L	0.5	-	27.4	<20	-
Copper (Cu)	µg/L	1	-	1.3	<5	-
Nickel (Ni)	µg/L	0.2	-	70	<100	-
Lead (Pb)	µg/L	0.5	-	4.4	<1-7	-
Zinc (Zn)	µg/L	5	-	15	<5	-
Mercury (Hg)	µg/L	0.04	-	0.4	<1	-
Tributyltin	µg/L	0.002	-	0.006	<0.01	-
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)						
Naphthalene	µg/L	1	-	70	-	-

Note
¹ WQOs for protection of Marine Aquatic Ecosystems in South-East Australia (ANZECC/ARMCANZ 2000 - Table 3.3.2)

² Toxicant guideline - 95% species protection in marine waters (ANZECC/ARMCANZ 2000 - Table 3.4.1)

³ Physico-chemical Stressor and Toxicant guidelines for the protection of aquaculture species (ANZECC/ARMCANZ 2000 - Tables 4.4.2 & 4.4.3)

⁴ Refer Marine Water Quality Objectives for NSW Ocean Waters - South Coast (DEC 2005)

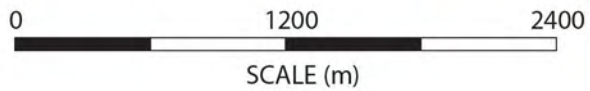
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2.1 MONITORING SITES

Water quality monitoring was undertaken at six (6) sites as shown in **Figure 1** (below), with location coordinates and site rationale provided in **Table 2**. Site locations were established in the field using depth and GPS integrated chart plotter with site coordinates recorded. Stored GPS waypoints in the chart plotter were used to relocate sites in subsequent monitoring rounds.

Table 2. Summary of WQ monitoring sites

Site name	Location	Water Depth (m)	Coordinates	Rationale
W1	Breakwater inner	-10.0	37° 4'28.17"S 149°54'20.84"E	WQ conditions adjacent to breakwater inside Snug cove
W2	Breakwater outer	-9.5	37° 4'35.34"S 149°54'37.33"E	WQ conditions adjacent to breakwater outside Snug cove, close proximity to rocky reef habitat
CB1	Near Cattle Bay	-6.5	37° 4'14.55"S 149°54'6.88"E	WQ conditions adjacent to Cattle Bay and sensitive seagrass meadows, additional Snug Cove site
MU1	Adjacent to mussel farm	-11.5	37° 4'32.56"S 149°53'51.69"E	WQ conditions adjacent to mussel farm to assess what potential impacts to mussel farm may be due to construction and dredging works
BAY1	Twofold Bay inner	-9.0	37° 5'12.80"S 149°53'6.59"E	Twofold Bay WQ reference site inner
BAY2	Twofold Bay outer	-17.5	37° 5'7.04"S 149°54'38.83"E	Twofold Bay WQ reference site outer



PROJECT:
BASELINE WATER QUALITY DATA COLLECTION
EDEN WHARF EXTENSION PROJECT

CLIENT:
DPI - LANDS

Designed: NY	Checked: AR	Date: JANUARY 2017
Drawn: NY	Approved: AR	Status: FINAL

TITLE:
WQ MONITORING SITES

FIGURE 1

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2.2 WATER QUALITY SAMPLING

The monitoring program was based on eight (8) rounds of data collection with water quality sampling commencing on 20 September 2016 and subsequent sampling rounds undertaken fortnightly thereafter as summarised **Table 3**.

The monitoring program was intended to run for a 12-week period including provision for two 'post-event' rounds following extreme weather events in order to gain understanding of ambient water quality under varying range of environmental conditions. The monitoring window was extended beyond the initial 12-week period into January 2017 in order to achieve this, however, only one post-event sampling round (25 October 2016) was possible during the monitoring program. The rationale for post-event sampling is discussed further in Section 2.3 below.

Table 3. Summary of field sampling events for Eden Baseline WQ Monitoring

Sample Round	Date	ALS Lab batch#	Comments
1	20 September 2016	EM1611097	
2	4 October 2016	ES1622273	Additional samples collected for TBT analysis.
3	18 October 2016	ES1623516	
4	25 October 2016	ES1624142	#1 post-weather event sampling
5	1 November 2016	ES1624788	
6	15 November 2016	ES1626072	
7	29 November 2016	ES1627383	
Waiting for opportunity to conduct #2 post-weather event sampling			
8	17 January 2017	ES1701119	

2.2.1 DEPTH PROFILING

A YSI 6600 V2-4 WQ sonde (**Figure 2**) was used to capture depth profiles of *in-situ* water quality parameters depth, turbidity, temperature, salinity, dissolved oxygen, electrical conductivity, and pH. The sonde was calibrated prior to each monitoring round as part of standard QAQC procedures with calibration certificates provided in **Appendix A**.

2.2.2 SECCHI DEPTH

A secchi disc was used to assess water clarity with greater secchi depth values corresponding to higher water clarity. Secchi depth was determined by lowering a secchi disc until not visible and noting depth, then further lowered and raised until visible again, noting depth when just visible. Secchi depth is the average of these two depth observations.

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2.2.3 SAMPLE COLLECTION AND LABORATORY ANALYSIS

A vertical oriented Kemmerer sampler (**Figure 3** - made of polycarbonate with silicone end caps appropriate for analysis of trace metals) was used to retrieve water samples from target depths, surface water (-1m) and bottom water (1m above the benthos), at each of the six monitoring sites. The sampler was cleaned with phosphate free detergent 'Decon90™' and rinsed in seawater between each site.

Water samples were transferred to laboratory supplied sterile glass and plastic bottles, and placed into a cooler with ice for sample storage and preservation. Vials for volatile analytes were filled first, with samples for dissolved metal analysis field filtered using 45 µm filters. Samples were forwarded in chilled eskies under chain of custody (COC) documentation to ALS Environmental (ALS Sydney) who are NATA accredited for the required analysis, as summarised in **Table 4**.

Table 4. Summary of Marine Waters Sample Analysis

Sample Type	Laboratory Analysis	Frequency
Marine Waters	Turbidity	All sample rounds
	Total Suspended Solids	All sample rounds
	Total metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	All sample rounds
	Dissolved metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	All sample rounds
	Nutrients (Total Nitrogen, NOx, Total Phosphorous)	All sample rounds
	Ammonia	All sample rounds
	Total Petroleum Hydrocarbons (TPH C ₆ -C ₃₆)	All sample rounds
	Polycyclic Aromatic Hydrocarbons (PAHs)	All sample rounds
	Tributyltin (TBT)	Once (round 2)

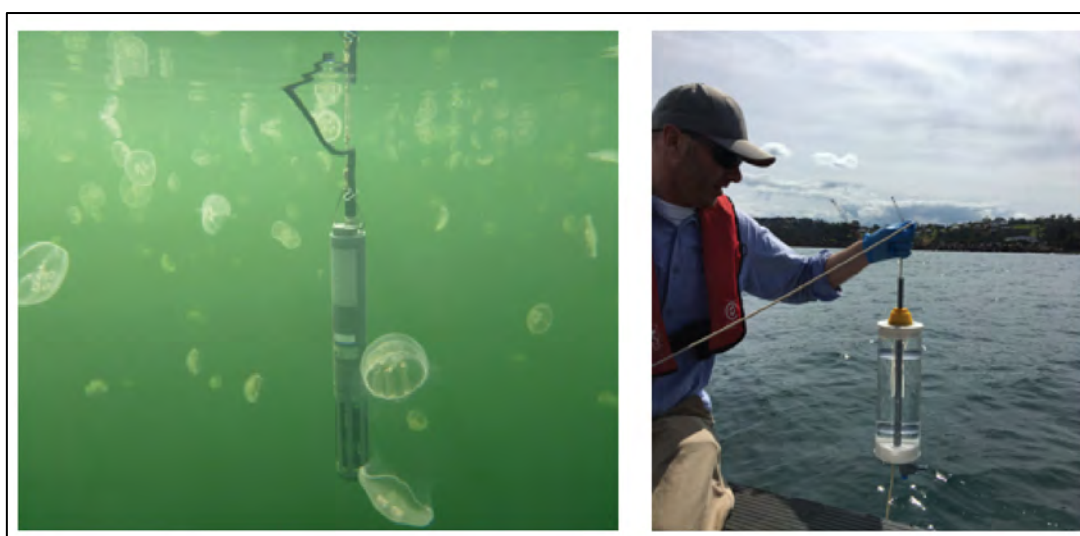


Figure 2. YSI multi-parameter WQ sonde (left) and discrete kemmerer water sampler (right)

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2.3 POST-EVENT WQ MONITORING

The monitoring program included a requirement for capturing data following significant weather that may include one of or a combination of high rainfall, sustained strong winds and large seaway. The purpose of the post-event sampling was to collect WQ data in Snug Cove during adverse conditions to assist in understanding the range of WQ conditions expected to occur naturally within Snug Cove.

Three types of weather events that can affect southern coastal NSW simultaneously with heavy rainfall, strong winds and large swells include a 'Southerly Buster', East Coast Low (ECL) and strong NE winds generated by a monsoon trough (such as a 'Black Nor'easter'). Given the short monitoring window (October – December 2016, then extended to January 2017), it was unlikely an extreme version of these types of weather would be observed, but there was reasonable likelihood an example of at least one of these weather types would occur.

Therefore a set of proposed triggers for conducting post-event sampling were developed, in consultation with NSW EPA, based on interpretation of available datasets (BOM, Water NSW, Manly Hydraulics Laboratory (MHL)). Trigger thresholds were set at levels that provided a reasonable likelihood that data collection would be undertaken during the monitoring period as well as represent a significant change from typical environmental conditions.

The following environmental trigger thresholds were adopted for post-event sampling (**Table 5**).

Table 5. Environmental factors and trigger thresholds for conducting post-event sampling

Environmental Factor	Trigger Threshold
Towamba River Level (m)	≥ 1.0m, 90 th percentile river level
Wind speed (km/hr)	≥ mean wind speeds of 50km/h (27 knots) at nearby Green Cape BoM station for at least a 6 hour period from the southern quadrant
Swell (m)	≥ 2.3m significant wave height, SE direction preferred, as measured at the nearby MHL Eden waverider buoy

Further discussion and rationale regarding the adopted trigger thresholds is provided in **Appendix B**.

2.4 DATA ANALYSIS

Data analysis includes comparison to relevant regulatory guidelines and WQOs where applicable. Site data trends were explored using descriptive statistics with parameters of most interest to this project (*i.e.* turbidity and TSS) and those consistently exceeding guideline trigger values displayed graphically as box-plots to aid understanding.

Box-plots present the minimum, maximum, 25th percentile, median (50th percentile) and 75th percentile data values. This provides a good visual presentation of the magnitude, skewness and typical range of values (those falling between 25th and 75th percentiles) of a water quality parameter, and presents the entire dataset in a form that is easily compared with existing guideline values or other value of interest. **Figure 3** (below) shows how to interpret the boxplots presented in this

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report. ANZECC trigger values are shown on charts where applicable, with median values output for 'all sites' and 'bay sites (reference locations)' provided.

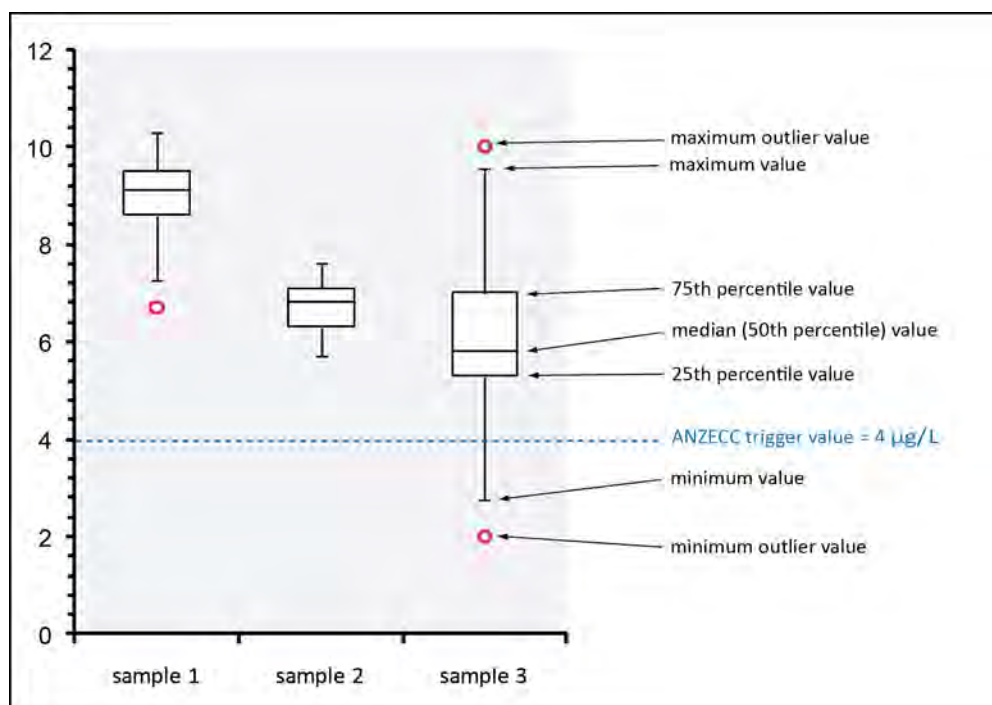


Figure 3. Form of the box-plot used in this report and its interpretation of underlying statistical values.

2.5 DATA VALIDATION

Data validation was undertaken using protocols based on guidance by AS4482 and the National Environmental Protection Council, to assess the data for its suitability for interpretive use.

Key checks in the data validation process included:

- Samples were received intact, cold and in good condition;
- All samples were analysed as required on the COC, and within recommended holding times;
- Field sample-id's in lab reports correlate to COC and field logs;
- Laboratory duplicate results correlate, and with RPDs <35%;
- Internal laboratory QAQC sample results, including laboratory check samples, matrix spike/matrix spike duplicate and surrogates met laboratory requirements; and
- Checks for anomalous results

All field data was logged to the YSI 650 MDS handheld unit and downloaded to PC at the conclusion of fieldwork. All field and laboratory analytical data was uploaded and managed in an excel database (*.xlsx).

Review of the dataset and laboratory QAQC interpretative results indicate the water quality dataset was suitable for interpretive use. Summary of the QAQC assessment for water quality is provided in **Table 6**.

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Table 6. Summary and Analytical Data Validation

QAQC measure	Comments
Sample Integrity	Samples were collected by methods approved by NSW EPA as per proposal in accordance with recommended procedures by suitably qualified and experienced field personnel. Samples were promptly dispatched to the laboratory using overnight courier in chilled eskies under COC documentation, and received by the laboratories intact, cold and in good condition.
Sample Analysis	Samples were analysed by laboratories NATA accredited for the required analysis, using appropriate analytical methods and within recommended holding times. Exception to this includes 24hour low level nitrogen and phosphorous – 18/10/16 (batch ES1623516), 25/10/16 (batch ES1624142), 15/11/16 (batch ES1626072), 29/11/16 (batch ES1627383) Discussion with the laboratory regarding these holding time breaches indicate sample integrity was high when received (samples were cold, intact and within sealed eskies) and sample analytical results could be relied upon.
Detection Limits	For the majority of analytes, Limits of Reporting (LOR) were sufficiently low to enable meaningful comparison with adopted guidelines. TSS guideline limits for aquaculture include ANZECC (2000) at <10 mg/L and NSW Marine Waters (DEC 2005) at <5 µg/L. The LOR of 1 mg/L can assess the ANZECC (2000) guideline limit but is unable to assess the NSW Marine Waters (DEC 2005) limit that may be a case of erroneous application of µg/L concentration units. For this report, we assume an NSW aquaculture TSS limit of 5 mg/L unless indicated otherwise.
Precision and Accuracy	Matrix spike, laboratory duplicate and surrogate results were reported within acceptable ranges. Overall, the results indicate good precision and accuracy in the dataset.
Anomalous Results	TSS results from monitoring event #1 on 20/9/2016 (lab batch EM1611097) report elevated TSS concentrations for number of samples with TSS results ranging between 11 - 40mg/L. These results represent statistical outliers and appear anomalous when considered among the range of TSS and turbidity results recorded during subsequent events in the monitoring program. Typical TSS values were reported below laboratory limit of reporting (<1mg/L) with TSS values up to 3 mg/L reported during post-event sampling (25/10/2016). It is noted that ALS performed QC checks for TSS samples in batch EM1611097 and reported similar results. Notwithstanding these QC checks, as statistical outliers the TSS results from EM1611097 are considered anomalous in the dataset and should be excluded from interpretive use.

RESULTS AND DISCUSSION

3.1 ENVIRONMENTAL CONDITIONS

Water quality monitoring was conducted in a variety of environmental conditions ranging from calm seas and little wind, to wind strengths of around 25 knots resulting in choppy surface conditions. Wave heights were generally small, <1m, during monitoring with the exception of post-event sampling (25/10/16) where residual wave heights were 1 - 2.0m, although significant wave heights exceeded >4.0m in the preceding 48-hour period.

A summary of environmental conditions and general observations recorded at the time of sampling is provided in **Table 7** below.

Table 7. Summary of environmental conditions and observations

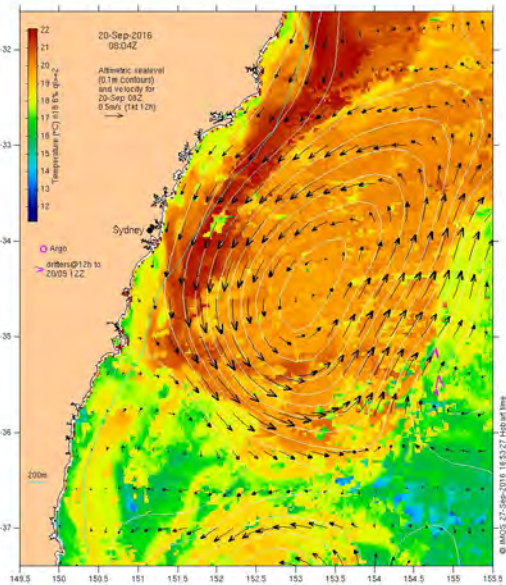
#	Date	Local Conditions	Water Color	IMOS Ocean Current trend offshore from Twofold Bay
1	20/10/16	Calm conditions. Wave heights <1.0m	Blue-green	Weak south flowing current
2	4/10/16	Windy, W winds 20–30 knots. Wave heights <0.5m.	Green	Moderate to strong south flowing current
3	18/10/16	Calm conditions, little swell, NE to NNW winds <10 knots. Wave heights <0.5m.	Green-blue	Weak north flowing current, influenced by EAC clockwise eddy located off continental shelf directly east of Twofold Bay
4	25/10/16	Post-Event Sampling #1, residual wave heights 1 - 2.0m. Sampling follows large SSE swell event (sig wave heights 4-6.5m) and sustained winds from S quadrants (20-35 knots, gusting up to 50 knots) over 23-24 Oct.	Green, cloudy	Weak north flowing current, influenced by EAC clockwise eddy located off continental shelf directly east of Twofold Bay
5	1/11/16	W-SW winds 10-15 knots. Wave heights <0.5m.	Green, cloudy	Weak south flowing current with EAC counter-clockwise eddy located well north of Twofold Bay and directing warmer waters offshore. Inshore waters characterised by cooler temperatures.
6	15/11/16	SW winds up to 25 knots. Wave heights <0.5m.	Green-blue	Strengthening south flowing current with EAC counter-clockwise eddy located east of Twofold Bay.
7	29/11/16	S-SE to E-NE winds, 10-15 knots. Wave heights <0.5m.	Blue-green	Strengthening south flowing current with EAC counter-clockwise eddy located east of Twofold Bay. Very high water clarity observed outside Twofold Bay at ADCP03 (secchi depth >20m) due to blue water current. This was having little influence on conditions inside Twofold Bay.
8	17/1/17	E-NE winds, <10 knots. Wave heights <0.5m.	Blue	South flowing current. High water clarity observed throughout Twofold Bay.

RESULTS AND DISCUSSION

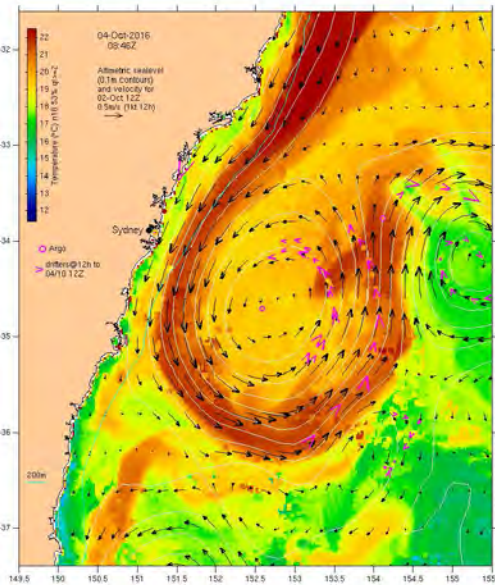
3.1.1 OFFSHORE BOUNDARY CURRENT CONDITIONS

The trend of offshore ocean boundary currents and how they may influence local water quality conditions of Twofold Bay was considered during the monitoring program. The East Australian Current (EAC) flows southward along the east coast of Australia bringing warmer nutrient poor waters to typically cool-temperate coastal regions. This boundary current generally strengthens and exerts its greatest influence on inshore waters of Twofold Bay in summer months when the current flows closer to the inshore zone.

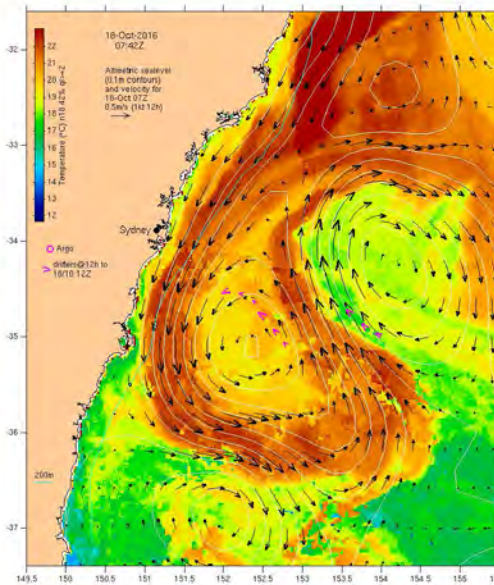
Sea surface temperature and ocean current charts from Integrated Marine Observing System (IMOS) were reviewed following each monitoring round to assess seasonal trend of the EAC (**Figure 4**). The EAC had little direct influence on Twofold Bay during spring (Sept-Oct) with the region influenced by weak south and north flowing currents at various times. However, at the beginning of November a large counter-clockwise eddy started to move southward with strengthening south flowing currents bringing warmer waters to the far south coast NSW region. By January 2017, the EAC was exerting its strongest influence on local water quality conditions bringing clear, blue warm waters into Twofold Bay.



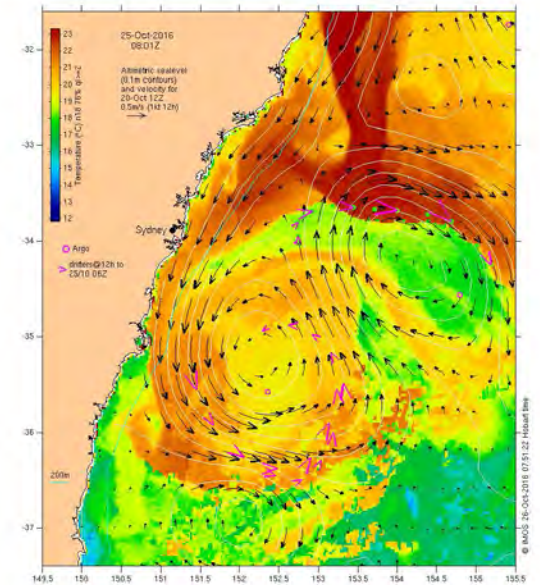
Monitoring Event #1 [20 Sep 2016]



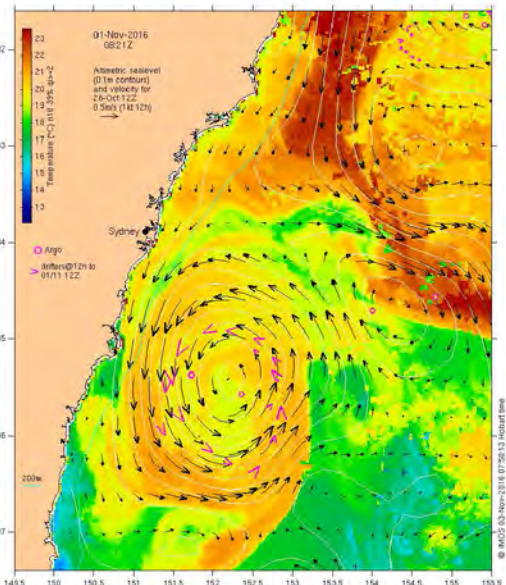
Monitoring Event #2 [4 Oct 2016]



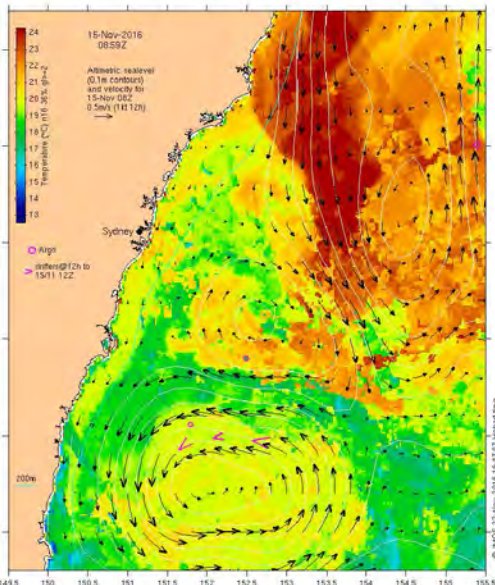
Monitoring Event #3 [18 Oct 2016]



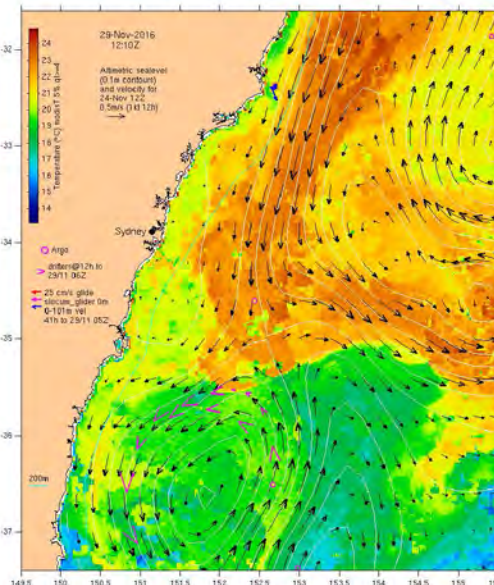
Monitoring Event #4 [25 Oct 2016]
 POST-EVENT SAMPLING



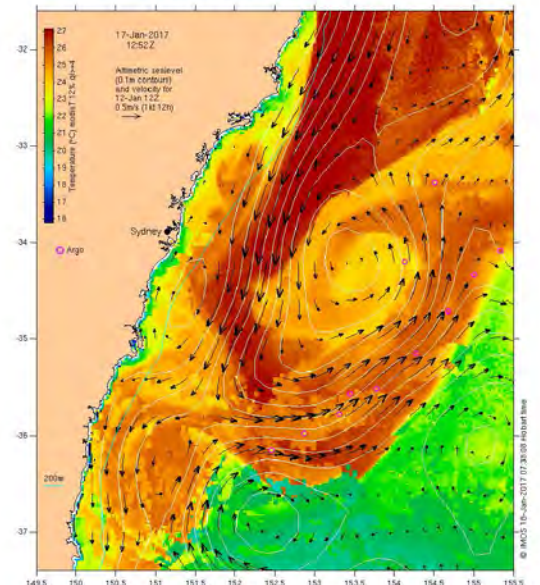
Monitoring Event #5 [1 Nov 2016]



Monitoring Event #6 [15 Nov 2016]



Monitoring Event #7 [29 Nov 2016]



Monitoring Event #8 [17 Jan 2017]

Charts downloaded from Integrated Marine Observing System (IMOS) - oceancurrent.imos.org.au



PROJECT:
 BASELINE WATER QUALITY DATA COLLECTION
 EDEN WHARF EXTENSION PROJECT

CLIENT:
 DPI - LANDS

Designed: NY	Checked: AR	Date: JANUARY 2017
Drawn: NY	Approved: AR	Status: FINAL

TITLE:
 SEA SURFACE TEMPERATURE
 AND SURFACE CURRENT CHARTS

FIGURE 4

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RESULTS AND DISCUSSION

3.2 AMBIENT WATER QUALITY

Field and laboratory analytical data is provided in **Table 8** (attached) with digital copy of the dataset provided in **Appendix C** and laboratory analytical reports in **Appendix D**.

Ambient water quality is assessed as median values for each analytical parameter. The median value (50th percentile value) is considered more representative of typical ambient conditions as extreme values or statistical outliers do not influence it compared to mean values. Where water quality parameters include values below the LOR (*i.e.* non-detects), these values were halved in order to output median values in accordance with USEPA guidance on the handling of non-detect values for statistical analysis.

A summary of median values output for each analytical parameter is provided in **Table 9** (attached).

3.2.1 PHYSICO-CHEMICAL PARAMETERS

Surface water temperature of Twofold Bay increased approximately 7°C over the duration of the monitoring program from 15°C to 22°C (September 2016 to January 2017). Site BAY2 located in deeper water in outer Twofold Bay was consistently cooler than inshore sites located in shallower waters (**Figure 5**). Across all sites, surface waters were consistently warmer than bottom waters with temperature differential of generally <1.0°C with mean temperature differential ranging between 0.4 to 0.7°C indicating water column was well mixed at all sites and not affected by thermal stratification over the monitoring period. One exception where surface to bottom water temperature differential was >1.0°C was 1 November 2016 with bottom waters 1.2°C to 1.5°C cooler than surface waters indicating Twofold Bay had been influenced by a moderate upwelling of cooler waters from the shelf zone as reflected in ocean current charts (**Figure 4**).

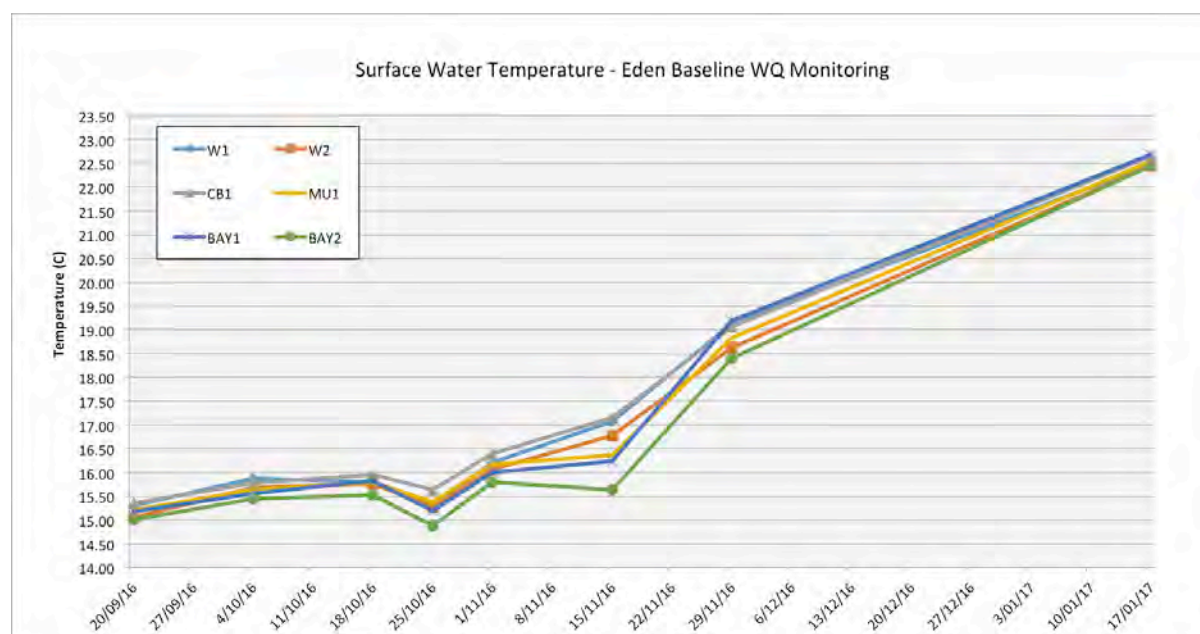


Figure 5. Surface water temperature at monitoring sites – September 2016 to January 2017

RESULTS AND DISCUSSION

3.2.2 WATER CLARITY – SECCHI DEPTH

Water clarity as measured by secchi depth provides a relatively cost-effective and simple method of estimating light penetration of the water column. Greater values of secchi depth correspond to higher water clarity. However, the method is subjective and can be influenced by visual disturbance of the water surface such as direct reflection from the sun and wind-induced ripples. As such, secchi depth is considered a coarse indicator of water clarity.

Median secchi depth ranged from 3.0 to 6.2m, with the inner (BAY1) and outer (BAY2) Twofold Bay sites displaying the lowest and highest water clarity respectively. Water clarity of all sites was impacted during post-event sampling with median secchi depth reducing to 2.0m. However, typical secchi depth based on all data for all sites is 4.3m with an 80th percentile value calculated at 3.0m.

3.2.3 CHLOROPHYLL *a* AND TOXIC ALGAL BLOOM EVENT

A bloom of the dinoflagellate *Alexandrium fundyense* occurred in Twofold Bay during the monitoring program with health alerts issued to not consume shellfish during October and November 2016 due to risk of paralytic shellfish poisoning (PSP). Cell concentrations reached maximum levels of 75,000 cells/L with elevated toxin levels reported (DPI 2016).

Chlorophyll *a*, an indicator of microalgal abundance, was monitored through this corresponding period. Levels of chlorophyll *a* exceeded the ANZECC guideline (1 µg/L) throughout October at all sites with concentrations ranging between 1-6 µg/L. Generally, levels of chlorophyll *a* in Twofold Bay were below the limit of reporting (<1 µg/L) with few guideline exceedances reported from November 2016 to January 2017.

3.2.4 TURBIDITY

Turbidity was relatively low (<1.5 ntu) across all sites throughout the monitoring period with median site-specific turbidity ranging between 0.3 and 0.9 ntu. Outer Twofold Bay (BAY2) consistently had the lowest turbidity (median 0.3 ntu), with waters of Cattle Bay (CB1) and inner Twofold Bay (BAY1) characterised by highest turbidity (median 0.9 ntu) as shown in **Figures 6 and 7**. Furthermore, surface waters were less turbid than bottom waters across all sites.

Levels of turbidity did not exceed the ANZECC guideline (<10 ntu) during the monitoring period. Elevated levels of turbidity were observed across all sites during post-event sampling (25/10/16) and the subsequent sampling round (1/11/16) due to residual weather effects on Twofold Bay water quality.

During post-event sampling, turbidity was observed to be four to ten times greater than median turbidity observed under calm conditions with the sites most affected by increased turbidity including W2, CB1, and MU1. Highest turbidity observed was 7.4 ntu at Cattle Bay. Statistically, the observed elevated turbidity from these monitoring events represents either maximum and/or outlier values as shown in boxplots (**Figure 6**).

Inner Twofold Bay site, BAY1, has been proposed as the reference site for the purposes of monitoring potential water quality impacts associated with the planned dredging of Port of Eden

RESULTS AND DISCUSSION

(Advisian 2016). BAY1 turbidity was observed to be the most variable among all sites and is possibly influenced by the nearby Nullica River. However, of the two reference sites monitored, BAY1 is more representative of the range of turbidity likely to be observed at inshore sites compared to BAY2.

In terms of setting an overall ambient level of turbidity for ongoing water quality monitoring - median, 75th percentile, and 80th percentile turbidity values were output for 'all sites' and compared to 'bay sites' as shown on **Figure 7**. Median turbidity for all sites is 0.6 ntu compared to 0.5 ntu for bay sites only with the 80th percentile turbidity for all sites 1.7 ntu and 1.3 ntu for bay sites only.

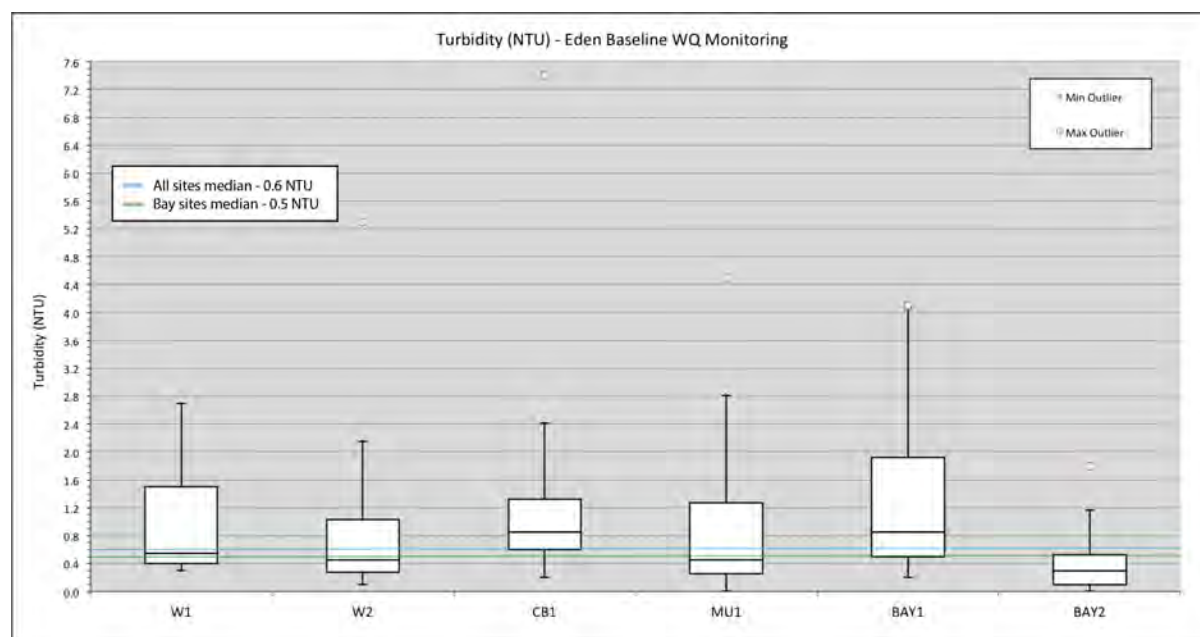


Figure 6. Summary of Turbidity (NTU) values by site.

3.2.5 TOTAL SUSPENDED SOLIDS (TSS)

Total Suspended Solids (TSS) were generally below the LOR (<1 mg/L) with the exception of TSS reported on 20/9/16 which included the highest TSS concentrations for majority of sites ranging between 11 – 40 mg/L despite calm ocean conditions. It is noted in data validation (Section 2.5) that TSS data from 20/9/16 are considered anomalous when compared to the remaining dataset. Statistically, these values represent TSS outliers for all sites as shown in boxplots (**Figure 8a**) and should be excluded from interpretive use.

For the routine sampling rounds, TSS was similar across all sites with median values ranging between 0.5 to 0.8 mg/L (**Figures 7 and 8b**), largely due to majority of the site results being below the LOR (<1mg/L). Similarly, a median level of TSS summed for both 'all sites' and 'bay sites' was calculated at 0.5 mg/L. The 80th percentile TSS for 'all sites' was calculated at 2 mg/L compared to 0.9 mg/L for 'bay sites' only (**Figure 7**).

For the post-event sampling (25/10/16), higher TSS was observed across most sites with TSS concentrations ranging between 2-3 mg/L. An exception was BAY2 where TSS remained below limit of reporting (<1mg/L). Highest TSS levels reported (excluding data from 20/9/2016), included 5mg/L

RESULTS AND DISCUSSION

at W1 and 6mg/L at MU1, with the latter result exceeding the adopted NSW aquaculture guideline limit of <5 mg/L (refer Section 2.5 in data validation).

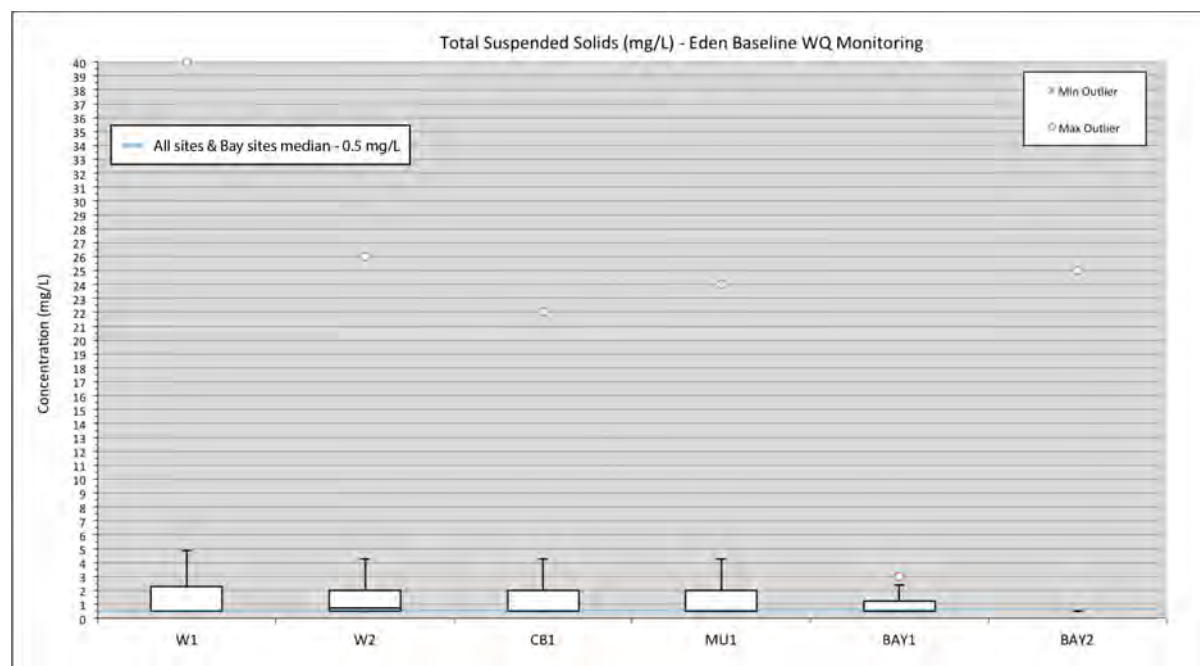


Figure 8a. Summary of Total Suspended Solids – TSS (mg/L) values by site.

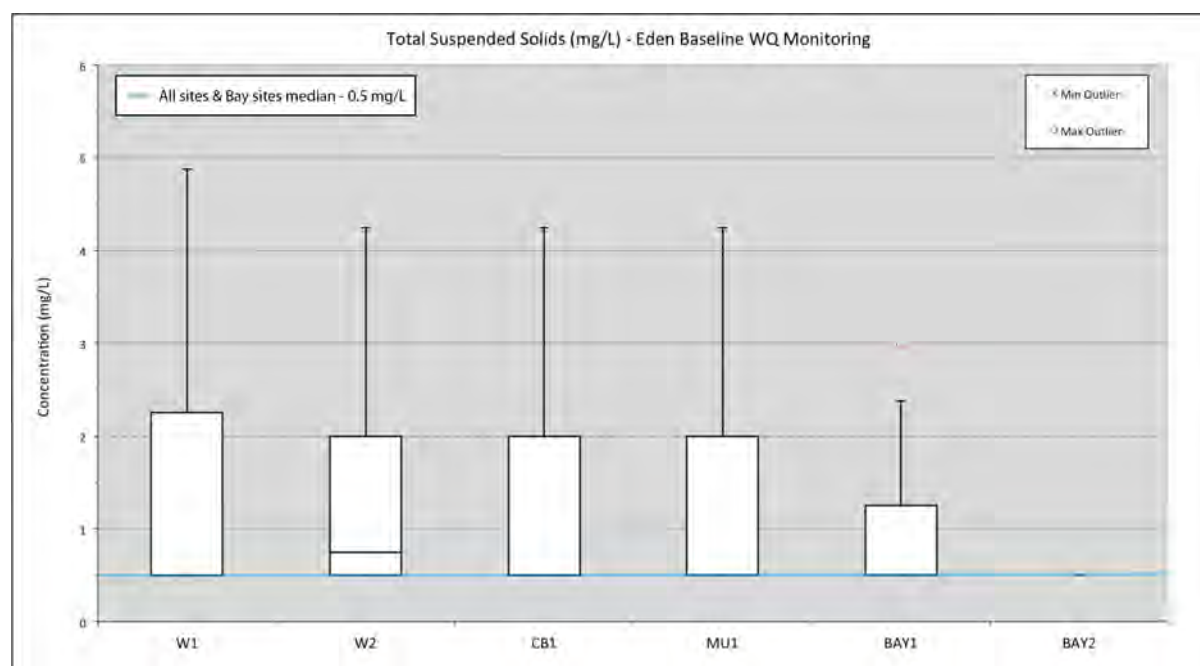


Figure 8b. Summary of Total Suspended Solids – TSS (mg/L) values by site (Y-axis scaled).

3.2.6 TRIBUTYL TIN (TBT)

Bottom water samples were analysed for TBT (4/11/16) following sediment chemistry data that reported levels of TBT in sediments in areas close to the existing port (Advisian 2016, p185). TBT concentrations of bottom waters were reported below the laboratory detection limit (<0.002 µg/L)

RESULTS AND DISCUSSION

at all sites. In consultation with NSW EPA, no further water analysis for TBT was required during the monitoring program.

Turbidity Values (NTU)

	All Sites	BAY Sites
Median	0.6	0.5
75th %	1.2	1.1
80th %	1.7	1.3
Maximum	7.4	4.1

n = 96 observations

TSS (mg/L)

	All Sites	BAY Sites
Median	0.5	0.5
75th %	2.0	0.5
80th %	2.0	0.9
Maximum	40	25

n = 96 observations



0 600 1200
SCALE (m)



PROJECT:
BASELINE WATER QUALITY DATA COLLECTION
EDEN WHARF EXTENSION PROJECT

CLIENT:
DPI - LANDS

Designed: NY	Checked: AR	Date: JANUARY 2017
Drawn: NY	Approved: AR	Status: FINAL

TITLE:
TURBIDITY (NTU) & TSS (mg/L) MEDIAN VALUES

FIGURE 7

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RESULTS AND DISCUSSION

3.2.7 METALS

Background levels of eight metals were assessed including total and dissolved concentrations of arsenic, cadmium, chromium, copper, nickel, lead, zinc and mercury.

Key points noted from the metals analysis includes and summarised in **Table 10**:

- Copper was detected at all sites in both total and dissolved form with concentrations ranging between 2-13 µg/L. The highest copper concentration of 13 µg/L was reported from bottom waters at MU1, adjacent to the mussel aquaculture farm and which also exceeded the ANZECC aquaculture guideline of 5 µg/L. The ANZECC marine water guideline (95% species protection) of 1.3 µg/L was exceeded in 11% of samples (22 of 192 samples). Copper was reported above the guideline at every site at least once with the most exceedances reported in bottom waters at CB1 and BAY2.
- Arsenic was detected at all sites in surface and bottom waters with concentrations ranging between 0.5-2.4 µg/L and predominantly in the dissolved form. All arsenic results were reported below the aquaculture guideline of <30 µg/L.
- Total chromium was detected in 2% of samples (4 of 192 samples), at sites CB1 (surface waters), MU1 (bottom waters) and BAY2 (bottom waters), with concentrations ranging between 1-10.6 µg/L. All results were reported below the ANZECC ecosystem protection (27.4 µg/L) and aquaculture (20 µg/L) guidelines.
- Nickel was detected in 3% of samples (6 of 192 samples), at sites CB1 (surface and bottom), BAY1 (surface), BAY2 (surface), MU1 (bottom) and W1 (bottom), with concentrations ranging between 0.2-0.5 µg/L. All results were reported below the ANZECC ecosystem protection (70 µg/L) and aquaculture (100 µg/L) guidelines.
- Lead was detected at all sites in surface and bottom waters with concentrations ranging between 0.5-1.4 µg/L and predominantly in the dissolved form. All results were reported below the ANZECC ecosystem protection (4.4 µg/L) guideline, whilst 14 results from the second round of sampling (4/10/16) marginally exceeded the ANZECC aquaculture lower guideline level (1 µg/L). Although it is noted that the lead guideline limit is dependent on water hardness (data not collected) such that the site-specific lead guideline trigger value may range as high as 7 µg/L.
- Total zinc was detected in 1.5% of samples (3 of 192 samples), at sites MU1 (bottom), W1 (bottom) and CB1 (bottom), with concentrations at these three sites ranging between 8-12 µg/L and exceeding the ANZECC aquaculture guideline of <5 µg/L. All results were below the ANZECC ecosystem protection (15 µg/L) guideline.
- Cadmium and mercury were not detected at any of the sites, with all results reported below the LOR of 0.2 µg/L and 0.04 µg/L, respectively.

RESULTS AND DISCUSSION

Table 10. Background metal concentrations

Metal	% samples where guideline exceeded	Background Concentration
Arsenic	0%	0.5 to 2.4 µg/L
Cadmium	0%	Below LOR <0.2 µg/L
Chromium	0%	Below LOR <0.5 µg/L to 10.6 µg/L
Copper	11%	2-13 µg/L
Nickel	0%	Below LOR <0.2 µg/L to 0.5 µg/L
Lead	7%	0.5 to 1.4 µg/L
Zinc	1.5%	Below LOR <5 µg/L to 12 µg/L
Mercury	0%	Below LOR <0.04 µg/L

3.2.8 ORGANIC CONTAMINANTS (TPH, PAH & BTEX)

Water samples were tested for a range of organic contaminants including Total Petroleum Hydrocarbons (TPH), Total Recoverable Hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAHs), and benzene, toluene, ethylbenzene, xylenes (BTEX). Results were reported below the LOR at all sites, except for the detection of PAHs, TRH and TPH in samples collected at W1 and W2 on 17/1/17. These included:

- PAHs naphthalene (W1 and W2), fluorene (W1) and phenanthrene in surface waters at concentrations ranging between 1.6-6.4 µg/L;
- Heavy end TRH C10-C40 fractions at W1 surface waters (2240 µg/L), W1 bottom waters (220 µg/L) and W2 surface waters (390 µg/L). Related parameter TPH reported similar concentrations at W1 surface waters (2290 µg/L), W1 bottom waters (350 µg/L) and W2 surface waters (430 µg/L).

The origin of the PAH, TRH and TPH results reported on 17/1/17 is currently unknown.

3.2.9 NUTRIENTS

Water samples were tested for nutrient suite that included ammonia, total nitrogen and total phosphorous. Key points noted from the nutrient analysis includes:

- Ammonia was mostly reported below LOR (<0.05 mg/L) with detected concentrations reported in 3% of samples (5 of 192 samples), and only during the first two sampling events on 20/9/16 and 4/10/16. For these five samples, concentrations ranged between 0.02-0.13 mg/L, with the maximum result of 0.13 mg/L reported at BAY1 (bottom waters) and exceeding the ANZECC aquaculture guideline of <0.1 mg/L.
- Total phosphorous was reported at all sites in both surface and bottom waters, with results ranging between <0.005-0.015 mg/L. All results were below the ANZECC guideline for protection of aquatic ecosystems (<0.025 mg/L).

RESULTS AND DISCUSSION

- Total nitrogen was reported at all sites in both surface and bottom waters, with the majority of results exceeding the ANZECC guideline for protection of aquatic ecosystems (<0.12 mg/L). Median TN values ranged between 0.13 – 0.15 mg/L as shown in **Figure 9**. The 80th percentile value calculated from the dataset was 0.17 mg/L.

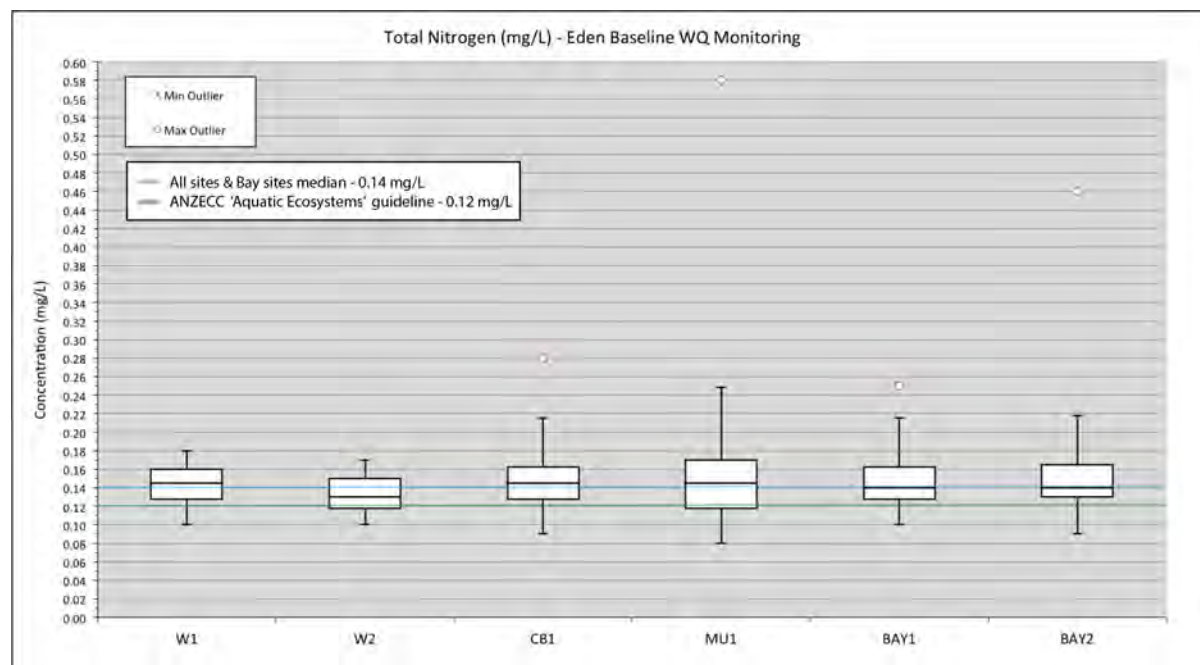


Figure 9. Summary of Total Nitrogen (mg/L) values by site.

RESULTS AND DISCUSSION

3.3 POST-EVENT WATER QUALITY

A significant wind and ocean swell event affected the coastal region of south-eastern Australia over a 48-hour period, 23-24 October due to a deep low pressure system in the southern Tasman Sea (**Figure 10**). Mean wind speeds at Green Cape over this 48-hour period generally exceeded 27 knots (50 km/hr) with regular gusts up to 40-50 knots (74-92 km/hr) (Refer **Figure 11**). The wind direction was from S-SW and directly influenced water quality conditions of Twofold Bay.

A large seaway also developed over this period with significant wave heights, as recorded by Eden waverider buoy, exceeding 4.0m over the 48-hour period with maximum wave heights during this period reaching >10.0m. The peak of the ocean swell event occurred on the Monday 24 October 2016 (**Figure 12**). The swell direction was from S-SE and also directly influenced water quality conditions of Twofold Bay.

Post-event sampling was undertaken on Tuesday 25 October on the basis that the adopted wind and ocean swell trigger thresholds were exceeded as summarised below.

Environmental Factor	Threshold	Observations (23-24 October)
Towamba River Level (m)	≥ 1.0m, 90 th percentile river level	n/a
Wind speed (Km/hr)	≥ mean wind speeds of 50km/h for minimum 6-hour period from southern quadrants	mean wind speeds generally >50 km/h gusting to 74-92 km/h over 48 hour period from S-SW.
Swell Height (m)	≥ 2.3m swell, SE direction preferred	S-SE swell, significant wave heights >4.0m for 48-hour period, with maximum wave heights to 10.16m.

3.3.1 EFFECT ON WATER QUALITY

Surface water conditions at Snug Cove were relatively calm during post-event sampling with light N winds in morning that steadily increased in strength through the day. The disturbance caused by strong winds and ocean swell during the weather event was most evident on color and clarity of water with green, cloudy waters observed at all monitoring sites.

Water clarity was impacted at all sites as indicated by reduced secchi depth ranging between 1.4m at Cattle Bay (CB1) to 4.5m at outer Twofold Bay (site BAY2), turbidity levels four to ten times greater than measured during the routine monitoring events, and generally higher TSS concentrations. All other parameters were relatively unaffected by the disturbance event in that parameter concentrations were reported at levels similar to the routine monitoring events, which were typically conducted in calm conditions.

RESULTS AND DISCUSSION

Analysis for 00:00 UTC on Sunday 23 October 2016

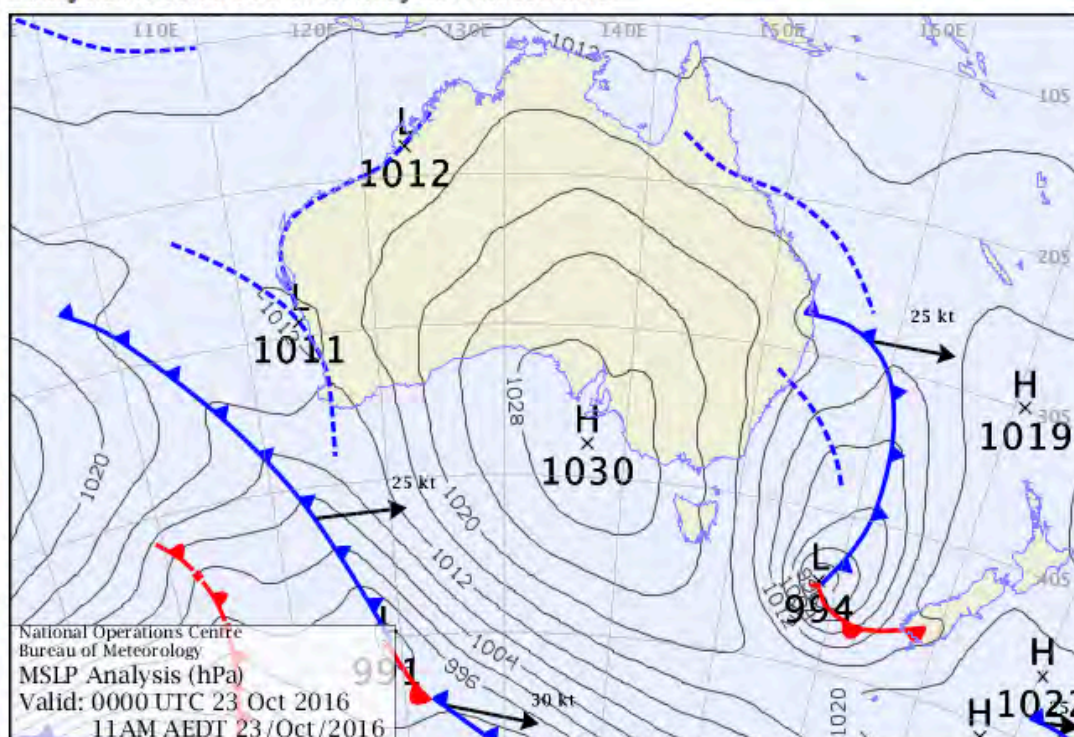


Figure 10. Synoptic chart 23-Oct-2016 showing low pressure system responsible for the wind and swell event observed at Twofold Bay.

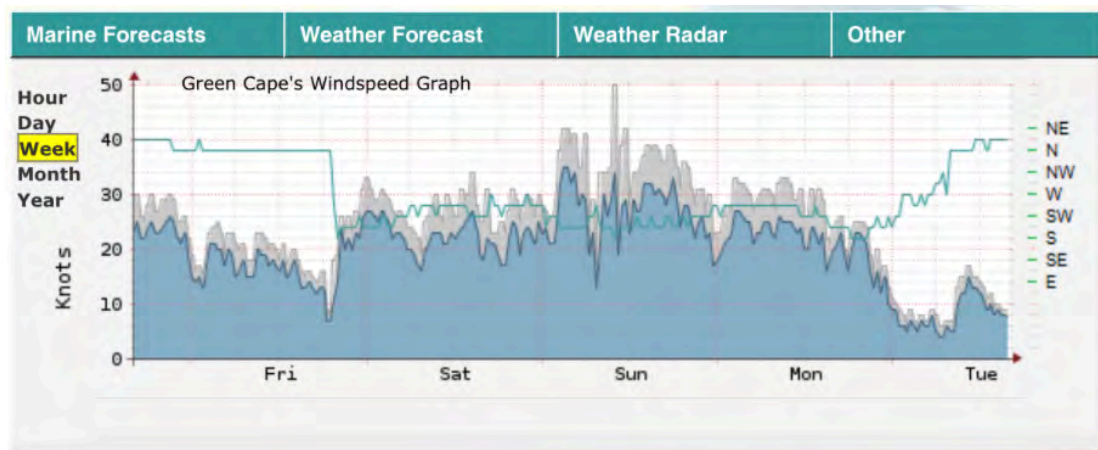


Figure 11. Mean wind speed (blue) and gusts (grey) recorded at Green Cape, NSW over Sunday 23rd and Monday 24th October, 2016.

RESULTS AND DISCUSSION

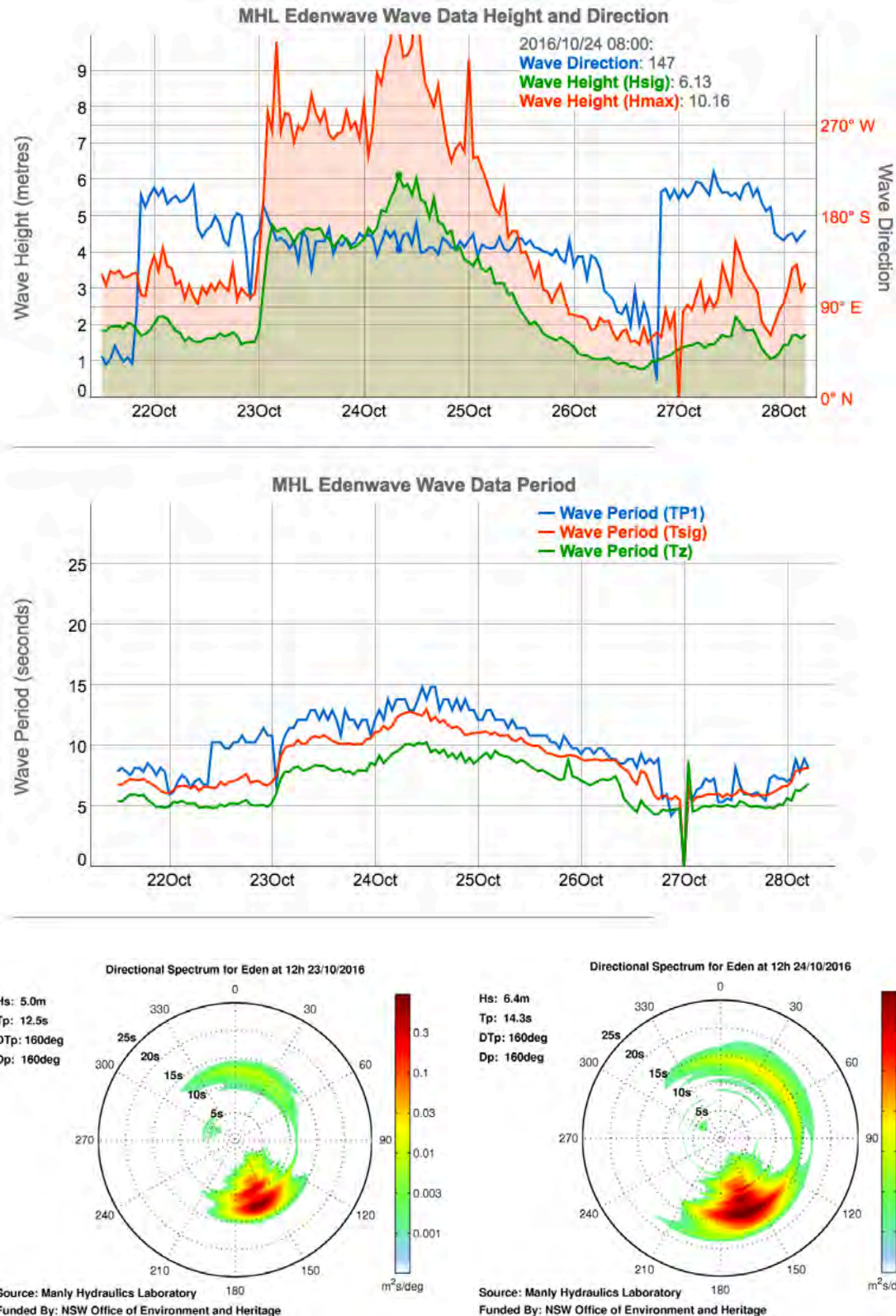


Figure 12. Wave height and direction at Eden Buoy over 23-24 October
<http://new.mhl.nsw.gov.au/data/realtime/wave/Buoy-edenow>.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the water quality monitoring program are the following conclusions and recommendations:

- Baseline water quality has been characterised at six sites in Twofold Bay and Snug Cove prior to the proposed construction and dredging works for the Eden Breakwater Wharf Extension Project. It is recommended the water quality data be used to inform the development and implementation of mitigation measures to reduced potential water quality impacts from the Project.
- Baseline water quality was characterised over eight monitoring rounds for a range of parameters, including turbidity, temperature, salinity, dissolved oxygen, electrical conductivity, pH, chlorophyll-*a*, total suspended solids, total and dissolved metals, nutrients, TPH, TRH, PAHs, BTEX and tributyltin.
 - Chlorophyll-*a* levels ranged between 1-6 µg/L
 - Water clarity as assessed by secchi depth had a median secchi depth of 4.3m and 80th percentile secchi depth of 3.0m;
 - Turbidity levels ranged between 0.3 – 0.9 ntu, with median turbidity of 0.6 ntu and 80th percentile turbidity of 1.7 ntu. Turbidity during the post-event storm sampling was up to four to ten times higher, ranging between 0.5-7.4 ntu.
 - Total suspended solids (TSS) ranged between 0.5 to 0.8 mg/L. Higher TSS concentrations between 2-3 mg/L were observed during post-event sampling.
 - Tributyltin was not detected.
 - Detected metals included arsenic, chromium, copper, nickel, lead and zinc. A small percentage of results for copper, lead and zinc exceeded ANZECC guidelines for ecosystem protection and/or aquaculture. This included detection of zinc, lead and copper above the ANZECC aquaculture guideline at the MU1 sampling site adjacent to the mussel aquaculture farm, and it is recommended that relevant stakeholders in this mussel farm be informed of these results.
 - Cadmium and mercury were not detected.
 - Organic parameters TPH, TRH, PAHs and BTEX were not detected, except for the 17/1/17 sampling round where PAHs and heavy end TRH and TPH fractions were reported at sites W1 and W2. The origin of the PAH, TRH and TPH results reported on 17/1/17 is currently unknown.
 - Total nitrogen generally exceeded the ANZECC guideline (<0.12 mg/L) with median values ranging between 0.13 – 0.145 mg/L. The 80th percentile TN value calculated for the dataset is 0.17 mg/L.
- One of the eight rounds included post-event storm sampling, which provided some understanding of how water quality in Twofold Bay responds to stormy wind and sea conditions. The disturbance to water quality was most evident on color and clarity of water

CONCLUSIONS AND RECOMMENDATIONS

with green, cloudy waters observed at all monitoring sites. Water clarity was impacted at all sites as indicated by reduced secchi depth ranging between 1.4m at Cattle Bay (CB1) to 4.5m at outer Twofold Bay (site BAY2), turbidity levels four to ten times greater than measured during the routine monitoring events, and generally higher TSS concentrations. All other parameters were relatively unaffected by the disturbance event in that parameter concentrations were reported at levels similar to the routine monitoring events, which were typically conducted in a range of calm to moderate weather conditions including wind strengths up to 25 knots. However, when strong winds did occur the direction was from W or N quadrants with Snug Cove relatively protected from these prevailing wind directions. It should be noted that for the Eden region, strongest winds typically occur between late spring and early summer, and generally more benign weather conditions can be expected in autumn with more variable wind conditions likely in winter.

- Other environmental events that occurred during the monitoring program include a bloom of the toxic dinoflagellate *Alexandrium fundyense*.
- A summary of median values output for each analytical parameter is provided in **Table 9** (attached).

REFERENCES

- Advisian (2016). Eden Breakwater Wharf Extension, State Significant Infrastructure – Environmental Impact Statement. Report prepared for DI-Lands, 3 November 2016.
- ANZECC/ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality.
- DEC (2004). Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales. Department of Environment and Conservation (NSW).
- DEC (2005). Marine Water Quality Objectives for NSW Ocean Waters - South Coast. Department of Environment and Conservation (NSW).
- DI-Lands (2017). The Eden Breakwater Wharf Extension Project, Department of Industry Lands website, accessed January 2017 (URL: http://www.crownland.nsw.gov.au/crown_land/coastal-harbours-and-river-entrances/eden/the-eden-breakwater-wharf-extension-project)
- DPI (2016). Twofold Bay area algal toxin alert – update, 18 November 2016 (URL: <http://www.dpi.nsw.gov.au/about-us/media-centre/releases/2016/twofold-bay-area-algal-toxin-alert-update2>)
- Standards Australia (1998) Water Quality Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples, AS 5667.1:1998.

LIMITATIONS

Elgin Associates Pty Ltd has prepared this report for the sole use of DI-Lands in accordance with generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the original proposal dated 26 August 2016.

The methodology adopted and sources of information used by Elgin Associates are outlined in this report. Elgin Associates has made no independent verification of this information beyond the agreed scope of works and Elgin Associates assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to Elgin Associates was false.

This report was prepared between September 2016 and January 2017 and is based on the conditions encountered and information reviewed during that period up to the time of preparation. Elgin Associates disclaims responsibility for any changes that may have occurred after this time. Opinions and recommendations contained in this report are based upon information gained during desktop study and fieldwork and information provided from government authorities' records and other third parties. The information in this report is considered to be accurate at the date of issue and reflects at the site at the dates sampled. This document and the information contained herein should only be regarded as validly representing the site conditions at the time of the fieldwork unless otherwise explicitly stated in a preceding section of this report.

This report should be read in full together with all other reports referenced by this report. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Table 8. Eden Baseline Marine Water Quality

Sample ID	Sample Type	Sample Date	Sample Time	FIELD PARAMETERS ^a										LABORATORY PARAMETERS ^b			
				Depth	DO	DO	Turbidity	Secchi Depth	pH	Salinity	Conductivity	Temperature	Suspended Solids (SS)	Turbidity	Ammonia as N	Ammonium (NH ₄ ⁺) ^c	
				m	%	mg/L	ntu	m	pH unit	ppt	µS/cm	°C	mg/L	ntu	mg/L	mg/L	
Limit of Reporting (LOR)				0.01	0.1	0.01	0.1	0.1	0.01	-	-	µS/cm	0.01	mg/L	0.1	mg/L	0.02
Aquatic Ecosystems ^d				-	90 - 110	-	-	-	8.0 - 8.4	-	-	-	-	-	-	-	0.02
Toxicants in Marine Waters - 95% species protection ^e				-	-	-	-	-	-	-	-	-	-	-	-	0.91	-
Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species ^f				-	-	>5	-	-	6.0-9.0	-	-	-	-	<10 ³ - <5 ^g	-	<0.1	-
Primary Contact Recreation ^h				-	-	-	-	≥1.6	-	-	-	-	-	-	-	-	-
W1_S_20/9/16	MARINE WATER	20-Sep-16	14:05	1.00	102.2	8.26	1.2	4.0	8.11	35.03	53.083	15.30	40	0.7	<0.02	<0.02	
W1_B_20/9/16	MARINE WATER	20-Sep-16	13:55	9.00	100.0	8.12	1.8	8.10	8.10	35.15	53.250	15.06	<1	0.4	0.03	0.0290	
W2_S_20/9/16	MARINE WATER	20-Sep-16	13:05	1.00	105.7	8.59	0.8	7.0	8.12	35.04	53.097	15.05	26	1	<0.02	<0.02	
W2_B_20/9/16	MARINE WATER	20-Sep-16	12:55	9.00	100.9	8.21	1.1	8.09	8.09	35.12	53.208	14.98	12	0.8	0.03	0.0290	
CB1_S_20/9/16	MARINE WATER	20-Sep-16	14:45	1.00	103.9	8.39	0.9	4.5	8.11	35.02	53.060	15.35	22	0.6	<0.02	<0.02	
CB1_B_20/9/16	MARINE WATER	20-Sep-16	14:25	5.50	104.5	8.44	1.7	5.0	8.11	35.18	53.284	15.29	<1	0.5	0.02	0.0193	
MU1_S_20/9/16	MARINE WATER	20-Sep-16	12:30	1.00	102.9	8.34	1.0	5.5	8.09	35.05	53.103	15.21	11	0.8	<0.02	<0.02	
MU1_B_20/9/16	MARINE WATER	20-Sep-16	12:20	10.50	98.6	8.00	1.8	8.08	8.08	35.20	53.320	15.10	24	1	0.02	0.0194	
BAY1_S_20/9/16	MARINE WATER	20-Sep-16	11:35	1.00	101.7	8.24	1.4	3.0	8.09	35.08	53.153	15.18	7	0.9	<0.02	<0.02	
BAY1_B_20/9/16	MARINE WATER	20-Sep-16	11:20	8.00	100.7	8.19	1.1	8.08	8.08	35.13	53.227	14.97	<1	0.9	<0.02	<0.02	
BAY2_S_20/9/16	MARINE WATER	20-Sep-16	10:45	1.00	102.7	8.36	0.6	8.0	7.99	34.95	52.973	15.01	25	0.4	<0.02	<0.02	
BAY2_B_20/9/16	MARINE WATER	20-Sep-16	10:30	16.50	96.3	7.82	1.0	8.03	8.03	35.21	53.338	15.02	<1	0.3	<0.02	<0.02	
W1_S_4/10/16	MARINE WATER	4-Oct-16	14:15	1.00	110.7	8.84	0.4	2.5	8.17	35.35	53.488	15.87	<1	1	<0.05	<0.05	
W1_B_4/10/16	MARINE WATER	4-Oct-16	14:00	9.00	89.6	7.25	0.3	8.05	8.05	35.50	53.725	15.15	<1	0.6	<0.05	<0.05	
W2_S_4/10/16	MARINE WATER	4-Oct-16	13:30	1.00	109.7	8.78	0.7	3.0	8.18	35.37	53.517	15.69	<1	0.8	<0.05	<0.05	
W2_B_4/10/16	MARINE WATER	4-Oct-16	13:15	9.00	93.8	7.57	0.3	8.08	8.08	35.47	53.682	15.30	<1	0.8	<0.05	<0.05	
CB1_S_4/10/16	MARINE WATER	4-Oct-16	15:00	1.00	112.6	9.00	0.6	3.0	8.17	35.39	53.551	15.78	<1	1	<0.05	<0.05	
CB1_B_4/10/16	MARINE WATER	4-Oct-16	14:45	5.50	91.1	7.34	0.2	8.07	8.07	35.51	53.726	15.39	<1	0.7	<0.05	<0.05	
MU1_S_4/10/16	MARINE WATER	4-Oct-16	12:30	1.00	106.7	8.55	0.1	3.0	8.15	35.40	53.571	15.64	<1	0.6	<0.05	<0.05	
MU1_B_4/10/16	MARINE WATER	4-Oct-16	12:00	10.50	90.4	7.30	0.6	8.06	8.06	35.50	53.722	15.25	<1	0.4	<0.05	<0.05	
BAY1_S_4/10/16	MARINE WATER	4-Oct-16	11:15	1.00	107.1	8.60	0.5	3.0	8.14	35.40	53.573	15.56	<1	1.1	<0.05	<0.05	
BAY1_B_4/10/16	MARINE WATER	4-Oct-16	11:00	8.00	88.3	7.18	0.5	8.03	8.03	35.51	53.724	15.42	<1	1	0.13	0.126	
BAY2_S_4/10/16	MARINE WATER	4-Oct-16	10:16	1.00	102.5	8.25	0.5	3.9	8.09	35.35	53.506	15.45	<1	0.6	<0.05	<0.05	
BAY2_B_4/10/16	MARINE WATER	4-Oct-16	10:00	16.50	85.9	7.01	0.3	8.01	8.01	35.44	53.668	14.72	<1	0.3	<0.05	<0.05	
W1_S_18/10/16	MARINE WATER	18-Oct-16	12:45	1.00	103.0	8.23	0.3	5.5	8.13	35.24	53.347	15.79	<1	0.5	<0.05	<0.05	
W1_B_18/10/16	MARINE WATER	18-Oct-16	12:40	9.00	98.3	7.97	0.6	8.08	8.08	35.37	53.544	15.06	<1	0.7	<0.05	<0.05	
W2_S_18/10/16	MARINE WATER	18-Oct-16	12:10	1.00	107.5	8.60	0.1	7.0	8.15	35.31	53.446	15.76	<1	0.3	<0.05	<0.05	
W2_B_18/10/16	MARINE WATER	18-Oct-16	12:00	9.00	105.2	8.46	0.1	8.13	8.13	35.33	53.484	15.48	<1	0.7	<0.05	<0.05	
CB1_S_18/10/16	MARINE WATER	18-Oct-16	13:20	1.00	104.8	8.35	0.6	4.5	8.15	35.29	53.409	15.95	<1	0.9	<0.05	<0.05	
CB1_B_18/10/16	MARINE WATER	18-Oct-16	13:20	5.50	105.2	8.43	0.8	8.15	8.15	35.31	53.441	15.66	<1	1.2	<0.05	<0.05	
MU1_S_18/10/16	MARINE WATER	18-Oct-16	10:55	1.00	105.6	8.44	0.1	6.0	8.14	35.30	53.427	15.80	<1	0.5	<0.05	<0.05	
MU1_B_18/10/16	MARINE WATER	18-Oct-16	10:45	10.50	97.5	7.92	0.3	8.07	8.07	35.38	53.574	14.97	<1	0.3	<0.05	<0.05	
BAY1_S_18/10/16	MARINE WATER	18-Oct-16	10:25	1.00	105.5	8.43	0.2	5.0	8.13	35.30	53.420	15.82	<1	0.5	<0.05	<0.05	
BAY1_B_18/10/16	MARINE WATER	18-Oct-16	10:15	8.00	103.2	8.29	2.0	8.11	8.11	35.32	53.466	15.54	<1	0.6	<0.05	<0.05	
BAY2_S_18/10/16	MARINE WATER	18-Oct-16	9:40	1.00	105.6	8.49	0.1	6.0	8.05	35.24	53.359	15.53	<1	0.6	<0.05	<0.05	
BAY2_B_18/10/16	MARINE WATER	18-Oct-16	9:30	16.50	89.2	7.28	0.3	8.00	8.00	35.38	53.575	14.72	<1	0.5	<0.05	<0.05	
W1_S_25/10/16	MARINE WATER	25-Oct-16	12:15	1.00	98.4	7.95	2.1	1.9	8.07	35.18	53.278	15.30	2	1.8	<0.05	<0.05	
W1_B_25/10/16	MARINE WATER	25-Oct-16	12:00	9.00	99.5	8.09	2.7	8.07	8.07	35.18	53.301	14.95	3	2	<0.05	<0.05	
W2_S_25/10/16	MARINE WATER	25-Oct-16	11:40	1.00	101.5	8.20	2.4	2.0	8.07	35.20	53.300	15.28	2	1.5	<0.05	<0.05	
W2_B_25/10/16	MARINE WATER	25-Oct-16	11:20	10.00	98.1	7.98	5.3	8.06	8.06	35.19	53.306	14.90	2	1.6	<0.05	<0.05	
CB1_S_25/10/16	MARINE WATER	25-Oct-16	12:50	1.00	100.0	8.03	4.2	1.4	8.06	35.18	53.263	15.63	2	2.5	<0.05	<0.05	
CB1_B_25/10/16	MARINE WATER	25-Oct-16	12:30	5.50	96.5	7.84	2.4	8.03	8.03	35.18	53.283	15.03	3	3.2	<0.05	<0.05	
MU1_S_25/10/16	MARINE WATER	25-Oct-16	11:00	1.00	102.6	8.27	2.8	1.9	8.07	35.20	53.310	15.38	2	1.7	<0.05	<0.05	
MU1_B_25/10/16	MARINE WATER	25-Oct-16	10:40	10.00	98.9	8.05	4.5	8.06	8.06	35.19	53.316	14.90	2	1.2	<0.05	<0.05	
BAY1_S_25/10/16	MARINE WATER	25-Oct-16	10:20	1.00	103.5	8.38	1.9	2.7	8.07	35.20	53.307	15.20	2	1.6	<0.05	<0.05	
BAY1_B_25/10/16	MARINE WATER	25-Oct-16	10:00	7.50	98.7	8.04	4.1	8.06	8.06	35.19	53.308	14.84	3	1.5	<0.05	<0.05	
BAY2_S_25/10/16	MARINE WATER	25-Oct-16	9:35	1.00	102.1	8.32	0.5	4.5	8.00	35.15	53.254	14.88	<1	0.6	<0.05	<0.05	
BAY2_B_25/10/16	MARINE WATER	25-Oct-16	9:20	16.00	98.7	8.05	1.8	8.04	8.04	35.22	53.360	14.85	<1	0.4	<0.05	<0.05	
W1_S_1/11/16	MARINE WATER	1-Nov-16	13:00	1.00	99.1	7.85	1.2	3.0	8.11	35.41	53.568	16.20	2	0.9	<0.05	<0.05	
W1_B_1/11/16	MARINE WATER	1-Nov-16	12:40	8.60	89.6	7.32	1.4	8.07	8.07	35.42	53.633	14.58	2	1	<0.05	<0.05	
W2_S_1/11/16	MARINE WATER	1-Nov-16	12:30	1.00	99.7	7.93	1.0	3.0	8.11	35.40	53.557	16.06	1	0.8	<0.05	<0.05	
W2_B_1/11/16	MARINE WATER	1-Nov-16	12:15	8.80	90.2	7.36	1.2	8.07	8.07	35.42	53.631	14.72	2	0.9	<0.05	<0.05	
CB1_S_1/11/16	MARINE WATER	1-Nov-16	13:30	1.00	98.8	7.80	1.2	3.1	8.10	35.42	53.567	16.40	1	0.8	<0.05	<0.05	
CB1_B_1/11/16	MARINE WATER	1-Nov-16	13:10	5.70	87.1	7.09	3.3	8.05	8.05	35.42	53.626	14.87	2	1.3	<0.05	<0.05	
MU1_S_1/11/16	MARINE WATER	1-Nov-16	11:10	1.00	98.4	7.80	1.1	3.5	8.09	35.42	53.571	16.18	1	0.8	<0.05	<0.05	
MU1_B_1/11/16	MARINE WATER	1-Nov-16	10:50	10.50	88.2	7.28	2.0	8.06	8.06	35.43	53.642	14.63	<1	0.6	<0.05	<0.05	
BAY1_S_1/11/16	MARINE WATER	1-Nov-16	10:30	1.0													

Table 8. Eden Baseline Marine Water Quality

Sample ID	Sample Type	Sample Date	Sample Time	Total Nitrogen as N	Total Phosphorus as P	Chlorophyll a	Total Arsenic (As)	Dissolved Arsenic (As)	Total Cadmium (Cd)	Dissolved Cadmium (Cd)	Total Chromium (Cr)	Dissolved Chromium (Cr)	Total Copper (Cu)	Dissolved Copper (Cu)
				mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
				0.05	0.005	1	0.5	0.5	0.2	0.2	0.5	0.5	1	1
Limit of Reporting (LOR)				0.12	0.025	1	-	-	-	-	-	-	-	-
Aquatic Ecosystems ¹				0.12	0.025	1	-	-	-	-	-	-	-	-
Toxicants in Marine Waters - 95% species protection ²				-	-	-	-	-	5.5	5.5	27.4	27.4	1.3	1.3
Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species ³				-	-	-	<30	<30	<0.5-5	<0.5-5	<20	<20	<5	<5
Primary Contact Recreation ⁴														
W1_S_20/9/16	MARINE WATER	20-Sep-16	14:05	0.15	<0.005	<1	2	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
W1_B_20/9/16	MARINE WATER	20-Sep-16	13:55	0.13	<0.005	1	1.9	1.7	<0.2	<0.2	<0.5	<0.5	<1	<1
W2_S_20/9/16	MARINE WATER	20-Sep-16	13:05	0.12	0.01	<1	2	1.9	<0.2	<0.2	<0.5	<0.5	<1	<1
W2_B_20/9/16	MARINE WATER	20-Sep-16	12:55	0.17	<0.005	<1	1.8	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
CB1_S_20/9/16	MARINE WATER	20-Sep-16	14:45	0.13	<0.005	1	2	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
CB1_B_20/9/16	MARINE WATER	20-Sep-16	14:25	0.16	<0.005	<1	1.8	1.7	<0.2	<0.2	<0.5	<0.5	<1	<1
MU1_S_20/9/16	MARINE WATER	20-Sep-16	12:30	0.14	<0.005	<1	1.9	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
MU1_B_20/9/16	MARINE WATER	20-Sep-16	12:20	0.14	0.005	<1	1.9	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY1_S_20/9/16	MARINE WATER	20-Sep-16	11:35	0.22	0.009	<1	2	1.7	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY1_B_20/9/16	MARINE WATER	20-Sep-16	11:20	0.13	<0.005	<1	2	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY2_S_20/9/16	MARINE WATER	20-Sep-16	10:45	0.14	0.006	1	2.1	1.9	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY2_B_20/9/16	MARINE WATER	20-Sep-16	10:30	0.13	0.008	<1	1.9	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
W1_S_4/10/16	MARINE WATER	4-Oct-16	14:15	0.18	0.014	3	2.3	2	<0.2	<0.2	<0.5	<0.5	<1	<1
W1_B_4/10/16	MARINE WATER	4-Oct-16	14:00	0.15	0.01	1	2.3	2	<0.2	<0.2	<0.5	<0.5	<1	<1
W2_S_4/10/16	MARINE WATER	4-Oct-16	13:30	0.11	0.008	3	2.1	2.1	<0.2	<0.2	<0.5	<0.5	<1	<1
W2_B_4/10/16	MARINE WATER	4-Oct-16	13:15	0.13	0.009	3	2.1	2	<0.2	<0.2	<0.5	<0.5	<1	<1
CB1_S_4/10/16	MARINE WATER	4-Oct-16	15:00	0.14	0.01	5	2.2	2.1	<0.2	<0.2	<0.5	<0.5	<1	<1
CB1_B_4/10/16	MARINE WATER	4-Oct-16	14:45	0.16	0.014	2	2.3	2.2	<0.2	<0.2	<0.5	<0.5	<1	<1
MU1_S_4/10/16	MARINE WATER	4-Oct-16	12:30	0.58	0.008	4	2.2	2.2	<0.2	<0.2	<0.5	<0.5	<1	<1
MU1_B_4/10/16	MARINE WATER	4-Oct-16	12:00	0.16	0.013	1	2.2	2.2	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY1_S_4/10/16	MARINE WATER	4-Oct-16	11:15	0.13	0.009	5	2.2	2	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY1_B_4/10/16	MARINE WATER	4-Oct-16	11:00	0.25	0.012	6	2.2	2.1	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY2_S_4/10/16	MARINE WATER	4-Oct-16	10:16	0.2	0.007	2	2.1	2.1	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY2_B_4/10/16	MARINE WATER	4-Oct-16	10:00	0.19	0.014	<1	2.4	2.2	<0.2	<0.2	<0.5	<0.5	<1	<1
W1_S_18/10/16	MARINE WATER	18-Oct-16	12:45	0.12	<0.005	1	1.8	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
W1_B_18/10/16	MARINE WATER	18-Oct-16	12:40	0.1	<0.005	<1	1.7	1.7	<0.2	<0.2	<0.5	<0.5	<1	<1
W2_S_18/10/16	MARINE WATER	18-Oct-16	12:10	0.1	<0.005	1	1.7	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
W2_B_18/10/16	MARINE WATER	18-Oct-16	12:00	0.12	<0.005	2	1.8	1.9	<0.2	<0.2	<0.5	<0.5	<1	<1
CB1_S_18/10/16	MARINE WATER	18-Oct-16	13:30	0.12	<0.005	<1	1.8	1.7	<0.2	<0.2	0.7	<0.5	<1	<1
CB1_B_18/10/16	MARINE WATER	18-Oct-16	13:20	0.09	<0.005	1	1.8	1.8	<0.2	<0.2	<0.5	<0.5	2	<1
MU1_S_18/10/16	MARINE WATER	18-Oct-16	10:55	0.1	<0.005	2	1.7	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
MU1_B_18/10/16	MARINE WATER	18-Oct-16	10:45	0.08	<0.005	2	1.9	1.8	<0.2	<0.2	10.6	<0.5	<1	<1
BAY1_S_18/10/16	MARINE WATER	18-Oct-16	10:25	0.11	<0.005	2	1.7	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY1_B_18/10/16	MARINE WATER	18-Oct-16	10:15	0.1	<0.005	3	1.9	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY2_S_18/10/16	MARINE WATER	18-Oct-16	9:40	0.46	<0.005	1	1.7	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY2_B_18/10/16	MARINE WATER	18-Oct-16	9:30	0.13	<0.005	1	2	1.9	<0.2	<0.2	<0.5	<0.5	2	1
W1_S_25/10/16	MARINE WATER	25-Oct-16	12:15	0.16	<0.005	1	1.7	1.5	<0.2	<0.2	<0.5	<0.5	1	<1
W1_B_25/10/16	MARINE WATER	25-Oct-16	12:00	0.17	<0.005	2	1.7	1.6	<0.2	<0.2	<0.5	<0.5	2	1
W2_S_25/10/16	MARINE WATER	25-Oct-16	11:40	0.15	<0.005	2	1.7	1.6	<0.2	<0.2	<0.5	<0.5	<1	<1
W2_B_25/10/16	MARINE WATER	25-Oct-16	11:20	0.15	<0.005	1	1.9	1.7	<0.2	<0.2	<0.5	<0.5	1	1
CB1_S_25/10/16	MARINE WATER	25-Oct-16	12:50	0.28	0.015	3	1.7	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
CB1_B_25/10/16	MARINE WATER	25-Oct-16	12:30	0.18	0.005	3	1.9	1.8	<0.2	<0.2	<0.5	<0.5	1	<1
MU1_S_25/10/16	MARINE WATER	25-Oct-16	11:00	0.19	0.006	2	1.9	1.7	<0.2	<0.2	<0.5	<0.5	2	<1
MU1_B_25/10/16	MARINE WATER	25-Oct-16	10:40	0.25	<0.005	3	2	1.8	<0.2	<0.2	<0.5	<0.5	<1	1
BAY1_S_25/10/16	MARINE WATER	25-Oct-16	10:20	0.14	<0.005	2	1.8	1.6	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY1_B_25/10/16	MARINE WATER	25-Oct-16	10:00	0.14	<0.005	2	1.9	1.7	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY2_S_25/10/16	MARINE WATER	25-Oct-16	9:35	0.14	<0.005	2	1.9	1.8	<0.2	<0.2	<0.5	<0.5	4	<1
BAY2_B_25/10/16	MARINE WATER	25-Oct-16	9:20	0.16	<0.005	1	1.9	1.9	<0.2	<0.2	1.2	<0.5	3	3
W1_S_1/11/16	MARINE WATER	1-Nov-16	13:00	0.1	<0.005	<1	1.8	1.7	<0.2	<0.2	<0.5	<0.5	1	<1
W1_B_1/11/16	MARINE WATER	1-Nov-16	12:40	0.12	<0.005	1	2	1.8	<0.2	<0.2	<0.5	<0.5	1	<1
W2_S_1/11/16	MARINE WATER	1-Nov-16	12:30	0.11	<0.005	<1	1.8	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
W2_B_1/11/16	MARINE WATER	1-Nov-16	12:15	0.11	<0.005	<1	1.9	1.7	<0.2	<0.2	<0.5	<0.5	2	2
CB1_S_1/11/16	MARINE WATER	1-Nov-16	13:30	0.12	<0.005	<1	2	1.7	<0.2	<0.2	<0.5	<0.5	<1	<1
CB1_B_1/11/16	MARINE WATER	1-Nov-16	13:10	0.11	<0.005	<1	1.8	1.8	<0.2	<0.2	<0.5	<0.5	2	<1
MU1_S_1/11/16	MARINE WATER	1-Nov-16	11:10	0.11	<0.005	<1	1.8	1.7	<0.2	<0.2	<0.5	<0.5	<1	<1
MU1_B_1/11/16	MARINE WATER	1-Nov-16	10:55	0.11	<0.005	<1	1.8	1.8	<0.2	<0.2	<0.5	<0.5	18	18
BAY1_S_1/11/16	MARINE WATER	1-Nov-16	10:30	0.1	<0.005	<1	1.7	1.6	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY1_B_1/11/16	MARINE WATER	1-Nov-16	10:15	0.12	<0.005	1	2	1.8	<0.2	<0.2	<0.5	<0.5	1	<1
BAY2_S_1/11/16	MARINE WATER	1-Nov-16	9:50	0.09	<0.005	<1	1.9	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
BAY2_B_1/11/16	MARINE WATER	1-Nov-16	9:20	0.12	<0.005	<1	1.9	1.7	<0.2	<0.2	<0.5	<0.5	4	4
W1_S_15/11/16	MARINE WATER	15-Nov-16	12:45	0.14	0.013	1	0.5	1.7	<0.2	<0.2	<0.5	<0.5	<1	<1
W1_B_15/11/16	MARINE WATER	15-Nov-16	12:25	0.16	0.015	<1	1.4	1.8	<0.2	<0.2	<0.5	<0.5	1	<1
W2_S_15/11/16	MARINE WATER	15-Nov-16	12:05	0.14	0.009	<1	1.9	1.9	<0.2	<0.2	<0.5	<0.5	<1	<1
W2_B_15/11/16	MARINE WATER	15-Nov-16	11:45	0.15	0.01	<1	0.9	1.8	<0.2	<0.2	<0.5	<0.5	<1	<1
CB1_S_15/11/16	MARINE WATER	15-Nov-16	13:15	0.14	0.01	<1	1.2	1.8	<					

Table 8. Eden Baseline Marine Water Quality

				Polynuclear Aromatic Hydrocarbons (g/g)										
	Sample Type	Sample Date	Sample Time	Total Nickel (Ni)	Dissolved Nickel (Ni)	Total Lead (Pb)	Dissolved Lead (Pb)	Total Zinc (Zn)	Dissolved Zinc (Zn)	Total Mercury (Hg)	Dissolved Mercury (Hg)	Tributyltin	Naphthalene	Acenaphthylene
Sample ID	Limit of Reporting (LOR)			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
				0.2	0.2	0.5	0.5	5	5	0.04	0.04	0.002	1	1
	Aquatic Ecosystems ¹			-	-	-	-	-	-	-	-	-	-	-
	Toxicants in Marine Waters - 95% species protection ²			70	70	4.4	4.4	15	15	0.4	0.4	0.006	70	-
	Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species ³			<100	<100	<1.7	<1.7	<5	<5	<1	<1	<0.01		
Primary Contact Recreation ⁴														
W1_S_20/9/16	MARINE WATER	20-Sep-16	14:05	<0.2	<0.2	0.8	0.7	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W1_B_20/9/16	MARINE WATER	20-Sep-16	13:55	<0.2	<0.2	0.7	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_S_20/9/16	MARINE WATER	20-Sep-16	13:05	<0.2	<0.2	0.7	0.7	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_B_20/9/16	MARINE WATER	20-Sep-16	12:55	<0.2	<0.2	0.8	0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1_S_20/9/16	MARINE WATER	20-Sep-16	14:45	0.5	<0.2	0.6	0.7	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1_B_20/9/16	MARINE WATER	20-Sep-16	14:25	<0.2	0.2	0.8	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
MU1_S_20/9/16	MARINE WATER	20-Sep-16	12:30	<0.2	<0.2	0.6	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
MU1_B_20/9/16	MARINE WATER	20-Sep-16	12:20	<0.2	<0.2	0.8	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY1_S_20/9/16	MARINE WATER	20-Sep-16	11:35	<0.2	<0.2	0.8	0.7	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY1_B_20/9/16	MARINE WATER	20-Sep-16	11:20	<0.2	<0.2	0.7	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY2_S_20/9/16	MARINE WATER	20-Sep-16	10:45	<0.2	<0.2	1	0.7	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY2_B_20/9/16	MARINE WATER	20-Sep-16	10:30	<0.2	<0.2	0.6	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W1_S_4/10/16	MARINE WATER	4-Oct-16	14:15	<0.2	<0.2	1.2	0.8	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W1_B_4/10/16	MARINE WATER	4-Oct-16	14:00	<0.2	<0.2	1.4	0.8	<5	<5	<0.04	<0.04	<0.002	<1.0	<1.0
W2_S_4/10/16	MARINE WATER	4-Oct-16	13:30	<0.2	<0.2	1	1.1	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_B_4/10/16	MARINE WATER	4-Oct-16	13:15	<0.2	<0.2	1.2	0.9	<5	<5	<0.04	<0.04	<0.002	<1.0	<1.0
CB1_S_4/10/16	MARINE WATER	4-Oct-16	15:00	<0.2	<0.2	0.9	0.8	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1_B_4/10/16	MARINE WATER	4-Oct-16	14:45	<0.2	<0.2	1.1	0.8	<5	<5	<0.04	<0.04	<0.002	<1.0	<1.0
MU1_S_4/10/16	MARINE WATER	4-Oct-16	12:30	<0.2	<0.2	1.4	1	<5	<5	<0.04	<0.04	-	<1.0	<1.0
MU1_B_4/10/16	MARINE WATER	4-Oct-16	12:00	<0.2	<0.2	0.8	1	<5	<5	<0.04	<0.04	<0.002	<1.0	<1.0
BAY1_S_4/10/16	MARINE WATER	4-Oct-16	11:15	<0.2	<0.2	1.1	1	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY1_B_4/10/16	MARINE WATER	4-Oct-16	11:00	<0.2	<0.2	1	1	<5	<5	<0.04	<0.04	<0.002	<1.0	<1.0
BAY2_S_4/10/16	MARINE WATER	4-Oct-16	10:16	<0.2	<0.2	0.8	0.8	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY2_B_4/10/16	MARINE WATER	4-Oct-16	10:00	<0.2	<0.2	1	0.9	<5	<5	<0.04	<0.04	<0.002	<1.0	<1.0
W1_S_18/10/16	MARINE WATER	18-Oct-16	12:45	<0.2	<0.2	0.6	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W1_B_18/10/16	MARINE WATER	18-Oct-16	12:40	<0.2	<0.2	0.5	0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_S_18/10/16	MARINE WATER	18-Oct-16	12:10	<0.2	<0.2	<0.5	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_B_18/10/16	MARINE WATER	18-Oct-16	12:00	<0.2	<0.2	<0.5	0.8	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1_S_18/10/16	MARINE WATER	18-Oct-16	13:20	<0.2	<0.2	0.6	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1_B_18/10/16	MARINE WATER	18-Oct-16	13:20	<0.2	<0.2	0.6	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
MU1_S_18/10/16	MARINE WATER	18-Oct-16	10:55	<0.2	<0.2	0.7	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
MU1_B_18/10/16	MARINE WATER	18-Oct-16	10:45	<0.2	<0.2	0.8	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY1_S_18/10/16	MARINE WATER	18-Oct-16	10:25	0.2	<0.2	0.5	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY1_B_18/10/16	MARINE WATER	18-Oct-16	10:15	<0.2	<0.2	0.6	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY2_S_18/10/16	MARINE WATER	18-Oct-16	9:40	<0.2	<0.2	<0.5	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY2_B_18/10/16	MARINE WATER	18-Oct-16	9:30	<0.2	<0.2	<0.5	0.7	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W1_S_25/10/16	MARINE WATER	25-Oct-16	12:15	<0.2	<0.2	0.6	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W1_B_25/10/16	MARINE WATER	25-Oct-16	12:00	<0.2	<0.2	<0.5	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_S_25/10/16	MARINE WATER	25-Oct-16	11:40	<0.2	<0.2	0.6	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_B_25/10/16	MARINE WATER	25-Oct-16	11:20	<0.2	<0.2	0.6	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1_S_25/10/16	MARINE WATER	25-Oct-16	12:50	<0.2	<0.2	<0.5	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1_B_25/10/16	MARINE WATER	25-Oct-16	12:30	<0.2	<0.2	0.6	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
MU1_S_25/10/16	MARINE WATER	25-Oct-16	11:00	<0.2	<0.2	0.7	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
MU1_B_25/10/16	MARINE WATER	25-Oct-16	10:40	<0.2	<0.2	0.7	0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY1_S_25/10/16	MARINE WATER	25-Oct-16	10:20	<0.2	<0.2	0.5	0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY1_B_25/10/16	MARINE WATER	25-Oct-16	10:00	<0.2	<0.2	0.8	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY2_S_25/10/16	MARINE WATER	25-Oct-16	9:35	0.2	<0.2	0.6	0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY2_B_25/10/16	MARINE WATER	25-Oct-16	9:20	<0.2	<0.2	0.9	0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W1_S_1/11/16	MARINE WATER	1-Nov-16	13:00	<0.2	<0.2	0.5	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W1_B_1/11/16	MARINE WATER	1-Nov-16	12:40	<0.2	<0.2	<0.5	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_S_1/11/16	MARINE WATER	1-Nov-16	12:30	<0.2	<0.2	0.7	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_B_1/11/16	MARINE WATER	1-Nov-16	12:15	<0.2	<0.2	0.6	0.8	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1_S_1/11/16	MARINE WATER	1-Nov-16	13:30	<0.2	<0.2	0.7	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1_B_1/11/16	MARINE WATER	1-Nov-16	13:10	<0.2	<0.2	0.7	0.7	<5	<5	<0.04	<0.04	-	<1.0	<1.0
MU1_S_1/11/16	MARINE WATER	1-Nov-16	11:10	<0.2	<0.2	0.6	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
MU1_B_1/11/16	MARINE WATER	1-Nov-16	10:55	0.4	<0.2	0.5	0.6	8	<5	<0.04	<0.04	-	<1.0	<1.0
BAY1_S_1/11/16	MARINE WATER	1-Nov-16	10:30	<0.2	<0.2	0.7	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY1_B_1/11/16	MARINE WATER	1-Nov-16	10:15	<0.2	<0.2	0.5	0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY2_S_1/11/16	MARINE WATER	1-Nov-16	9:50	<0.2	<0.2	0.6	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
BAY2_B_1/11/16	MARINE WATER	1-Nov-16	9:20	<0.2	<0.2	0.6	0.6	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W1_S_15/11/16	MARINE WATER	15-Nov-16	12:45	<0.2	<0.2	<0.5	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W1_B_15/11/16	MARINE WATER	15-Nov-16	12:25	<0.2	<0.2	<0.5	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_S_15/11/16	MARINE WATER	15-Nov-16	11:45	<0.2	<0.2	<0.5	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
W2_B_15/11/16	MARINE WATER	15-Nov-16	11:25	<0.2	<0.2	<0.5	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1_S_15/11/16	MARINE WATER	15-Nov-16	13:15	<0.2	<0.2	<0.5	<0.5	<5	<5	<0.04	<0.04	-	<1.0	<1.0
CB1														

Sample ID	Sample Type	Sample Date	Sample Time	PAH										
				Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
				1	1	1	1	1	1	1	1	1	1	0.5
	Limit of Reporting (LOR)													
	Aquatic Ecosystems ¹													
	Toxicants in Marine Waters - 95% species protection ²													
	Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species ³													
	Primary Contact Recreation ⁴													
W1_S_20/9/16	MARINE WATER	20-Sep-16	14:05	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
W1_B_20/9/16	MARINE WATER	20-Sep-16	13:55	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
W2_S_20/9/16	MARINE WATER	20-Sep-16	13:05	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
W2_B_20/9/16	MARINE WATER	20-Sep-16	12:55	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
CB1_S_20/9/16	MARINE WATER	20-Sep-16	14:45	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
CB1_B_20/9/16	MARINE WATER	20-Sep-16	14:25	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
MU1_S_20/9/16	MARINE WATER	20-Sep-16	12:30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
MU1_B_20/9/16	MARINE WATER	20-Sep-16	12:20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
BAY1_S_20/9/16	MARINE WATER	20-Sep-16	11:35	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
BAY1_B_20/9/16	MARINE WATER	20-Sep-16	11:20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
BAY2_S_20/9/16	MARINE WATER	20-Sep-16	10:45	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
BAY2_B_20/9/16	MARINE WATER	20-Sep-16	10:30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
W1_S_4/10/16	MARINE WATER	4-Oct-16	14:15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
W1_B_4/10/16	MARINE WATER	4-Oct-16	14:00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
W2_S_4/10/16	MARINE WATER	4-Oct-16	13:30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
W2_B_4/10/16	MARINE WATER	4-Oct-16	13:15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
CB1_S_4/10/16	MARINE WATER	4-Oct-16	15:00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
CB1_B_4/10/16	MARINE WATER	4-Oct-16	14:45	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
MU1_S_4/10/16	MARINE WATER	4-Oct-16	12:30	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
MU1_B_4/10/16	MARINE WATER	4-Oct-16	12:00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
BAY1_S_4/10/16	MARINE WATER	4-Oct-16	11:15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5
BAY1_B_4/10/16	MARINE WATER	4-Oct-16	11:00											

² WQOs for protection of Marine Aquatic Ecosystems in South-East Australia (ANZECC/ARMCANZ 2000 - Table 3.3.2)

² Toxicant guideline - 95% species protection in marine waters (ANZECC/ARMCANZ 2000 - Table 3.4.1)

³ Physico-chemical Stressor and Toxicant guidelines for the protection of aquaculture species (ANZECC/ARMCANZ 2000 - Tables 4.4.2 & 4.4.3)

⁴ Refer Marine Water Quality Objectives for NSW Ocean Waters - South Coast (DEC 2005 - <http://www.environment.nsw.gov.au/resources/water/mwqo/southcoast05582.pdf>)

³ Field parameters measured *insitu* using YSI 6600 V2-4 sonde

^e Laboratory parameters reported by ALS Melbourne and ALS Sydney

Shaded cells with **bold** text indicate Aquatic Ecosystems or 95% species protection limit g

Table 8. Eden Baseline Marine Water Quality

				Total Petroleum Hydrocarbons (TPH)											Total Recoverable Hydrocarb	
Sample ID	Sample Type	Sample Date	Sample Time	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene	Sum of polycyclic aromatic hydrocarbons	Benzo(a)pyrene TEQ (zero)	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)	C6 - C10 Fraction	C6 - C10 Fraction minus BTEX (F1)	>C10 - C16 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	µg/L
				1	1	1	0.5	0.5	20	50	100	50	20	20	100	
Limit of Reporting (LOR)																
Aquatic Ecosystems ¹				-	-	-	-	-	-	-	-	-	-	-	-	-
Toxicants in Marine Waters - 95% species protection ²				-	-	-	-	-	-	-	-	-	-	-	-	-
Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species ³				-	-	-	-	-	-	-	-	-	-	-	-	-
Primary Contact Recreation ⁴				-	-	-	-	-	-	-	-	-	-	-	-	-
W1_S_20/9/16	MARINE WATER	20-Sep-16	14:05	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W1_B_20/9/16	MARINE WATER	20-Sep-16	13:55	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W2_S_20/9/16	MARINE WATER	20-Sep-16	13:05	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W2_B_20/9/16	MARINE WATER	20-Sep-16	12:55	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
CB1_S_20/9/16	MARINE WATER	20-Sep-16	14:45	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
CB1_B_20/9/16	MARINE WATER	20-Sep-16	14:25	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
MU1_S_20/9/16	MARINE WATER	20-Sep-16	12:30	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
MU1_B_20/9/16	MARINE WATER	20-Sep-16	12:20	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY1_S_20/9/16	MARINE WATER	20-Sep-16	11:35	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY1_B_20/9/16	MARINE WATER	20-Sep-16	11:20	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY2_S_20/9/16	MARINE WATER	20-Sep-16	10:45	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY2_B_20/9/16	MARINE WATER	20-Sep-16	10:30	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W1_S_4/10/16	MARINE WATER	4-Oct-16	14:15	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W1_B_4/10/16	MARINE WATER	4-Oct-16	14:00	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W2_S_4/10/16	MARINE WATER	4-Oct-16	13:30	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W2_B_4/10/16	MARINE WATER	4-Oct-16	13:15	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
CB1_S_4/10/16	MARINE WATER	4-Oct-16	15:00	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
CB1_B_4/10/16	MARINE WATER	4-Oct-16	14:45	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
MU1_S_4/10/16	MARINE WATER	4-Oct-16	12:30	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
MU1_B_4/10/16	MARINE WATER	4-Oct-16	12:00	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY1_S_4/10/16	MARINE WATER	4-Oct-16	11:15	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY1_B_4/10/16	MARINE WATER	4-Oct-16	11:00	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY2_S_4/10/16	MARINE WATER	4-Oct-16	10:16	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY2_B_4/10/16	MARINE WATER	4-Oct-16	10:00	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W1_S_18/10/16	MARINE WATER	18-Oct-16	12:45	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W1_B_18/10/16	MARINE WATER	18-Oct-16	12:40	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W2_S_18/10/16	MARINE WATER	18-Oct-16	12:10	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W2_B_18/10/16	MARINE WATER	18-Oct-16	12:00	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
CB1_S_18/10/16	MARINE WATER	18-Oct-16	13:30	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
CB1_B_18/10/16	MARINE WATER	18-Oct-16	13:20	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
MU1_S_18/10/16	MARINE WATER	18-Oct-16	10:55	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
MU1_B_18/10/16	MARINE WATER	18-Oct-16	10:45	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY1_S_18/10/16	MARINE WATER	18-Oct-16	10:25	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY1_B_18/10/16	MARINE WATER	18-Oct-16	10:15	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY2_S_18/10/16	MARINE WATER	18-Oct-16	9:40	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY2_B_18/10/16	MARINE WATER	18-Oct-16	9:30	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W1_S_25/10/16	MARINE WATER	25-Oct-16	12:15	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W1_B_25/10/16	MARINE WATER	25-Oct-16	12:00	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W2_S_25/10/16	MARINE WATER	25-Oct-16	11:40	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W2_B_25/10/16	MARINE WATER	25-Oct-16	11:20	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
CB1_S_25/10/16	MARINE WATER	25-Oct-16	12:50	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
CB1_B_25/10/16	MARINE WATER	25-Oct-16	12:30	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
MU1_S_25/10/16	MARINE WATER	25-Oct-16	11:00	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
MU1_B_25/10/16	MARINE WATER	25-Oct-16	10:55	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
MU1_S_25/10/16	MARINE WATER	25-Oct-16	10:40	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY1_S_25/10/16	MARINE WATER	25-Oct-16	10:20	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY1_B_25/10/16	MARINE WATER	25-Oct-16	10:00	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY2_S_25/10/16	MARINE WATER	25-Oct-16	9:35	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
BAY2_B_25/10/16	MARINE WATER	25-Oct-16	9:20	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W1_S_1/11/16	MARINE WATER	1-Nov-16	13:00	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W1_B_1/11/16	MARINE WATER	1-Nov-16	12:40	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W2_S_1/11/16	MARINE WATER	1-Nov-16	12:30	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
W2_B_1/11/16	MARINE WATER	1-Nov-16	12:15	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
CB1_S_1/11/16	MARINE WATER	1-Nov-16	13:30	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20	<100
CB1_B_1/11/16	MARINE WATER	1-Nov-16	13:10	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100</					

Table 9. Eden Breakwater Wharf Extension Project - Ambient Water Quality (Median Values)

	FIELD PARAMETERS ⁵									LABORATORY PARAMETERS ⁶		
WQ Parameter	DO	DO	Turbidity	Secchi Depth	pH	Salinity	Conductivity	Temperature	Suspended Solids (SS)	Turbidity	Ammonia as N	Ammonium (NH ₄ ⁺) ⁶
Units	%	mg/L	ntu	m	pH unit	ppt	µS/cm	°C	mg/L	ntu	mg/L	mg/L
Limit of Reporting (LOR)	0.1	0.01	0.1	0.1	0.01	-	-	0.01	1	0.1	0.02	0.02
Aquatic Ecosystems ¹	90 - 110	-	0.5-10	-	8.0 - 8.4	-	-	-	-	-	-	0.02
Toxicants in Marine Waters - 95% species protection ²	-	-	-	-	-	-	-	-	-	-	0.91	-
Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species ³	-	>5	-	-	6.0-9.0	-	-		<10 ³ , <5 ⁴		<0.1	-
Primary Contact Recreation ⁴	-	-	-	≥1.6	-	-	-	-	-	-	-	-
W1	101.7	7.9	0.5	4.1	8.1	35.4	53,600	15.8	0.5	0.6	0.025	0.025
W2	103.1	8.0	0.5	4.3	8.1	35.4	53,595	15.7	0.8	0.8	0.025	0.025
CB1	103.9	7.9	0.8	4.2	8.1	35.4	53,600	15.9	0.5	0.7	0.025	0.025
MU1	102.3	7.9	0.5	5.2	8.1	35.4	53,600	15.7	0.5	0.5	0.035	0.035
BAY1	102.6	8.0	0.8	3.0	8.1	35.4	53,600	15.7	0.5	0.8	0.025	0.025
BAY2	102.3	7.9	0.3	6.2	8.0	35.4	53,620	15.2	0.5	0.4	0.025	0.025
BAY SITES (BAY1 & BAY2)	102.3	8.0	0.5	4.5	8.1	35.4	53,610	15.5	0.5	0.5	0.025	0.025
ALL SITES	102.1	8.0	0.6	4.3	8.1	35.4	53,600	15.7	0.5	0.6	0.025	0.025

Note

¹ WQOs for protection of Marine Aquatic Ecosystems in South-East Australia (ANZECC/ARMCANZ 2000 - Table 3.3.2)

² Toxicant guideline - 95% species protection in marine waters (ANZECC/ARMCANZ 2000 - Table 3.4.1)

³ Physico-chemical Stressor and Toxicant guidelines for the protection of aquaculture species (ANZECC/ARMCANZ 2000 - Tables 4.4.2 & 4.4.3)

⁴ Refer Marine Water Quality Objectives for NSW Ocean Waters - South Coast (DEC 2005 - <http://www.environment.nsw.gov.au/resources/water/mwqo/southcoast05582.pdf>)

⁵ Field parameters measured *in situ* using YSI 6600 V2-4 sonde

⁶ Laboratory parameters reported by ALS Melbourne and ALS Sydney

Shaded cells with **bold** text indicate Aquatic Ecosystems or 95% species protection limit guideline value has been exceeded.

Shaded cells with **underline** text indicate Aquaculture guideline value has been exceeded.

Table 9. Eden Breakwater Wharf Extension Project - Ambient Water Quality (Median Values)

LABORATORY PARAMETERS ⁶															
WQ Parameter	Total Nitrogen as N	Total Phosphorus as P	Chlorophyll a	Total Arsenic (As)	Dissolved Arsenic (As)	Total Cadmium (Cd)	Dissolved Cadmium (Cd)	Total Chromium (Cr)	Dissolved Chromium (Cr)	Total Copper (Cu)	Dissolved Copper (Cu)	Total Nickel (Ni)	Dissolved Nickel (Ni)	Total Lead (Pb)	Dissolved Lead (Pb)
Units	mg/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
Limit of Reporting (LOR)	0.05	0.005	1	0.5	0.5	0.2	0.2	0.5	0.5	1	1	0.2	0.2	0.5	0.5
Aquatic Ecosystems ¹	0.12	0.025	1	-	-	-	-	-	-	-	-	-	-	-	-
Toxicants in Marine Waters - 95% species protection ²	-	-	-	-	-	5.5	5.5	27.4	27.4	1.3	1.3	70	70	4.4	4.4
Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species ³	-	-	-	<30	<30	<0.5-5	<0.5-5	<20	<20	<5	<5	<100	<100	<1-7	<1-7
Primary Contact Recreation ⁴	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W1	0.145	0.003	1.0	1.8	1.8	0.1	0.1	0.25	0.25	0.5	0.5	0.1	0.1	0.38	0.25
W2	0.130	0.003	0.5	1.9	1.8	0.1	0.1	0.25	0.25	0.5	0.5	0.1	0.1	0.43	0.25
CB1	0.145	0.004	0.5	1.9	1.8	0.1	0.1	0.25	0.25	0.5	0.5	0.1	0.1	0.60	0.25
MU1	0.145	0.004	0.5	1.9	1.8	0.1	0.1	0.25	0.25	0.5	0.5	0.1	0.1	0.60	0.38
BAY1	0.140	0.004	1.0	1.9	1.8	0.1	0.1	0.25	0.25	0.5	0.5	0.1	0.1	0.50	0.50
BAY2	0.140	0.004	1.0	1.9	1.9	0.1	0.1	0.25	0.25	0.5	0.5	0.1	0.1	0.43	0.55
BAY SITES (BAY1 & BAY2)	0.140	0.004	1.0	1.9	1.8	0.1	0.1	0.25	0.25	0.5	0.5	0.1	0.1	0.50	0.50
ALL SITES	0.140	0.003	0.5	1.9	1.8	0.1	0.1	0.25	0.25	0.5	0.5	0.1	0.1	0.60	0.25

Note

¹ WQOs for protection of Marine Aquatic Ecosystems in South-East Australia (ANZECC/ARMCANZ 2000 - Table 3.3.2)

² Toxicant guideline - 95% species protection in marine waters (ANZECC/ARMCANZ 2000 - Table 3.4.1)

³ Physico-chemical Stressor and Toxicant guidelines for the protection of aquaculture species (ANZECC/ARMCANZ 2000 - Tables 4.4.2 & 4.4.3)

⁴ Refer Marine Water Quality Objectives for NSW Ocean Waters - South Coast (DEC 2005 - <http://www.environment.nsw.gov.au/resources/water/mwqo/southcoast05582.pdf>)

⁵ Field parameters measured *in situ* using YSI 6600 V2-4 sonde

⁶ Laboratory parameters reported by ALS Melbourne and ALS Sydney

Shaded cells with **bold** text indicate Aquatic Ecosystems or 95% species protection limit guideline value has been exceeded.

Shaded cells with **underline** text indicate Aquaculture guideline value has been exceeded.

Table 9. Eden Breakwater Wharf Extension Project - Ambient Water Quality (Median Values)

LABORATORY PARAMETERS ⁶															
WQ Parameter	Total Zinc (Zn)	Dissolved Zinc (Zn)	Total Mercury (Hg)	Dissolved Mercury (Hg)	Tributyltin	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene
Units	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
Limit of Reporting (LOR)	5	5	0.04	0.04	0.002	1	1	1	1	1	1	1	1	1	1
Aquatic Ecosystems ¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toxicants in Marine Waters - 95% species protection ²	15	15	0.4	0.4	0.006	70	-	-	-	-	-	-	-	-	-
<u>Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species³</u>	<5	<5	<1	<1	<0.01	-	-	-	-	-	-	-	-	-	-
Primary Contact Recreation ⁴	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W1	2.50	2.50	0.02	0.02	<0.002	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
W2	2.50	2.50	0.02	0.02	<0.002	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CB1	2.50	2.50	0.02	0.02	<0.002	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MU1	2.50	2.50	0.02	0.02	<0.002	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
BAY1	2.50	2.50	0.02	0.02	<0.002	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
BAY2	2.50	2.50	0.02	0.02	<0.002	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
BAY SITES (BAY1 & BAY2)	2.50	2.50	0.02	0.02	<0.002	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
ALL SITES	2.50	2.50	0.02	0.02	<0.002	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Note

¹ WQOs for protection of Marine Aquatic Ecosystems in South-East Australia (ANZECC/ARMCANZ 2000 - Table 3.3.2)

² Toxicant guideline - 95% species protection in marine waters (ANZECC/ARMCANZ 2000 - Table 3.4.1)

³ Physico-chemical Stressor and Toxicant guidelines for the protection of aquaculture species (ANZECC/ARMCANZ 2000 - Tables 4.4.2 & 4.4.3)

⁴ Refer Marine Water Quality Objectives for NSW Ocean Waters - South Coast (DEC 2005 - <http://www.environment.nsw.gov.au/resources/water/mwqo/southcoast05582.pdf>)

⁵ Field parameters measured *in situ* using YSI 6600 V2-4 sonde

⁶ Laboratory parameters reported by ALS Melbourne and ALS Sydney

Shaded cells with **bold** text indicate Aquatic Ecosystems or 95% species protection limit guideline value has been exceeded.

Shaded cells with **underline** text indicate Aquaculture guideline value has been exceeded.

Table 9. Eden Breakwater Wharf Extension Project - Ambient Water Quality (Median Values)

LABORATORY PARAMETERS ⁶															
WQ Parameter	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1.2.3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene	Sum of polycyclic aromatic hydrocarbons	Benzo(a)pyrene TEQ (zero)	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)	C6 - C10 Fraction	C6 - C10 Fraction minus BTEX (F1)
Units	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
Limit of Reporting (LOR)	1	1	0.5	1	1	1	0.5	0.5	20	50	100	50	50	20	20
Aquatic Ecosystems¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toxicants in Marine Waters - 95% species protection²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Primary Contact Recreation⁴															
W1	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20
W2	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20
CB1	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20
MU1	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20
BAY1	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20
BAY2	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20
BAY SITES (BAY1 & BAY2)	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20
ALL SITES	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5	<20	<50	<100	<50	<50	<20	<20

Note

¹ WQOs for protection of Marine Aquatic Ecosystems in South-East Australia (ANZECC/ARMCANZ 2000 - Table 3.3.2)

² Toxicant guideline - 95% species protection in marine waters (ANZECC/ARMCANZ 2000 - Table 3.4.1)

³ Physico-chemical Stressor and Toxicant guidelines for the protection of aquaculture species (ANZECC/ARMCANZ 2000 - Tables 4.4.2 & 4.4.3)

⁴ Refer Marine Water Quality Objectives for NSW Ocean Waters - South Coast (DEC 2005 - <http://www.environment.nsw.gov.au/resources/water/mwqo/southcoast05582.pdf>)

⁵ Field parameters measured *in situ* using YSI 6600 V2-4 sonde

⁶ Laboratory parameters reported by ALS Melbourne and ALS Sydney

Shaded cells with **bold** text indicate Aquatic Ecosystems or 95% species protection limit guideline value has been exceeded.

Shaded cells with **underline** text indicate Aquaculture guideline value has been exceeded.

Table 9. Eden Breakwater Wharf Extension Project - Ambient Water Quality (Median Values)

LABORATORY PARAMETERS ⁶													
WQ Parameter	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	>C10 - C16 Fraction minus Naphthalene (F2)	Benzene	Toluene	Ethylbenzene	meta- & para Xylene	ortho-Xylene	Total Xylenes	Sum of BTEX	Naphthalene
Units	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
Limit of Reporting (LOR)	100	100	100	100	100	1	2	2	2	2	2	1	5
Aquatic Ecosystems ¹	-	-	-	-	-	-	-	-	-	-	-	-	-
Toxicants in Marine Waters - 95% species protection ²	-	-	-	-	-	-	-	-	-	-	-	-	-
Physico-chemical Stressor and Toxicant guidelines for protection of saltwater aquaculture species ³	-	-	-	-	-	-	-	-	-	-	-	-	-
Primary Contact Recreation ⁴													
W1	<100	<100	<100	<100	<100	<1	<2	<2	<2	<2	<2	<1	<5
W2	<100	<100	<100	<100	<100	<1	<2	<2	<2	<2	<2	<1	<5
CB1	<100	<100	<100	<100	<100	<1	<2	<2	<2	<2	<2	<1	<5
MU1	<100	<100	<100	<100	<100	<1	<2	<2	<2	<2	<2	<1	<5
BAY1	<100	<100	<100	<100	<100	<1	<2	<2	<2	<2	<2	<1	<5
BAY2	<100	<100	<100	<100	<100	<1	<2	<2	<2	<2	<2	<1	<5
BAY SITES (BAY1 & BAY2)	<100	<100	<100	<100	<100	<1	<2	<2	<2	<2	<2	<1	<5
ALL SITES	<100	<100	<100	<100	<100	<1	<2	<2	<2	<2	<2	<1	<5

Note

¹ WQOs for protection of Marine Aquatic Ecosystems in South-East Australia (ANZECC/ARMCANZ 2000 - Table 3.3.2)

² Toxicant guideline - 95% species protection in marine waters (ANZECC/ARMCANZ 2000 - Table 3.4.1)

³ Physico-chemical Stressor and Toxicant guidelines for the protection of aquaculture species (ANZECC/ARMCANZ 2000 - Tables 4.4.2 & 4.4.3)

⁴ Refer Marine Water Quality Objectives for NSW Ocean Waters - South Coast (DEC 2005 - <http://www.environment.nsw.gov.au/resources/water/mwqo/southcoast05582.pdf>)

⁵ Field parameters measured *in situ* using YSI 6600 V2-4 sonde

⁶ Laboratory parameters reported by ALS Melbourne and ALS Sydney

Shaded cells with **bold** text indicate Aquatic Ecosystems or 95% species protection limit guideline value has been exceeded.

Shaded cells with **underline** text indicate Aquaculture guideline value has been exceeded.

APPENDIX A

JN16149 Eden Baseline water quality monitoring
YSI 6600 V2-4 Sonde Calibration Certificates

6600-V2 Multi-parameter Water Quality Sonde

The instrument has been tested and calibrated to factory specifications, as detailed below:



Parameter	Standard	Result		Standard	Result		Standard	Result		
Temperature	Control: thermometer	17.1		Instrument:	17.21		± 0.15 °C	0.11		
Conductivity (6560 sensor)	1,000 µS/cm	Pre- cal.	Post- cal.	10,000 µS/cm	Pre- cal.	Post- cal.	50,000 µS/cm	Pre- cal.	Post- cal.	
		-	-		-	-		49,320	50,000	
Conductivity (6560 sensor)	SpCond Cell Constant	-		SpCond Cell Constant	-		SpCond Cell Constant 5.0 ± 0.45	5.1714		
Dissolved O ₂ (ROX sensor)	Saturated air	99.00%		at 754.4 mmHg	99.50%		ODO gain Range 0.85 - 1.15	0.99338		
pH	7.0	Pre- cal.	Post- cal.	10.0	Pre- cal.	Post- cal.	4.0	Pre- cal.	Post- cal.	
		7.02	7.00		9.95	10.00		3.91	3.98	
pH mV	Offset: -50 to +50	-9.7		-165 to -180 from offset?	-173.1		+165 to +180 from offset?	172.1		
ORP mV	Zobell's	_____mV		@_____°C			-			
Depth	Zeroed in air	0		Check at _____m			± _____m			
Depth Calibration - if zero was entered, barometric pressure at time of calibration _____ mmHg (= hPa @ MSLP x 0.750062)										
Pressure offset	Offset:			Within spec?			-	-		
Turbidity (6136 sensor)	0.5 ntu	Pre- cal.	Post- cal.	126 ntu	Pre- cal.	Post- cal.			ok	
		0.5	0.5							
Turbidity offset	Offset:	2.69751		-10 to +20 ?	✓		-	-		
Chlorophyll (6025 sensor)	RFU zero (distilled water)	-		Offset:	-		Within spec?			
BGA-PC/ PA	Zero	-		Offset:	-		Within spec?			
Rhodamine	Zero	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.	Offset:			
					-	-				

New batteries in sonde? *yes (12.4 volts)*

Date inserted: *19-Sep-16*

New batteries in 650 MDS? *no*

Date inserted: *19-Sep-16*

Calibrated by: *NR Yee*

Date: *19-Sep-16*

Client: *DPI Lands - Sample Event 1*

Comments/ Notes (i.e. components requiring attention):

All sensors working according to spec.

No maintenance required.

6600-V2 Multi-parameter Water Quality Sonde

The instrument has been tested and calibrated to factory specifications, as detailed below:



Parameter	Standard	Result		Standard	Result		Standard	Result		
Temperature	Control: thermometer	16.5		Instrument:	16.65		± 0.15 °C	0.15		
Conductivity (6560 sensor)	1,000 µS/cm	Pre- cal.	Post- cal.	10,000 µS/cm	Pre- cal.	Post- cal.	50,000 µS/cm	Pre- cal.	Post- cal.	
		-	-		-	-		49,447	50,001	
Conductivity (6560 sensor)	SpCond Cell Constant	-		SpCond Cell Constant	-		SpCond Cell Constant 5.0 ± 0.45	5.20178		
Dissolved O ₂ (ROX sensor)	Saturated air	97.40%		at 748.2 mmHg	98.60%		ODO gain Range 0.85 - 1.15	0.99024		
pH	7.0	Pre- cal.	Post- cal.	10.0	Pre- cal.	Post- cal.	4.0	Pre- cal.	Post- cal.	
		7.02	7.00		10.00	10.00		4.01	4.00	
pH mV	Offset: -50 to +50	-12		-165 to -180 from offset?	-173.8		+165 to +180 from offset?	174.1		
ORP mV	Zobell's	_____mV		@ _____°C			-			
Depth	Zeroed in air	0		Check at _____m			± _____m			
Depth Calibration - if zero was entered, barometric pressure at time of calibration _____ mmHg (= hPa @ MSLP x 0.750062)										
Pressure offset	Offset:			Within spec?			-	-		
Turbidity (6136 sensor)	0.5 ntu	Pre- cal.	Post- cal.	126 ntu	Pre- cal.	Post- cal.			ok	
		1.4	0.5							
Turbidity offset	Offset:	3.63501		-10 to +20 ?	✓		-	-		
Chlorophyll (6025 sensor)	RFU zero (distilled water)	-		Offset:	-		Within spec?			
BGA-PC/ PA	Zero	-		Offset:	-		Within spec?			
Rhodamine	Zero	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.	Offset:			
					-	-				

New batteries in sonde?

no

Date inserted:

26-Sep-16

New batteries in 650 MDS?

no

Date inserted:

19-Sep-16

Calibrated by: NR Yee

Date: 4-Oct-16

Client: DPI - Lands Sample Event 2

Comments/ Notes (i.e. components requiring attention):

All sensors working according to spec.

No maintenance required.

6600-V2 Multi-parameter Water Quality Sonde

The instrument has been tested and calibrated to factory specifications, as detailed below:



Parameter	Standard	Result		Standard	Result		Standard	Result	
Temperature	Control: thermometer	16.7		Instrument:	16.6		± 0.15 °C	0.1	
Conductivity (6560 sensor)	1,000 µS/cm	Pre- cal.	Post- cal.	10,000 µS/cm	Pre- cal.	Post- cal.	50,000 µS/cm	Pre- cal.	Post- cal.
		-	-		-	-		50,100	50,000
Conductivity (6560 sensor)	SpCond Cell Constant	-		SpCond Cell Constant	-		SpCond Cell Constant 5.0 ± 0.45	5.1915	
Dissolved O ₂ (ROX sensor)	Saturated air	99.60%		at 752.7 mmHg	100.90%		ODO gain Range 0.85 - 1.15	0.98352	
pH	7.0	Pre- cal.	Post- cal.	10.0	Pre- cal.	Post- cal.	4.0	Pre- cal.	Post- cal.
		7.06	7.00		9.95	10.00		3.97	3.99
pH mV	Offset: -50 to +50	-15.2		-165 to -180 from offset?	-173		+165 to +180 from offset?	174.1	
ORP mV	Zobell's	_____mV		@ _____°C			-		
Depth	Zeroed in air	0		Check at _____m			± _____m		
Depth Calibration - if zero was entered, barometric pressure at time of calibration _____ mmHg (= hPa @ MSLP x 0.750062)									
Pressure offset	Offset:			Within spec?			-	-	
Turbidity (6136 sensor)	0.0 ntu	Pre- cal.	Post- cal.	126 ntu	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.
		-0.4	0		126.7	126		ok	
Turbidity offset	Offset:	3.14844		-10 to +20 ?	✓		-	-	
Chlorophyll (6025 sensor)	RFU zero (distilled water)	-		Offset:	-		Within spec?		
BGA-PC/ PA	Zero	-		Offset:	-		Within spec?		
Rhodamine WT	Zero	Pre- cal.	Post- cal.	106 µg/L @ 26°C	Pre- cal.	Post- cal.	Offset:	-0.33031	
		0	0		107	115.1			

New batteries in sonde? *no (12.4 volts)*

Date inserted: 26-Sep-16

New batteries in 650 MDS? *no*

Date inserted: 19-Sep-16

Calibrated by: NR Yee

Date: 17-Oct-16

Client: DPI - Lands Sample Event 3

Comments/ Notes (i.e. components requiring attention):

All sensors working according to spec.

No maintenance required.

6600-V2 Multi-parameter Water Quality Sonde

The instrument has been tested and calibrated to factory specifications, as detailed below:



Parameter	Standard	Result		Standard	Result		Standard	Result	
Temperature	Control: thermometer	18		Instrument:	18.08		± 0.15 °C	0.08	
Conductivity (6560 sensor)	1,000 µS/cm	Pre- cal.	Post- cal.	10,000 µS/cm	Pre- cal.	Post- cal.	50,000 µS/cm	Pre- cal.	Post- cal.
		-	-		-	-		50,615	50,000
Conductivity (6560 sensor)	SpCond Cell Constant	-		SpCond Cell Constant	-		SpCond Cell Constant 5.0 ± 0.45	5.12781	
Dissolved O ₂ (ROX sensor)	Saturated air	99.80%		at 759.9 mmHg	99.90%		ODO gain Range 0.85 - 1.15	0.98534	
pH	7.0	Pre- cal.	Post- cal.	10.0	Pre- cal.	Post- cal.	4.0	Pre- cal.	Post- cal.
		7.01	7.00		10.01	10.00		4.01	4.00
pH mV	Offset: -50 to +50	-12.13		-165 to -180 from offset?	-169.3		+165 to +180 from offset?	168.4	
ORP mV	Zobell's	_____mV		@ _____°C			-		
Depth	Zeroed in air	0		Check at _____m			± _____m		
Depth Calibration - if zero was entered, barometric pressure at time of calibration _____ mmHg (= hPa @ MSLP x 0.750062)									
Pressure offset	Offset:			Within spec?			-	-	
Turbidity (6136 sensor)	0.0 ntu	Pre- cal.	Post- cal.	12.7 ntu	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.
		0.1	0		12.1	12.7		ok	
Turbidity offset	Offset:	3.36537		-10 to +20 ?	✓		-	-	
Chlorophyll (6025 sensor)	RFU zero (distilled water)	-		Offset:	-		Within spec?		
BGA-PC/ PA	Zero	-		Offset:	-		Within spec?		
Rhodamine WT	Zero	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.	Offset:		

New batteries in sonde? *yes (13.0 volts)*

Date inserted: 24-Oct-16

New batteries in 650 MDS? *yes*

Date inserted: 24-Oct-16

Calibrated by: *NR Yee*

Date: 24-Oct-16

Client: *DPI - Lands Sample Event 4 (POST EVENT)*

Comments/ Notes (i.e. components requiring attention):

All sensors working according to spec.

No maintenance required.

6600-V2 Multi-parameter Water Quality Sonde

The instrument has been tested and calibrated to factory specifications, as detailed below:



Parameter	Standard	Result		Standard	Result		Standard	Result	
Temperature	Control: thermometer	19.1		Instrument:	19.2		± 0.15 °C	0.1	
Conductivity (6560 sensor)	1,000 µS/cm	Pre- cal.	Post- cal.	10,000 µS/cm	Pre- cal.	Post- cal.	50,000 µS/cm	Pre- cal.	Post- cal.
		-	-		-	-		49,748	50,001
Conductivity (6560 sensor)	SpCond Cell Constant	-		SpCond Cell Constant	-		SpCond Cell Constant 5.0 ± 0.45	5.15367	
Dissolved O ₂ (ROX sensor)	Saturated air	102.50%		at 755.6 mmHg	99.90%		ODO gain Range 0.85 - 1.15	0.95515	
pH	7.0	Pre- cal.	Post- cal.	10.0	Pre- cal.	Post- cal.	4.0	Pre- cal.	Post- cal.
		7.01	7.00		9.99	10.00		4.01	4.00
pH mV	Offset: -50 to +50	-16.7		-165 to -180 from offset?	-173.6		+165 to +180 from offset?	173.4	
ORP mV	Zobell's	_____mV		@ _____°C			-		
Depth	Zeroed in air	0		Check at _____m			± _____m		
Depth Calibration - if zero was entered, barometric pressure at time of calibration _____ mmHg (= hPa @ MSLP x 0.750062)									
Pressure offset	Offset:			Within spec?			-	-	
Turbidity (6136 sensor)	0.0 ntu	Pre- cal.	Post- cal.	12.7 ntu	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.
		-0.3	0		13	12.7		ok	
Turbidity offset	Offset:	3.11541		-10 to +20 ?	✓		-	-	
Chlorophyll (6025 sensor)	RFU zero (distilled water)	-		Offset:	-		Within spec?		
BGA-PC/ PA	Zero	-		Offset:	-		Within spec?		
Rhodamine WT	Zero	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.	Offset:		

New batteries in sonde?

no

Date inserted:

24-Oct-16

New batteries in 650 MDS?

no

Date inserted:

24-Oct-16

Calibrated by: NR Yee

Date: 31-Oct-16

Client: DPI - Lands Sample Event 5

Comments/ Notes (i.e. components requiring attention):

All sensors working according to spec.

No maintenance required.

6600-V2 Multi-parameter Water Quality Sonde

The instrument has been tested and calibrated to factory specifications, as detailed below:



Parameter	Standard	Result		Standard	Result		Standard	Result	
Temperature	Control: thermometer	22.1		Instrument:	22.24		± 0.15 °C	0.14	
Conductivity (6560 sensor)	1,000 µS/cm	Pre- cal.	Post- cal.	10,000 µS/cm	Pre- cal.	Post- cal.	50,000 µS/cm	Pre- cal.	Post- cal.
		-	-		-	-		49,346	50,009
Conductivity (6560 sensor)	SpCond Cell Constant	-		SpCond Cell Constant	-		SpCond Cell Constant 5.0 ± 0.45	5.21433	
Dissolved O ₂ (ROX sensor)	Saturated air	96.00%		at 752.6 mmHg	99.90%		ODO gain Range 0.85 - 1.15	0.98475	
pH	7.0	Pre- cal.	Post- cal.	10.0	Pre- cal.	Post- cal.	4.0	Pre- cal.	Post- cal.
		6.99	7.00		9.97	10.00		4.01	4.00
pH mV	Offset: -50 to +50	-16.2		-165 to -180 from offset?	-173.8		+165 to +180 from offset?	173.9	
ORP mV	Zobell's	_____mV		@ _____°C			-		
Depth	Zeroed in air	0		Check at _____m			± _____m		
Depth Calibration - if zero was entered, barometric pressure at time of calibration _____ mmHg (= hPa @ MSLP x 0.750062)									
Pressure offset	Offset:			Within spec?			-	-	
Turbidity (6136 sensor)	0.0 ntu	Pre- cal.	Post- cal.	12.7 ntu	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.
		0.1	0		12.6	12.7		ok	
Turbidity offset	Offset:	3.20951		-10 to +20 ?	✓		-	-	
Chlorophyll (6025 sensor)	RFU zero (distilled water)	-		Offset:	-		Within spec?		
BGA-PC/ PA	Zero	-		Offset:	-		Within spec?		
Rhodamine WT	Zero	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.	Offset:		
					-	-			

New batteries in sonde?

no

Date inserted:

24-Oct-16

New batteries in 650 MDS?

no

Date inserted:

24-Oct-16

Calibrated by: NR Yee

Date: 14-Nov-16

Client: DPI - Lands Sample Event 6

Comments/ Notes (i.e. components requiring attention):

All sensors working according to spec.

No maintenance required.

6600-V2 Multi-parameter Water Quality Sonde

The instrument has been tested and calibrated to factory specifications, as detailed below:



Parameter	Standard	Result		Standard	Result		Standard	Result	
Temperature	Control: thermometer	22.2		Instrument:	22.34		± 0.15 °C	0.14	
Conductivity (6560 sensor)	1,000 µS/cm	Pre- cal.	Post- cal.	10,000 µS/cm	Pre- cal.	Post- cal.	50,000 µS/cm	Pre- cal.	Post- cal.
		-	-		-	-		50,031	50,001
Conductivity (6560 sensor)	SpCond Cell Constant	-		SpCond Cell Constant	-		SpCond Cell Constant 5.0 ± 0.45	5.21105	
Dissolved O ₂ (ROX sensor)	Saturated air	101.00%		at 765.7 mmHg	100.90%		ODO gain Range 0.85 - 1.15	0.96424	
pH	7.0	Pre- cal.	Post- cal.	10.0	Pre- cal.	Post- cal.	4.0	Pre- cal.	Post- cal.
		7.00	7.00		9.96	10.00		3.99	4.00
pH mV	Offset: -50 to +50	-16.3		-165 to -180 from offset?	-172.9		+165 to +180 from offset?	173.8	
ORP mV	Zobell's	_____mV		@ _____°C			-		
Depth	Zeroed in air	0		Check at _____m			± _____m		
Depth Calibration - if zero was entered, barometric pressure at time of calibration _____ mmHg (= hPa @ MSLP x 0.750062)									
Pressure offset	Offset:			Within spec?			-	-	
Turbidity (6136 sensor)	0.0 ntu	Pre- cal.	Post- cal.	12.7 ntu	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.
		0.1	0		12.7	12.7		ok	
Turbidity offset	Offset:	3.11995		-10 to +20 ?	✓		-	-	
Chlorophyll (6025 sensor)	RFU zero (distilled water)	-		Offset:	-		Within spec?		
BGA-PC/ PA	Zero	-		Offset:	-		Within spec?		
Rhodamine WT	Zero	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.	Offset:		
					-	-			

New batteries in sonde?

no

Date inserted:

24-Oct-16

New batteries in 650 MDS?

no

Date inserted:

24-Oct-16

Calibrated by: NR Yee

Date: 28-Nov-16

Client: DPI - Lands Sample Event 7

Comments/ Notes (i.e. components requiring attention):

All sensors working according to spec.

No maintenance required.

6600-V2 Multi-parameter Water Quality Sonde

The instrument has been tested and calibrated to factory specifications, as detailed below:



Parameter	Standard	Result		Standard	Result		Standard	Result	
Temperature	Control: thermometer	27		Instrument:	26.98		± 0.15 °C	-0.02	
Conductivity (6560 sensor)	1,000 µS/cm	Pre- cal.	Post- cal.	10,000 µS/cm	Pre- cal.	Post- cal.	50,000 µS/cm	Pre- cal.	Post- cal.
		-	-		-	-		50,481	50,001
Conductivity (6560 sensor)	SpCond Cell Constant	-		SpCond Cell Constant	-		SpCond Cell Constant 5.0 ± 0.45	5.1295	
Dissolved O ₂ (ROX sensor)	Saturated air	97.60%		at 761 mmHg	100.20%		ODO gain Range 0.85 - 1.15	0.98891	
pH	7.0	Pre- cal.	Post- cal.	10.0	Pre- cal.	Post- cal.	4.0	Pre- cal.	Post- cal.
		7.02	7.00		9.94	10.00		3.95	4.00
pH mV	Offset: -50 to +50	-16.9		-165 to -180 from offset?	-172.8		+165 to +180 from offset?	176.9	
ORP mV	Zobell's	_____mV		@ _____°C			-		
Depth	Zeroed in air	0		Check at _____m			± _____m		
Depth Calibration - if zero was entered, barometric pressure at time of calibration _____ mmHg (= hPa @ MSLP x 0.750062)									
Pressure offset	Offset:			Within spec?			-	-	
Turbidity (6136 sensor)	0.0 ntu	Pre- cal.	Post- cal.	12.7 ntu	Pre- cal.	Post- cal.		Pre- cal.	Post- cal.
		0	0		12.6	12.7		ok	
Turbidity offset	Offset:	3.2444		-10 to +20 ?	✓		-	-	
Chlorophyll (6025 sensor)	RFU zero (distilled water)	-		Offset:	-		Within spec?		
BGA-PC/ PA	Zero	-		Offset:	-		Within spec?		
Rhodamine WT	Zero	Pre- cal.	Post- cal.	106 µg/L @ 26°C	Pre- cal.	Post- cal.	Offset:	1.02647	
		1.6	0		126.5	106			

New batteries in sonde? *yes (13.0 volts)*

Date inserted: 17-Jan-17

New batteries in 650 MDS? *no*

Date inserted: 24-Oct-16

Calibrated by: *NR Yee*

Date: 15-Jan-17

Client: *DPI - Lands JN16149 Sample Event 8*

Comments/ Notes (i.e. components requiring attention):

All sensors working according to spec.

No maintenance required.

JN16149 Eden Baseline water quality monitoring Post-Event Trigger Thresholds

APPENDIX B

The monitoring program included a requirement for capturing data following significant weather that may include a combination of high rainfall, sustained strong winds and large seaway. The purpose of the post-event sampling is to collect WQ data in Snug Cove during adverse conditions to assist in understanding the range of WQ conditions expected to occur naturally within Snug Cove.

Southern coastal NSW is affected by three main types of weather events where rainfall, strong winds and large swells are likely. These include 'Southerly Buster', East Coast Low (ECL) and strong NE winds generated by a monsoon trough. Given the short monitoring window (October – December 2016), it is unlikely we would see an extreme version of these types of weather, but there is reasonable likelihood an example of at least one of these weather types will occur.

Therefore a set of proposed triggers for conducting post-event sampling were developed, in consultation with NSW EPA, based on interpretation of available datasets (BOM, Office of Water, Manly Hydraulics). Trigger thresholds were set at levels that provided a reasonable likelihood that data collection would be undertaken during the monitoring period as well as represent a significant change from typical environmental conditions.

Preliminary discussions with DPI Lands regarding appropriate triggers to undertake post-event sampling included review of river level (m) and mean discharge (ML/day) data of the Towamba River and ocean swell height data. Provided below are data and discussion for proposed triggers for conducting post-event sampling following:

- 1) high rainfall,
- 2) large ocean swell event, and
- 3) sustained strong winds.

1. High Rainfall Event – Towamba River Level and Discharge

A number of high rainfall events (i.e. >100mm rainfall in 24hr period) were recorded in the two-year period, November 2014 to October 2016, that resulted in significant river discharges across the Bega Valley Shire region. Towamba River discharge and height data from this time period has been considered for setting a trigger level for post-event sampling. The most significant events in terms of total rainfall and rainfall intensity include early December 2014, April 2015, late January 2016 and early June 2016. A summary of these events and the response of the Towamba River are provided below with a plot provided over page.

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Towamba @Nungatta St (BOM 69073)

Date	Total Rainfall (mm)	ARI (AEP)	Towamba River – Mean Level (m)	Mean Discharge (ML/d)
6-7 Dec, 2014	133		1.862	13,631
7-9 Apr, 2015	165	<1 yr (>63%)	1.404	2,284
31 Jan, 2016	107	10-20 yr (5-10%)	1.37	2,298
4-6 June, 2016	No data available	No data available	3.919	83,226

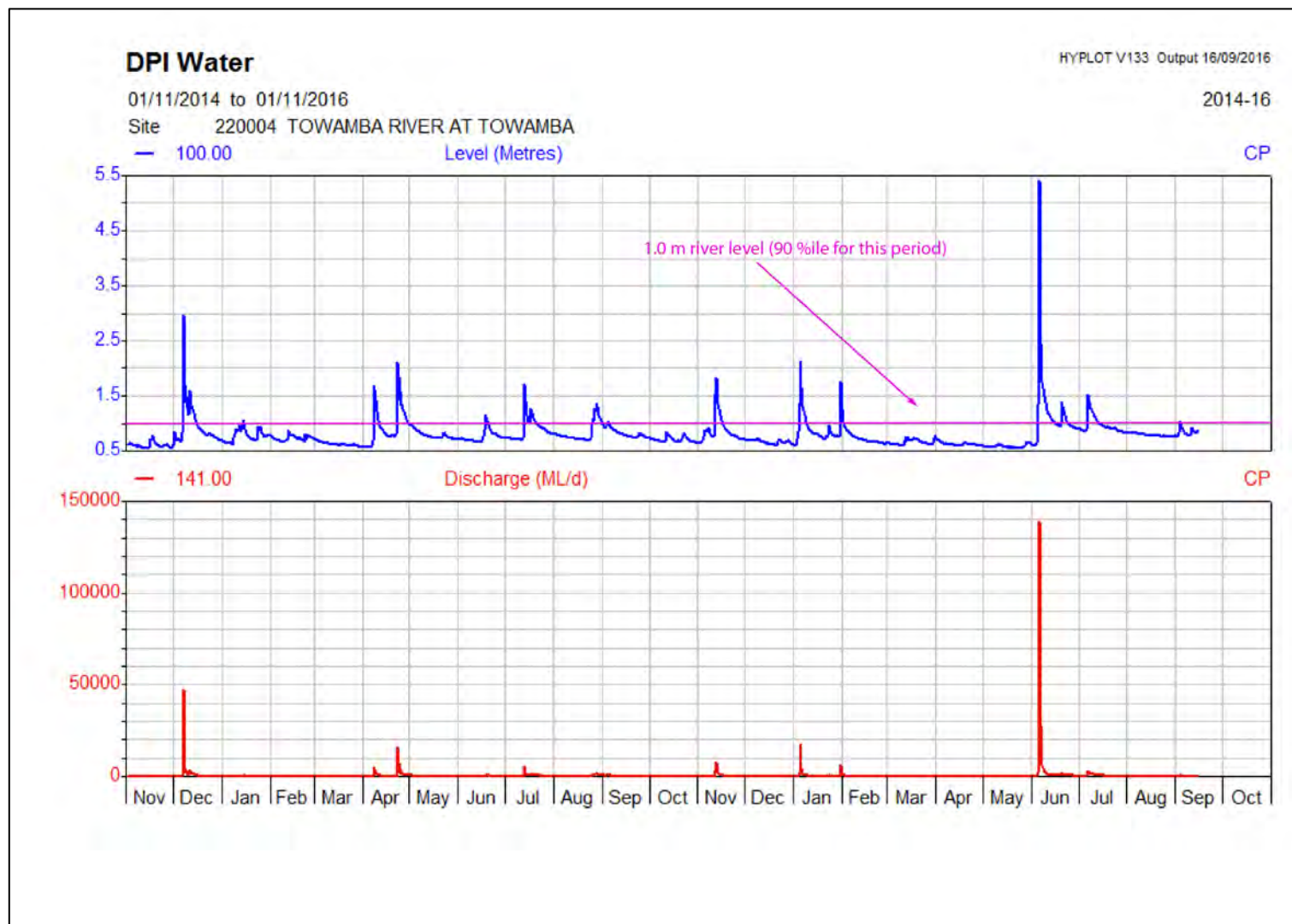
Towamba River statistics for two-year period (Nov 2014 – Oct 2016) show that median level is 0.732m with mean discharge of 122.4 ML/day.

Towamba River @ Towamba – Median Level and Mean Discharge

	Median Level (Metres)	Mean Discharge (ML/d)
median	0.732	122.4
75 %ile	0.831	211.0
80 %ile	0.88	266.8
90 %ile	1.0184	538.7
95 %ile	1.2121	1214.2
Max	3.919	83,226.9

A post-event trigger at ≥90%ile for river level is proposed, where sampling would proceed should the Towamba River exceed 1.0m level.

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2. Large Ocean Swell Event

Consideration for a trigger level based on ocean swell event is based on Eden wave data collected by Manly Hydraulics Laboratory (34 years of data). This included review of % exceedance for significant wave height (m) and % occurrence for principal wave direction for the Eden waverider buoy.

Swell direction is principally SE-S-SW through October with an increasing likelihood of E and NE swell through November and December. While swell from the S quadrants is still likely in November and December, the overall likelihood is less compared to October. Swell directions from E to S would exert some influence on Snug Cove with very large NE swells also exerting some influence on local hydrodynamics.

Statistics for significant wave height for the period October to December is provided below.

Eden – Significant Wave Height (m)

	October	November	December
Mean	1.55	1.54	1.5
Max	6.35	5.73	5.56
Min	0.38	0.38	0.38

Following review of % exceedance for significant wave height (m), swell events with significant wave heights of at least 2.5m have occurred <10% frequency in October, November and December. A trigger value set at 90%ile for significant wave height would lie between 2.0 – 2.5m. Provisionally, a trigger threshold of wave height of >2.3m is proposed, with swells from SE direction preferred.


Public Works
 Manly Hydraulics Laboratory


Office of Environment & Heritage

EXCEEDANCE STATISTICS

Site Name : EDEN
 Site Code : EDENOW

Nominated start/Finish : 08-FEB-1978 to 31-DEC-2012, Record Length : 34.92 years
 Data Start/Finish : 08-FEB-1978 to 31-DEC-2012, Record Length : 34.92 years

Creation date : 23-AUG-2013

PERCENTAGE EXCEEDANCE FOR Significant Wave Height(m)

monitoring window

Hsig	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	Hsig
0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.000	0.00
0.50	99.93	99.86	99.90	99.80	99.58	99.81	99.78	99.72	99.73	99.86	99.92	99.91	99.816	0.50
1.00	92.83	93.74	93.37	89.40	87.16	87.22	87.08	86.28	90.15	87.95	89.87	89.79	89.436	1.00
1.50	55.53	53.56	53.67	53.94	53.77	55.03	52.03	45.65	50.39	49.83	50.73	48.65	51.811	1.50
2.00	18.39	19.41	20.44	24.30	25.18	28.08	25.72	20.02	21.00	21.10	19.57	18.94	21.960	2.00
2.50	4.77	6.78	2.99	10.09	10.49	14.41	12.81	6.72	8.37	8.93	8.13	6.25	9.059	2.50
3.00	1.42	2.57	3.66	4.40	4.32	7.95	6.20	3.85	3.00	3.90	3.71	2.24	3.986	3.00
3.50	0.49	1.17	1.99	1.55	1.92	4.50	3.21	1.91	0.95	1.69	1.83	1.01	1.881	3.50
4.00	0.21	0.60	1.22	0.71	0.96	2.33	1.68	0.88	0.22	0.80	0.96	0.45	0.933	4.00
4.50	0.08	0.31	0.76	0.26	0.50	1.18	0.94	0.38	0.12	0.50	0.39	0.16	0.473	4.50
5.00	0.02	0.12	0.49	0.06	0.29	0.57	0.42	0.12	0.07	0.20	0.13	0.06	0.214	5.00
5.50	0.00	0.03	0.18	0.01	0.17	0.30	0.13	0.04	0.05	0.09	0.01	0.01	0.085	5.50
6.00	0.00	0.00	0.07	0.00	0.06	0.08	0.03	0.01	0.02	0.03	0.00	0.00	0.025	6.00
6.50	0.00	0.00	0.03	0.00	0.02	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.006	6.50
7.00	0.00	0.00	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.003	7.00
7.50	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.001	7.50
8.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	8.00
8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	8.50
Average :	1.57	1.56	1.61	1.59	1.58	1.71	1.63	1.48	1.53	1.55	1.54	1.50	1.65	
Maximum :	5.36	5.98	8.06	5.68	7.31	7.53	6.70	6.14	6.78	6.35	5.73	5.56	8.06	
Minimum :	0.37	0.38	0.38	0.29	0.29	0.38	0.29	0.29	0.29	0.38	0.38	0.38	0.29	
Number of data points used for statistical analysis:														
17008 16273 16617 17010 18778 19060 18987 19138 17661 20157 18744 18296 217729														
Percent capture based on Data start/finish:														
79.47 83.13 77.22 82.08 85.99 84.92 82.67 85.80 84.11 90.98 85.57 78.27 83.36														
Percent capture based on Nominated start/finish:														
79.47 83.13 77.22 82.08 85.99 84.92 82.67 85.80 84.11 90.98 85.57 78.27 83.36														

APPENDIX B

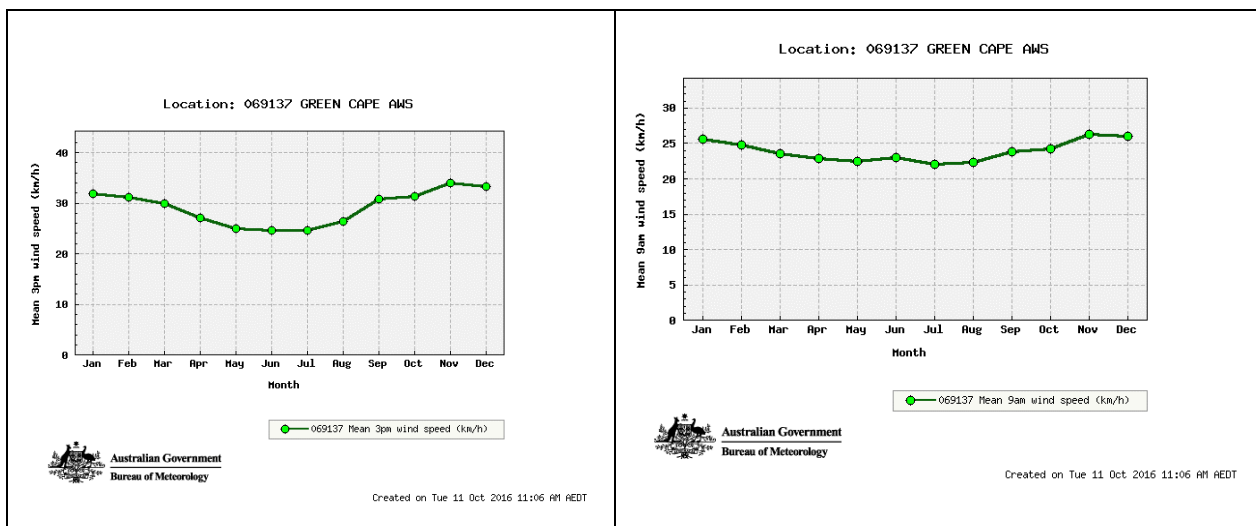
3. Sustained Strong Winds

Consideration for a trigger level based on wind is based on BOM data collected at Green Cape AWS (BOM station 69137). Strongest winds of year at Green Cape occur in November, followed by December then October. Further review of data shows that 9am and 3pm winds are similar through the monitoring window with 9am winds likely to be either N or SW, with 3pm winds likely to be either N or S.

A proposed trigger threshold based on wind strength takes into account the mean wind speeds from October to December at both 9am and 3pm. From data in table below, twice the mean wind speed for this time period provides an indicative threshold range of 51-66 km/hr. A mean wind speed trigger threshold of 50 km/hr (27 knots) sustained for period of at least 6 hours from the S quadrants is proposed.

For comparison, the BOM issues the following advice regarding winds:

- Strong wind warning – mean winds 25-33 knots
- Gale warning – mean winds 33-47 knots



Statistic Element	October	November	December	Annual	Twice mean Oct, Nov, Dec (km/h)
Mean 9am wind speed (km/h) for years 1991 to 2010	24.3	26.3	26	23.9	51
Mean 3pm wind speed (km/h) for years 1991 to 2010	31.4	34	33.3	29.2	66
Maximum wind gust speed (km/h) for years 2003 to 2016	104	117	115	135	
Date of Maximum wind gust speed for years 2003 to 2016	39371	41581	39796	39661	

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Summary

Following review by NSW EPA and DPI-Lands, the environmental trigger thresholds adopted for post-event sampling were as follows:

Environmental Factor	Threshold
Towamba River Level (m)	≥ 1.0m, 90%ile river level
Wind speed (Km/hr)	≥ mean wind speeds of 50km/h for 6 hour period from southern quadrants
Swell height (m)	≥ 2.3m swell, SE direction preferred

APPENDIX C

JN16149 Eden Baseline water quality monitoring dataset
[October 2016 to January 2017]
(* .xlsx digital file submitted with this report)

APPENDIX D

JN16149 Eden Baseline water quality monitoring
Laboratory Analytical Data (Reports, COCs, SRNs)

Sample Round	Date	Lab. Batch No.
1	20 September 2016	EM1611097
2	4 October 2016	ES1622273
3	18 October 2016	ES1623516
4	25 October 2016	ES1624142
5	1 November 2016	ES1624788
6	15 November 2016	ES1626072
7	29 November 2016	ES1627383
8	17 January 2017	ES1701119

CERTIFICATE OF ANALYSIS

Work Order	: EM1611097	Page	: 1 of 12
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: MR NICK YEE	Contact	: Carol Walsh
Address	: PO BOX 829	Address	: 4 Westall Rd Springvale VIC Australia 3171
	BEGA NSW, AUSTRALIA 2550		
Telephone	: +61 02 8003 4590	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 21-Sep-2016 12:35
Order number	: ----	Date Analysis Commenced	: 22-Sep-2016
C-O-C number	: ----	Issue Date	: 04-Oct-2016 17:50
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Chris Lemaitre	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	Senior Semivolatile Instrument Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
RICHARD TEA	Lab technician	Sydney Inorganics, Smithfield, NSW
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



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.

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

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

LOR = Limit of reporting

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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EG093A: It is recognised that total Ni, Cu, Pb is less than dissolved for samples EM1611097-005, 006, 010. However, the difference is within experimental variation of the methods.
- 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), Dibenzo(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

				W1_S_20/9/16	W1_B_20/9/16	W2_S_20/9/16	W2_B_20/9/16	CB1_S_20/9/16
Client sampling date / time				20-Sep-2016 14:05	20-Sep-2016 13:55	20-Sep-2016 13:05	20-Sep-2016 12:55	20-Sep-2016 14:45
Compound	CAS Number	LOR	Unit	EM1611097-001	EM1611097-002	EM1611097-003	EM1611097-004	EM1611097-005
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	40	<1	26	12	<1
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.7	0.4	1.0	0.8	0.5
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.8	1.7	1.9	1.8	1.7
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	0.2
Nickel	7440-02-0	0.5	µg/L	0.7	0.6	0.7	0.6	0.6
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	2.0	1.9	2.0	1.8	1.8
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	0.8	0.7	0.7	0.8	0.8
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.02	0.03	<0.02	0.03	0.02
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.15	0.13	0.12	0.17	0.16
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	0.010	<0.005	<0.005
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	mg/m³	<1	1	<1	<1	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				W1_S_20/9/16	W1_B_20/9/16	W2_S_20/9/16	W2_B_20/9/16	CB1_S_20/9/16
Client sampling date / time				20-Sep-2016 14:05	20-Sep-2016 13:55	20-Sep-2016 13:05	20-Sep-2016 12:55	20-Sep-2016 14:45
Compound	CAS Number	LOR	Unit	EM1611097-001	EM1611097-002	EM1611097-003	EM1611097-004	EM1611097-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	----	<100	<100	<100	<100



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				W1_S_20/9/16	W1_B_20/9/16	W2_S_20/9/16	W2_B_20/9/16	CB1_S_20/9/16
Client sampling date / time				20-Sep-2016 14:05	20-Sep-2016 13:55	20-Sep-2016 13:05	20-Sep-2016 12:55	20-Sep-2016 14:45
Compound	CAS Number	LOR	Unit	EM1611097-001	EM1611097-002	EM1611097-003	EM1611097-004	EM1611097-005
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	31.4	37.1	36.9	32.9	24.3
2-Chlorophenol-D4	93951-73-6	1	%	59.9	70.0	63.2	53.8	53.0
2,4,6-Tribromophenol	118-79-6	1	%	61.9	75.0	63.9	60.0	62.5
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	73.5	94.8	81.0	61.5	53.1
Anthracene-d10	1719-06-8	1	%	87.7	102	86.0	63.3	66.7
4-Terphenyl-d14	1718-51-0	1	%	83.3	97.1	82.3	59.0	79.6
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	85.0	88.3	94.4	110	98.1
Toluene-D8	2037-26-5	2	%	82.3	87.0	71.1	92.2	80.4
4-Bromofluorobenzene	460-00-4	2	%	96.6	92.0	87.7	101	89.9



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	CB1_B_20/9/16	MU1_S_20/9/16	MU1_B_20/9/16	BAY1_S_20/9/16	BAY1_B_20/9/16
Client sampling date / time					20-Sep-2016 14:25	20-Sep-2016 12:30	20-Sep-2016 12:20	20-Sep-2016 11:35	20-Sep-2016 11:20
Compound	CAS Number	LOR	Unit		EM1611097-006	EM1611097-007	EM1611097-008	EM1611097-009	EM1611097-010
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		22	11	24	2	<1
EA045: Turbidity									
Turbidity	----	0.1	NTU		0.6	0.8	1.0	0.9	0.9
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.8	1.8	1.8	1.7	1.8
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	1
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		0.7	0.6	0.6	0.7	0.6
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		2.0	1.9	1.9	2.0	1.9
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		0.5	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		0.6	0.6	0.8	0.8	0.7
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.02	<0.02	0.02	<0.02	<0.02
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.13	0.14	0.14	0.22	0.13
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		<0.005	<0.005	0.005	0.009	<0.005
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m³		1	<1	<1	<1	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_20/9/16	MU1_S_20/9/16	MU1_B_20/9/16	BAY1_S_20/9/16	BAY1_B_20/9/16
Client sampling date / time				20-Sep-2016 14:25	20-Sep-2016 12:30	20-Sep-2016 12:20	20-Sep-2016 11:35	20-Sep-2016 11:20
Compound	CAS Number	LOR	Unit	EM1611097-006	EM1611097-007	EM1611097-008	EM1611097-009	EM1611097-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_20/9/16	MU1_S_20/9/16	MU1_B_20/9/16	BAY1_S_20/9/16	BAY1_B_20/9/16
Client sampling date / time				20-Sep-2016 14:25	20-Sep-2016 12:30	20-Sep-2016 12:20	20-Sep-2016 11:35	20-Sep-2016 11:20
Compound	CAS Number	LOR	Unit	EM1611097-006	EM1611097-007	EM1611097-008	EM1611097-009	EM1611097-010
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	32.2	28.3	31.0	24.6	31.0
2-Chlorophenol-D4	93951-73-6	1	%	54.2	55.8	58.2	47.3	52.1
2,4,6-Tribromophenol	118-79-6	1	%	55.7	55.5	62.4	54.0	54.6
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	68.4	83.4	86.3	70.0	76.0
Anthracene-d10	1719-06-8	1	%	66.2	85.3	87.5	78.7	84.2
4-Terphenyl-d14	1718-51-0	1	%	60.0	87.8	86.4	79.6	79.9
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	91.8	91.0	99.8	93.2	90.9
Toluene-D8	2037-26-5	2	%	80.3	88.3	70.4	74.7	87.9
4-Bromofluorobenzene	460-00-4	2	%	82.3	92.5	88.0	90.6	99.1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BAY2_S_20/9/16	BAY2_B_20/9/16	----	----	----
Client sampling date / time					20-Sep-2016 10:45	20-Sep-2016 10:30	----	----	----
Compound	CAS Number	LOR	Unit		EM1611097-011	EM1611097-012	-----	-----	-----
				Result	Result		----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		<1	25	----	----	----
EA045: Turbidity									
Turbidity	----	0.1	NTU		0.3	0.4	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	----	----	----
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.8	1.9	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L		<1	<1	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		0.6	0.7	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.9	2.1	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L		<1	<1	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		0.6	1.0	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.02	<0.02	----	----	----
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.13	0.14	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		0.008	0.006	----	----	----
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m³		<1	1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				BAY2_S_20/9/16	BAY2_B_20/9/16	----	----	----
Client sampling date / time				20-Sep-2016 10:45	20-Sep-2016 10:30	----	----	----
Compound	CAS Number	LOR	Unit	EM1611097-011	EM1611097-012	-----	-----	-----
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	----	----	----
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	----	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	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				BAY2_S_20/9/16	BAY2_B_20/9/16	----	----	----
Client sampling date / time				20-Sep-2016 10:45	20-Sep-2016 10:30	----	----	----
Compound	CAS Number	LOR	Unit	EM1611097-011	EM1611097-012	-----	-----	-----
				Result	Result	----	----	----
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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	30.3	33.6	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	59.0	63.0	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%	64.7	62.7	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	84.2	86.8	----	----	----
Anthracene-d10	1719-06-8	1	%	93.4	85.5	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	91.2	84.6	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	102	99.9	----	----	----
Toluene-D8	2037-26-5	2	%	89.0	79.2	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	99.2	90.9	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	46
2-Chlorophenol-D4	93951-73-6	23	104
2,4,6-Tribromophenol	118-79-6	28	130
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	36	114
Anthracene-d10	1719-06-8	51	119
4-Terphenyl-d14	1718-51-0	49	127
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

QUALITY CONTROL REPORT

Work Order	: EM1611097	Page	: 1 of 8
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: MR NICK YEE	Contact	: Carol Walsh
Address	: PO BOX 829 BEGA NSW, AUSTRALIA 2550	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 02 8003 4590	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 21-Sep-2016
Order number	: ----	Date Analysis Commenced	: 22-Sep-2016
C-O-C number	: ----	Issue Date	: 04-Oct-2016
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This 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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Chris Lemaitre	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	Senior Semivolatile Instrument Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
RICHARD TEA	Lab technician	Sydney Inorganics, Smithfield, NSW
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



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 (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 592569)									
EM1611097-003	W2_S_20/9/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	26	22	17.3	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 597356)									
EM1611097-001	W1_S_20/9/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	40	44	9.52	0% - 20%
EM1611328-004	Anonymous	EA025-SW: Suspended Solids (SS)	----	1	mg/L	8	4	69.8	No Limit
EA045: Turbidity (QC Lot: 594569)									
EM1611097-001	W1_S_20/9/16	EA045: Turbidity	----	0.1	NTU	0.7	0.6	0.00	No Limit
EM1611097-012	BAY2_B_20/9/16	EA045: Turbidity	----	0.1	NTU	0.4	0.3	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 596810)									
EM1611097-001	W1_S_20/9/16	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EM1611097-011	BAY2_S_20/9/16	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 598246)									
EM1611097-001	W1_S_20/9/16	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EM1611097-011	BAY2_S_20/9/16	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 596083)									
EM1611097-001	W1_S_20/9/16	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.8	1.8	0.00	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	0.7	0.7	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EM1611097-011	BAY2_S_20/9/16	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.8	1.8	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: 596083) - continued									
EM1611097-011	BAY2_S_20/9/16	EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	0.6	0.6	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 596108)									
EM1611097-001	W1_S_20/9/16	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	2.0	2.0	0.00	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	0.8	0.8	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EM1611097-011	BAY2_S_20/9/16	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	1.9	2.0	0.00	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	0.6	0.8	26.4	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QC Lot: 597529)									
EM1611097-001	W1_S_20/9/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.02	<0.02	0.00	No Limit
EM1611097-010	BAY1_B_20/9/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.02	<0.02	0.00	No Limit
EK262A: Total Nitrogen (QC Lot: 595432)									
EM1611097-001	W1_S_20/9/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.15	0.14	0.00	No Limit
EM1611097-011	BAY2_S_20/9/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.13	0.14	0.00	No Limit
EK267A: Total Phosphorus (Persulfate Digestion) (QC Lot: 595433)									
EM1611097-001	W1_S_20/9/16	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.007	31.0	No Limit
EM1611097-011	BAY2_S_20/9/16	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	0.008	<0.005	40.9	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 594688)									
EM1611097-001	W1_S_20/9/16	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	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 (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 594688) - continued									
EM1611097-001	W1_S_20/9/16	EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	<1.0	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 594687)									
EM1611097-001	W1_S_20/9/16	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 600377)									
EM1611097-001	W1_S_20/9/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EM1611097-011	BAY2_S_20/9/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 594687)									
EM1611097-001	W1_S_20/9/16	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 600377)									
EM1611097-001	W1_S_20/9/16	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EM1611097-011	BAY2_S_20/9/16	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 600377)									
EM1611097-001	W1_S_20/9/16	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
EM1611097-011	BAY2_S_20/9/16	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	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 Spike (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**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 592569)								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	99.3	92	114
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 597356)								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	94.7	92	114
EA045: Turbidity (QCLot: 594569)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	104	92	106
EG035F: Dissolved Mercury by FIMS (QCLot: 596810)								
EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	103	83	105
EG035T: Total Mercury by FIMS (QCLot: 598246)								
EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	95.0	85	105
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 596083)								
EG093A-F: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	90.9	76	134
EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	10 µg/L	90.4	69	117
EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	10 µg/L	83.7	76	122
EG093A-F: Copper	7440-50-8	1	µg/L	<1	10 µg/L	92.4	71	129
EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	82.2	74	120
EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	89.1	72	124
EG093A-F: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	87.3	70	126
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 596108)								
EG093A-T: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	108	89	125
EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	10 µg/L	111	82	122
EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	10 µg/L	104	85	123
EG093A-T: Copper	7440-50-8	1	µg/L	<1	10 µg/L	120	84	128
EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	102	85	125
EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	112	85	125
EG093A-T: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	104	82	128
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 597529)								
EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.02	0.5 mg/L	95.2	80	115
EK262A: Total Nitrogen (QCLot: 595432)								
EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	<0.05	1 mg/L	88.5	81	111
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 595433)								
EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.44 mg/L	103	88	112
EP008: Chlorophyll (QCLot: 593845)								
EP008: Chlorophyll a	----	1	mg/m³	<1	20 mg/m³	95.0	70	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP008: Chlorophyll (QCLot: 595555)								
EP008: Chlorophyll a	----	1	mg/m³	<1	20 mg/m³	95.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 594688)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	77.7	39	110
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	87.6	40	124
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	82.0	47	117
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	83.4	51	118
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	90.2	53	119
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	92.1	51	113
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	93.6	59	123
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	90.5	58	123
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	90.2	52	126
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	92.3	55	123
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	95.1	52	131
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	101	57	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	101	56	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	93.2	53	123
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	93.9	53	125
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	94.1	53	125
EP080/071: Total Petroleum Hydrocarbons (QCLot: 594687)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	3368 µg/L	110	53	123
EP071: C15 - C28 Fraction	----	100	µg/L	<100	14735 µg/L	105	57	133
EP071: C29 - C36 Fraction	----	50	µg/L	<50	7856 µg/L	97.9	55	141
EP080/071: Total Petroleum Hydrocarbons (QCLot: 600377)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	98.1	67	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 594687)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	5225 µg/L	104	54	122
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	19994 µg/L	98.6	56	132
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1449 µg/L	90.4	51	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 600377)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	96.4	65	125
EP080: BTEXN (QCLot: 600377)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	97.9	76	120
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	101	76	124
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	99.8	72	124
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	40 µg/L	102	72	130
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	106	78	128

Matrix Spike (MS) Report

Sub-Matrix: **WATER**

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
EG035F: Dissolved Mercury by FIMS (QCLot: 596810)							
EM1611097-002	W1_B_20/9/16	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	92.0	70	130
EG035T: Total Mercury by FIMS (QCLot: 598246)							
EM1611097-003	W2_S_20/9/16	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	88.0	70	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 596083)							
EM1611097-002	W1_B_20/9/16	EG093A-F: Arsenic	7440-38-2	50 µg/L	99.7	70	130
		EG093A-F: Cadmium	7440-43-9	12.5 µg/L	99.8	70	130
		EG093A-F: Chromium	7440-47-3	50 µg/L	90.5	70	130
		EG093A-F: Copper	7440-50-8	50 µg/L	100	70	130
		EG093A-F: Lead	7439-92-1	50 µg/L	97.4	70	130
		EG093A-F: Nickel	7440-02-0	50 µg/L	100	70	130
		EG093A-F: Zinc	7440-66-6	50 µg/L	122	70	130
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 596108)							
EM1611097-002	W1_B_20/9/16	EG093A-T: Arsenic	7440-38-2	50 µg/L	114	70	130
		EG093A-T: Cadmium	7440-43-9	12.5 µg/L	120	70	130
		EG093A-T: Chromium	7440-47-3	50 µg/L	113	70	130
		EG093A-T: Copper	7440-50-8	50 µg/L	118	70	130
		EG093A-T: Lead	7439-92-1	50 µg/L	116	70	130
		EG093A-T: Nickel	7440-02-0	50 µg/L	117	70	130
		EG093A-T: Zinc	7440-66-6	50 µg/L	114	70	130
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 597529)							
EM1611097-002	W1_B_20/9/16	EK055G-SW: Ammonia as N	7664-41-7	0.5 mg/L	95.7	70	130
EK262A: Total Nitrogen (QCLot: 595432)							
EM1611097-001	W1_S_20/9/16	EK262PA-SW: Total Nitrogen as N	----	0.5 mg/L	97.4	70	130
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 595433)							
EM1611097-001	W1_S_20/9/16	EK267PA-SW: Total Phosphorus as P	----	0.5 mg/L	98.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 594688)							

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 Work Order : EM1611097
 Client : ELGIN ASSOCIATES PTY LTD
 Project : Eden Baseline Marine Water Quality



Sub-Matrix: **WATER**

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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 594688) - continued							
EM1611097-001	W1_S_20/9/16	EP075(SIM): Acenaphthene	83-32-9	5 µg/L	101	42	122
		EP075(SIM): Pyrene	129-00-0	5 µg/L	92.4	40	136
EP080/071: Total Petroleum Hydrocarbons (QCLot: 600377)							
EM1611097-002	W1_B_20/9/16	EP080: C6 - C9 Fraction	----	280 µg/L	90.9	43	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 600377)							
EM1611097-002	W1_B_20/9/16	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	85.9	44	122
EP080: BTEXN (QCLot: 600377)							
EM1611097-002	W1_B_20/9/16	EP080: Benzene	71-43-2	20 µg/L	108	68	130
		EP080: Toluene	108-88-3	20 µg/L	100	72	132

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EM1611097	Page	: 1 of 9
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: MR NICK YEE	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 21-Sep-2016
Site	: ----	Issue Date	: 04-Oct-2016
Sampler	: ----	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12

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)					
PAH/Phenols (GC/MS - SIM)	1	15	6.67	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	18	5.56	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	18	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025-SW) W2_S_20/9/16, MU1_S_20/9/16, BAY1_S_20/9/16,	W2_B_20/9/16, MU1_B_20/9/16, BAY1_B_20/9/16	20-Sep-2016	----	----	----	22-Sep-2016	27-Sep-2016	✓
Clear Plastic Bottle - Natural (EA025-SW) W1_S_20/9/16, CB1_S_20/9/16, BAY2_S_20/9/16,	W1_B_20/9/16, CB1_B_20/9/16, BAY2_B_20/9/16	20-Sep-2016	----	----	----	27-Sep-2016	27-Sep-2016	✓
EA045: Turbidity								
Clear Plastic Bottle - Natural (EA045) W1_S_20/9/16, W2_S_20/9/16, CB1_S_20/9/16, MU1_S_20/9/16, BAY1_S_20/9/16, BAY2 S_20/9/16,	W1_B_20/9/16, W2_B_20/9/16, CB1_B_20/9/16, MU1_B_20/9/16, BAY1_B_20/9/16, BAY2 B_20/9/16	20-Sep-2016	----	----	----	22-Sep-2016	22-Sep-2016	✓



Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035F: Dissolved Mercury by FIMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F-LL)		20-Sep-2016	----	----	----	26-Sep-2016	18-Oct-2016	✓
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16,	BAY2_B_20/9/16,							
EG035T: Total Mercury by FIMS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035T-LL)		20-Sep-2016	----	----	----	29-Sep-2016	18-Oct-2016	✓
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16,	BAY2_B_20/9/16,							
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093A-F)		20-Sep-2016	----	----	----	26-Sep-2016	19-Mar-2017	✓
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16,	BAY2_B_20/9/16,							
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-T)		20-Sep-2016	26-Sep-2016	19-Mar-2017	✓	26-Sep-2016	19-Mar-2017	✓
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16,	BAY2_B_20/9/16,							
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Clear Plastic Bottle - Sulfuric Acid (EK055G-SW)		20-Sep-2016	----	----	----	28-Sep-2016	18-Oct-2016	✓
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2 S_20/9/16,	BAY2_B_20/9/16,							



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK262A: Total Nitrogen								
Clear Plastic Bottle - Frozen (AS) (EK262PA-SW)		20-Sep-2016	23-Sep-2016	18-Oct-2016	✓	23-Sep-2016	18-Oct-2016	✓
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16,	BAY2_B_20/9/16,							
EK267A: Total Phosphorus (Persulfate Digestion)								
Clear Plastic Bottle - Frozen (AS) (EK267PA-SW)		20-Sep-2016	23-Sep-2016	18-Oct-2016	✓	23-Sep-2016	18-Oct-2016	✓
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16,	BAY2_B_20/9/16,							
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008)		20-Sep-2016	----	----	----	23-Sep-2016	11-Oct-2016	✓
CB1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16								
White Plastic Bottle - Unpreserved (EP008)		20-Sep-2016	----	----	----	22-Sep-2016	22-Sep-2016	✓
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_B_20/9/16,	MU1_S_20/9/16,							
MU1_B_20/9/16,	BAY1_S_20/9/16,							
BAY2_B_20/9/16								
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))		20-Sep-2016	23-Sep-2016	27-Sep-2016	✓	28-Sep-2016	02-Nov-2016	✓
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2 S_20/9/16,	BAY2 B_20/9/16,							



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)		20-Sep-2016	23-Sep-2016	27-Sep-2016	✔	27-Sep-2016	02-Nov-2016	✔
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16,	BAY2_B_20/9/16,							
Amber VOC Vial - Sulfuric Acid (EP080)		20-Sep-2016	29-Sep-2016	04-Oct-2016	✔	29-Sep-2016	04-Oct-2016	✔
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16,	BAY2_B_20/9/16,							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		20-Sep-2016	23-Sep-2016	27-Sep-2016	✔	27-Sep-2016	02-Nov-2016	✔
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16,	BAY2_B_20/9/16,							
Amber VOC Vial - Sulfuric Acid (EP080)		20-Sep-2016	29-Sep-2016	04-Oct-2016	✔	29-Sep-2016	04-Oct-2016	✔
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2_S_20/9/16,	BAY2_B_20/9/16,							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		20-Sep-2016	29-Sep-2016	04-Oct-2016	✔	29-Sep-2016	04-Oct-2016	✔
W1_S_20/9/16,	W1_B_20/9/16,							
W2_S_20/9/16,	W2_B_20/9/16,							
CB1_S_20/9/16,	CB1_B_20/9/16,							
MU1_S_20/9/16,	MU1_B_20/9/16,							
BAY1_S_20/9/16,	BAY1_B_20/9/16,							
BAY2 S_20/9/16,	BAY2 B_20/9/16,							



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)							
Ammonia as N (Saline Water)	EK055G-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	6.67	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	3	25	12.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	2	12	16.67	9.52	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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							
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✔	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	18	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard



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
Suspended Solids - Saline Water	EA025-SW	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Turbidity	EA045	WATER	In house: Referenced to APHA 2130 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Mercury by FIMS - Low Level	EG035F-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS - Low Level	EG035T-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm 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)
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. 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)
Ammonia as N (Saline Water)	EK055G-SW	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.



Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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	In house: Referenced to 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	In house: Referenced to 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
Persulfate Digestion for UT TN and TP for FIA/Saline	EK262/267PA-SW Prep	WATER	In house: Referenced to APHA 4500 P - J. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EM1611097

Client : ELGIN ASSOCIATES PTY LTD Contact : MR NICK YEE Address : PO BOX 829 BEGA NSW, AUSTRALIA 2550 E-mail : nick.yee@elgin.com.au Telephone : +61 02 8003 4590 Facsimile : +61 03 8648 6336 Project : Eden Baseline Marine Water Quality Order number : --- C-O-C number : --- Site : --- Sampler :	Laboratory : Environmental Division Melbourne Contact : Carol Walsh Address : 4 Westall Rd Springvale VIC Australia 3171 E-mail : carol.walsh@alsglobal.com Telephone : +61-3-8549 9608 Facsimile : +61-3-8549 9601 Page : 1 of 3 Quote number : EM2016ELGASS0003 (ME/411/16 V2) QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 21-Sep-2016 12:35 PM	Issue Date : 22-Sep-2016
Client Requested Due : 29-Sep-2016	Scheduled Reporting Date : 03-Oct-2016
Date	

Delivery Details

Mode of Delivery : Carrier	Security Seal : Intact.
No. of coolers/boxes : 2	Temperature : 9.2°C - Ice present
Receipt Detail :	No. of samples received / analysed : 12 / 12

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 direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.
- **Analytical work for this work order will be conducted at ALS Springvale and ALS Sydney.**
- **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 Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

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.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA025-SW Suspended Solids - Saline Water	WATER - EK055G-SW Ammonia as N (Sea Water)	WATER - EK262PA-SW Total Nitrogen by Persulfate Digestion	WATER - EP008 Chlorophyll a	WATER - EP075 SIM PAH only SIM - PAH only	WATER - MW-2(ANZECC) 7 METALS ORC + LL Hg (Marine Water ANZECC)	WATER - MW-2T (ANZECC) 7 METALS ORC Total + LL Hg (Marine Water)
EM1611097-001	20-Sep-2016 14:05	W1_S_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-002	20-Sep-2016 13:55	W1_B_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-003	20-Sep-2016 13:05	W2_S_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-004	20-Sep-2016 12:55	W2_B_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-005	20-Sep-2016 14:45	CB1_S_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-006	20-Sep-2016 14:25	CB1_B_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-007	20-Sep-2016 12:30	MU1_S_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-008	20-Sep-2016 12:20	MU1_B_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-009	20-Sep-2016 11:35	BAY1_S_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-010	20-Sep-2016 11:20	BAY1_B_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-011	20-Sep-2016 10:45	BAY2_S_20/9/16	✓	✓	✓	✓	✓	✓	✓
EM1611097-012	20-Sep-2016 10:30	BAY2_B_20/9/16	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA045 Turbidity	WATER - EK267PA-SW Total Phosphorus by Persulfate Digestion	WATER - TPH TRH (C6-C40)
EM1611097-001	20-Sep-2016 14:05	W1_S_20/9/16	✓	✓	✓
EM1611097-002	20-Sep-2016 13:55	W1_B_20/9/16	✓	✓	✓
EM1611097-003	20-Sep-2016 13:05	W2_S_20/9/16	✓	✓	✓
EM1611097-004	20-Sep-2016 12:55	W2_B_20/9/16	✓	✓	✓
EM1611097-005	20-Sep-2016 14:45	CB1_S_20/9/16	✓	✓	✓
EM1611097-006	20-Sep-2016 14:25	CB1_B_20/9/16	✓	✓	✓
EM1611097-007	20-Sep-2016 12:30	MU1_S_20/9/16	✓	✓	✓
EM1611097-008	20-Sep-2016 12:20	MU1_B_20/9/16	✓	✓	✓
EM1611097-009	20-Sep-2016 11:35	BAY1_S_20/9/16	✓	✓	✓
EM1611097-010	20-Sep-2016 11:20	BAY1_B_20/9/16	✓	✓	✓
EM1611097-011	20-Sep-2016 10:45	BAY2_S_20/9/16	✓	✓	✓
EM1611097-012	20-Sep-2016 10:30	BAY2_B_20/9/16	✓	✓	✓

Telephone : + 61-3-8549 9600

[illegible]



CHAIN OF CUSTODY

ALS (Priority, please tick)

1. Sydney: 277 Woodpark Rd. Smithfield NSW 2171
Ph: 02 9714 5600 E: samples@als.com.au
2. Newcastle: 5 Robinson Rd. Newcastle NSW 2300
Ph: 02 4969 3412 E: nsw@als.com.au

3. Brisbane: 52 Strand St. St. Lawrence QLD 4053
Ph: 07 3219 7222 E: samples@als.com.au
4. Townsville: 18-15 Deering Ct. Bohle QLD 3845
Ph: 07 4706 0900 E: townsville@als.com.au

5. Melbourne: 7 Waverley Pl. Camberwell VIC 3121
Ph: 03 9547 8618 E: samples@als.com.au
6. Adelaide: 24 Blythe St. Adelaide SA 5004
Ph: 08 8333 1600 E: adelaide@als.com.au

7. Perth: 12 Hays Way. Mandurah WA 6250
Ph: 08 9429 2955 E: samples@als.com.au
8. Vancouver: 27 West 4th St. Vancouver BC V6Z 1Z2
Ph: 604 261 7121 E: vancouver@als.com

CLIENT: ELGIN ASSOCIATES		TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Elements)	
OFFICE: 1st Floor 45-47 Church Street, BEGA, NSW 2550		ALS QUOTE NO.: ME411/16-V3	
PROJECT: Eden Baseline Marine Water Quality		COC SEQUENCE NUMBER: 1016	
ORDER NUMBER:		COC: 6	
PROJECT MANAGER: NICHOLAS YEE		CONTACT PH: 0400 385 234	
SAMPLER: Elgin Associates		SAMPLER MOBILE:	
COC emailed to ALS? (YES / NO)		RELINQUISHED BY: N.Yee	
Email Reports to: nick.yee@elgin.com.au		DATE/TIME: 20/9/16 1630	
Email Invoice to: nick.yee@elgin.com.au		RECEIVED BY:	
		DATE/TIME:	
		RELINQUISHED BY:	
		DATE/TIME:	
		RECEIVED BY:	
		DATE/TIME:	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:					
ANALYSIS REQUIRED including SUITES (NB: A tick in the box indicates that the analysis is required)					
Where Metals are analysed as follows: (tick in the box if required)					
Add Sample Information					
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (Refer to 2008-08-01)	TOTAL BOTTLES
1	WL_S_20/9/16	20/9/16	Seawater	None	1
2	WL_B_20/9/16	20/9/16	Seawater	None	1
3	WL_S_20/9/16	20/9/16	Seawater	None	1
4	WL_B_20/9/16	20/9/16	Seawater	None	1
5	CB1_S_20/9/16	20/9/16	Seawater	None	1
6	CB1_B_20/9/16	20/9/16	Seawater	None	1
7	MUF_S_20/9/16	20/9/16	Seawater	None	1
8	MUF_B_20/9/16	20/9/16	Seawater	None	1
9	BAY1_S_20/9/16	20/9/16	Seawater	None	1
10	BAY1_B_20/9/16	20/9/16	Seawater	None	1
11	BAY2_S_20/9/16	20/9/16	Seawater	None	1
12	BAY2_B_20/9/16	20/9/16	Seawater	None	1



CHAIN OF CUSTODY

ALS Laboratory: please tick →

□ Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph 02 8734 8555 E: samples.sydney@alsenviro.com
□ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
Ph 02 4568 3433 E: samples.newcastle@alsenviro.com

□ Brisbane: 32 Stand St, Stafford QLD 4053
Ph 07 3243 7222 E: samples.brisbane@alsenviro.com
□ Townsville: 14-15 Deema Ct, Bohle QLD 4818
Ph 07 4736 0600 E: townsville.environmental@alsenviro.com

✓ Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph 03 8543 9800 E: samples.melbourne@alsenviro.com
□ Adelaide: 2-1 Burma Rd, Norriska SA 5095
Ph 08 8359 0360 E: adelaide@alsenviro.com

□ Perth: 10 Hod Way, Malaga WA 6090
Ph 08 9209 7655 E: samples.perth@alsenviro.com
□ Launceston: 27 Wellington St, Launceston TAS 7250
Ph 03 6331 2158 E: launceston@alsenviro.com

CLIENT: ELGIN ASSOCIATES		TURNAROUND REQUIREMENTS:		FOR LABORATORY USE ONLY (Circle)	
OFFICE: 1st Floor 45-47 Church Street, BEGA, NSW 2550		(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)		Custody Seal Intact? Yes No N/A	
PROJECT: Eden Baseline Marine Water Quality		ALS QUOTE NO.: ME/411/16 V3		Free ice / frozen ice bricks present upon receipt? Yes No N/A	
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)		Random Sample Temperature on Receipt °C	
PROJECT MANAGER: NICHOLAS YEE		CONTACT PH: 0400 365 234		Other comment:	
SAMPLER: Elgin Associates		SAMPLER MOBILE:		RECEIVED BY:	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		DATE/TIME:	
Email Reports to : nick.yee@elgin.com.au		RELINQUISHED BY: N.Yee		DATE/TIME:	
Email Invoice to : nick.yee@elgin.com.au		DATE/TIME: 20/9/16 1630		DATE/TIME:	

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	EA045 - Turbidity	EA025-SW - Suspended solids in seawater (1mg/L LOR)	EK055A-SW - Ammonia in seawater	EK262PA-SW - Total Nitrogen (incl. NOx and TKN) - low level (ALS Sydney)	EK067-SW - Total P in seawater	EP008 -Chlorophyll a (ALS Sydney)	MW-2 (ANZECC 95%) - ultra trace dissolved metals in marine water - As, Cd, Cr, Cu, Pb, Ni, Zn, Hg-LL (ALS Sydney)	MW-2T (ANZECC 95%) - ultra trace Total metals in marine water - As, Cd, Cr, Cu, Pb, Ni, Zn, Hg-LL (ALS Sydney)	EP075B (SIM - PAH	EP071/80 - TPH (C6-C40).						
	W1_S_20/9/16	20/9/16	Saline W	3P, 1SP, 2AP, 2VS, 3AG	11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		* Dissolved metals have been filtered in field				
	W1_B_20/9/16	1355	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	W2_S_20/9/16	1305	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	W2_B_20/9/16	1255	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		* Pls freeze TN bottles upon receipt.				
	CB1_S_20/9/16	1445	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	CB1_B_20/9/16	1425	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	MU1_S_20/9/16	1230	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	MU1_B_20/9/16	1220	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	BAY1_S_20/9/16	1135	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	BAY1_B_20/9/16	1120	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	BAY2_S_20/9/16	1045	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	BAY2_B_20/9/16	1630	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
TOTAL					110																

Water Container Codes: P = Unpreserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; VS = VOA Vial Sulfuric Preserved; SP = Sulfuric Preserved Plastic

Water Container Codes: P = Unpreserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; VS = VOA Vial Sulfuric Preserved; SP = Sulfuric Preserved Plastic



☐ **Perth:** 10 Hod Way, Malaga WA 6090
 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ **Launceston:** 27 Wellington St, Launceston TAS 7250
 Ph: 03 6331 2158 E: launceston@alsenviro.com

CERTIFICATE OF ANALYSIS

Work Order : **ES1622273**
Client : **ELGIN ASSOCIATES PTY LTD**
Contact : **MR NICK YEE**
Address : **PO BOX 829**
BEGA NSW, AUSTRALIA 2550
Telephone : **+61 02 8003 4590**
Project : **Eden Baseline Marine Water Quality**
Order number : **----**
C-O-C number : **----**
Sampler : **----**
Site : **----**
Quote number : **----**
No. of samples received : **12**
No. of samples analysed : **12**

Page : 1 of 12
Laboratory : Environmental Division Sydney
Contact : Carol Walsh
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-3-8549 9608
Date Samples Received : 05-Oct-2016 09:10
Date Analysis Commenced : 05-Oct-2016
Issue Date : 12-Oct-2016 16:00



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Diana Mesa	Instrument Chemist	Brisbane Organics, Stafford, QLD
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
RICHARD TEA	Lab technician	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

When 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.

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

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

LOR = Limit of reporting

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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods
- EK055G: LOR raised for NOx for various samples due to sample matrix.
- 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), Dibenzo(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

				W1_S_4/10/16	W1_B_4/10/16	W2_S_4/10/16	W2_B_4/10/16	CB1_S_4/10/16
Client sampling date / time				04-Oct-2016 14:15	04-Oct-2016 14:00	04-Oct-2016 13:30	04-Oct-2016 13:15	04-Oct-2016 15:00
Compound	CAS Number	LOR	Unit	ES1622273-001	ES1622273-002	ES1622273-003	ES1622273-004	ES1622273-005
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1
EA045: Turbidity								
Turbidity	----	0.1	NTU	1.0	0.6	0.8	0.8	1.0
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	2.0	2.0	2.1	2.0	2.1
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	0.8	0.8	1.1	0.9	0.8
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	2.3	2.3	2.1	2.1	2.2
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	1.2	1.4	1.0	1.2	0.9
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.18	0.15	0.11	0.13	0.14
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	0.014	0.010	0.008	0.009	0.010
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	mg/m³	3	1	3	3	5
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				W1_S_4/10/16	W1_B_4/10/16	W2_S_4/10/16	W2_B_4/10/16	CB1_S_4/10/16
Client sampling date / time				04-Oct-2016 14:15	04-Oct-2016 14:00	04-Oct-2016 13:30	04-Oct-2016 13:15	04-Oct-2016 15:00
Compound	CAS Number	LOR	Unit	ES1622273-001	ES1622273-002	ES1622273-003	ES1622273-004	ES1622273-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				W1_S_4/10/16	W1_B_4/10/16	W2_S_4/10/16	W2_B_4/10/16	CB1_S_4/10/16
Client sampling date / time				04-Oct-2016 14:15	04-Oct-2016 14:00	04-Oct-2016 13:30	04-Oct-2016 13:15	04-Oct-2016 15:00
Compound	CAS Number	LOR	Unit	ES1622273-001	ES1622273-002	ES1622273-003	ES1622273-004	ES1622273-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	----	<2	----	<2	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	25.6	25.0	26.4	29.4	25.4
2-Chlorophenol-D4	93951-73-6	1	%	67.5	68.7	56.6	67.7	47.2
2,4,6-Tribromophenol	118-79-6	1	%	41.8	39.4	36.0	39.3	44.0
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	69.0	68.4	56.5	65.4	61.3
Anthracene-d10	1719-06-8	1	%	85.6	80.0	73.3	85.0	65.9
4-Terphenyl-d14	1718-51-0	1	%	99.0	88.9	88.4	86.2	82.5
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	106	103	95.2	97.0	99.0
Toluene-D8	2037-26-5	2	%	117	108	100	102	103
4-Bromofluorobenzene	460-00-4	2	%	104	95.1	88.8	89.6	91.3
EP090S: Organotin Surrogate								
Tripopyltin	----	5	%	----	69.2	----	71.3	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	CB1_B_4/10/16	MU1_S_4/10/16	MU1_B_4/10/16	BAY1_S_4/10/16	BAY1_B_4/10/16
Client sampling date / time					04-Oct-2016 14:45	04-Oct-2016 12:30	04-Oct-2016 12:00	04-Oct-2016 11:15	04-Oct-2016 11:00
Compound	CAS Number	LOR	Unit		ES1622273-006	ES1622273-007	ES1622273-008	ES1622273-009	ES1622273-010
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1
EA045: Turbidity									
Turbidity	----	0.1	NTU		0.7	0.6	0.4	1.1	1.0
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		2.2	2.2	2.2	2.0	2.1
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		0.8	1.0	1.0	1.0	1.0
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		2.3	2.2	2.2	2.2	2.2
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		1.1	1.4	0.8	1.1	1.0
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.05	<0.05	<0.05	<0.05	0.13
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.16	0.58	0.16	0.13	0.25
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		0.014	0.008	0.013	0.009	0.012
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m³		2	4	1	5	6
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_4/10/16	MU1_S_4/10/16	MU1_B_4/10/16	BAY1_S_4/10/16	BAY1_B_4/10/16
Client sampling date / time				04-Oct-2016 14:45	04-Oct-2016 12:30	04-Oct-2016 12:00	04-Oct-2016 11:15	04-Oct-2016 11:00
Compound	CAS Number	LOR	Unit	ES1622273-006	ES1622273-007	ES1622273-008	ES1622273-009	ES1622273-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_4/10/16	MU1_S_4/10/16	MU1_B_4/10/16	BAY1_S_4/10/16	BAY1_B_4/10/16
Client sampling date / time				04-Oct-2016 14:45	04-Oct-2016 12:30	04-Oct-2016 12:00	04-Oct-2016 11:15	04-Oct-2016 11:00
Compound	CAS Number	LOR	Unit	ES1622273-006	ES1622273-007	ES1622273-008	ES1622273-009	ES1622273-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	----	<2	----	<2
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	29.2	25.6	23.6	30.1	23.9
2-Chlorophenol-D4	93951-73-6	1	%	58.0	53.1	68.4	55.7	58.4
2,4,6-Tribromophenol	118-79-6	1	%	36.0	38.7	36.5	35.4	41.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	53.8	60.0	64.0	68.6	69.8
Anthracene-d10	1719-06-8	1	%	81.7	59.8	90.2	76.4	79.6
4-Terphenyl-d14	1718-51-0	1	%	93.3	84.9	92.9	83.5	87.6
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	93.3	98.8	97.5	103	111
Toluene-D8	2037-26-5	2	%	92.2	103	106	105	114
4-Bromofluorobenzene	460-00-4	2	%	83.8	90.8	91.8	91.0	98.0
EP090S: Organotin Surrogate								
Tripopyltin	----	5	%	74.4	----	78.4	----	63.7



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BAY2_S_4/10/16	BAY2_B_4/10/16	----	----	----
Client sampling date / time					04-Oct-2016 10:16	04-Oct-2016 10:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1622273-011	ES1622273-012	-----	-----	-----
					Result	Result	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		<1	<1	----	----	----
EA045: Turbidity									
Turbidity	----	0.1	NTU		0.6	0.3	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	----	----	----
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		2.1	2.2	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L		<1	<1	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		0.8	0.9	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		2.1	2.4	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L		<1	<1	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		0.7	1.0	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.05	<0.05	----	----	----
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.20	0.19	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		0.007	0.014	----	----	----
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m³		2	<1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				BAY2_S_4/10/16	BAY2_B_4/10/16	----	----	----
Client sampling date / time				04-Oct-2016 10:16	04-Oct-2016 10:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1622273-011	ES1622273-012	-----	-----	-----
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	----	----	----
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	----	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	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				BAY2_S_4/10/16	BAY2_B_4/10/16	----	----	----
Client sampling date / time				04-Oct-2016 10:16	04-Oct-2016 10:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1622273-011	ES1622273-012	-----	-----	-----
				Result	Result	----	----	----
EP080: BTEXN - Continued								
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	----	----	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	----	<2	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	25.2	22.8	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	60.3	55.0	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%	40.2	44.8	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	74.4	67.8	----	----	----
Anthracene-d10	1719-06-8	1	%	65.6	78.3	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	87.2	84.9	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	104	112	----	----	----
Toluene-D8	2037-26-5	2	%	118	131	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	98.5	104	----	----	----
EP090S: Organotin Surrogate								
Tripopyltin	----	5	%	----	82.9	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP090S: Organotin Surrogate			
Tripropyltin	----	24	116

QUALITY CONTROL REPORT

Work Order	: ES1622273	Page	: 1 of 9
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Contact	: Carol Walsh
Address	: PO BOX 829 BEGA NSW, AUSTRALIA 2550	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8003 4590	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 05-Oct-2016
Order number	: ----	Date Analysis Commenced	: 05-Oct-2016
C-O-C number	: ----	Issue Date	: 12-Oct-2016
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This 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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Diana Mesa	Instrument Chemist	Brisbane Organics, Stafford, QLD
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
RICHARD TEA	Lab technician	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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 (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 609556)									
ES1622273-001	W1_S_4/10/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	2	0.00	No Limit
ES1622273-010	BAY1_B_4/10/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	2	0.00	No Limit
EA045: Turbidity (QC Lot: 606649)									
ES1622227-005	Anonymous	EA045: Turbidity	----	0.1	NTU	1.0	1.1	0.00	0% - 50%
ES1622273-003	W2_S_4/10/16	EA045: Turbidity	----	0.1	NTU	0.8	0.8	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 609457)									
EP1609062-001	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
ES1622273-002	W1_B_4/10/16	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 609458)									
ES1622273-012	BAY2_B_4/10/16	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 608028)									
EP1609062-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EP1609334-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 608029)									
ES1622273-010	BAY1_B_4/10/16	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 607186)									
ES1622273-001	W1_S_4/10/16	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	2.0	2.1	0.00	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	0.8	1.0	13.0	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
ES1622273-011	BAY2_S_4/10/16	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	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 (%)
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 607186) - continued									
ES1622273-011	BAY2_S_4/10/16	EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	2.1	2.2	0.00	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	0.8	1.1	23.8	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 607197)									
ES1622273-010	BAY1_B_4/10/16	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	2.2	2.1	5.29	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	1.0	0.9	12.2	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
ES1622258-001	Anonymous	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	0.3	0.4	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	0.4	0.4	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	2.1	2.1	0.00	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	1.4	1.2	16.2	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	5	<5	0.00	No Limit
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QC Lot: 608135)									
ES1622273-001	W1_S_4/10/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
ES1622273-010	BAY1_B_4/10/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	0.13	0.11	16.7	No Limit
EK262A: Total Nitrogen (QC Lot: 606522)									
ES1622273-001	W1_S_4/10/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.18	0.16	6.54	No Limit
ES1622273-011	BAY2_S_4/10/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.20	0.18	9.49	No Limit
EK267A: Total Phosphorus (Persulfate Digestion) (QC Lot: 606524)									
ES1622273-001	W1_S_4/10/16	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	0.014	0.016	19.8	No Limit
ES1622273-011	BAY2_S_4/10/16	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	0.007	0.011	40.1	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 606433)									
ES1622273-001	W1_S_4/10/16	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit



Sub-Matrix: **WATER**

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 (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 606433) - continued									
ES1622273-001	W1_S_4/10/16	EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit
ES1622273-008	MU1_B_4/10/16	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 606434)									
ES1622273-001	W1_S_4/10/16	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
ES1622273-008	MU1_B_4/10/16	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 611117)									
ES1622273-001	W1_S_4/10/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1622273-011	BAY2_S_4/10/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 606434)									
ES1622273-001	W1_S_4/10/16	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit

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 Work Order : ES1622273
 Client : ELGIN ASSOCIATES PTY LTD
 Project : Eden Baseline Marine Water Quality



Sub-Matrix: **WATER**

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 Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 606434) - continued									
ES1622273-008	MU1_B_4/10/16	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 611117)									
ES1622273-001	W1_S_4/10/16	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1622273-011	BAY2_S_4/10/16	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 611117)									
ES1622273-001	W1_S_4/10/16	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
ES1622273-011	BAY2_S_4/10/16	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit		

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 Spike (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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
		LCS	Low	High
Result				
<1	150 mg/L	109	86	128
<1	1000 mg/L	93.2	80	112
<0.1	40 NTU	99.8	91	105
<0.00004	0.0001 mg/L	101	83	105
<0.00004	0.0001 mg/L	102	83	105
<0.00004	0.0001 mg/L	105	85	105
<0.00004	0.0001 mg/L	105	85	105
<0.5	10 µg/L	116	76	134
<0.2	10 µg/L	103	69	117
<0.5	10 µg/L	99.9	76	122
<1	10 µg/L	85.3	71	129
<0.2	10 µg/L	97.2	74	120
<0.5	10 µg/L	118	72	124
<5	10 µg/L	104	70	126
<0.5	10 µg/L	118	89	125
<0.2	10 µg/L	110	82	122
<0.5	10 µg/L	101	85	123
<1	10 µg/L	86.7	84	128
<0.2	10 µg/L	102	85	125
<0.5	10 µg/L	120	85	125
<5	10 µg/L	109	82	128
<0.02	0.5 mg/L	106	80	120
<0.05	1 mg/L	94.6	81	111



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 606524) - continued								
EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.44 mg/L	104	88	112
EP008: Chlorophyll (QCLot: 607177)								
EP008: Chlorophyll a	----	1	mg/m³	<1	20 mg/m³	95.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 606433)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	65.5	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	68.7	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	68.5	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	67.3	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	96.5	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	92.6	64	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	98.7	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	91.3	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	95.8	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	81.5	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	75.1	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	68.9	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	84.6	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	86.5	60	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	86.8	61	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	73.6	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 606434)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	98.5	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	95.7	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	87.3	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 611117)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	95.3	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 606434)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	96.6	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	91.9	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	95.8	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 611117)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	95.7	75	127
EP080: BTEXN (QCLot: 611117)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	92.0	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	102	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	86.3	70	120

Matrix Spike (MS) Report

Sub-Matrix: WATER

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
EG035F: Dissolved Mercury by FIMS (QCLot: 609457)							
EP1609062-002	Anonymous	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	89.0	70	130
EG035T: Total Mercury by FIMS (QCLot: 608028)							
EP1609062-002	Anonymous	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	85.3	70	130
EG035T: Total Mercury by FIMS (QCLot: 608029)							
ES1622273-011	BAY2_S_4/10/16	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	91.1	70	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 607186)							
ES1622273-002	W1_B_4/10/16	EG093A-F: Arsenic	7440-38-2	50 µg/L	116	70	130
		EG093A-F: Cadmium	7440-43-9	12.5 µg/L	109	70	130
		EG093A-F: Chromium	7440-47-3	50 µg/L	106	70	130
		EG093A-F: Copper	7440-50-8	50 µg/L	125	70	130
		EG093A-F: Lead	7439-92-1	50 µg/L	108	70	130
		EG093A-F: Nickel	7440-02-0	50 µg/L	122	70	130
		EG093A-F: Zinc	7440-66-6	50 µg/L	106	70	130
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 607197)							
ES1622273-001	W1_S_4/10/16	EG093A-T: Arsenic	7440-38-2	50 µg/L	114	70	130
		EG093A-T: Cadmium	7440-43-9	12.5 µg/L	113	70	130
		EG093A-T: Chromium	7440-47-3	50 µg/L	109	70	130
		EG093A-T: Copper	7440-50-8	50 µg/L	130	70	130
		EG093A-T: Lead	7439-92-1	50 µg/L	111	70	130
		EG093A-T: Nickel	7440-02-0	50 µg/L	126	70	130
		EG093A-T: Zinc	7440-66-6	50 µg/L	106	70	130
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 608135)							

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 Work Order : ES1622273
 Client : ELGIN ASSOCIATES PTY LTD
 Project : Eden Baseline Marine Water Quality



Sub-Matrix: **WATER**

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
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 608135) - continued							
ES1622273-001	W1_S_4/10/16	EK055G-SW: Ammonia as N	7664-41-7	1 mg/L	115	70	130
EK262A: Total Nitrogen (QCLot: 606522)							
ES1622273-001	W1_S_4/10/16	EK262PA-SW: Total Nitrogen as N	----	0.5 mg/L	98.1	70	130
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 606524)							
ES1622273-001	W1_S_4/10/16	EK267PA-SW: Total Phosphorus as P	----	0.5 mg/L	98.5	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 606433)							
ES1622273-001	W1_S_4/10/16	EP075(SIM): Acenaphthene	83-32-9	2 µg/L	72.8	70	130
		EP075(SIM): Pyrene	129-00-0	2 µg/L	88.1	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 606434)							
ES1622273-001	W1_S_4/10/16	EP071: C10 - C14 Fraction	----	2000 µg/L	120	74	150
		EP071: C15 - C28 Fraction	----	2500 µg/L	95.2	77	153
		EP071: C29 - C36 Fraction	----	2000 µg/L	104	67	153
EP080/071: Total Petroleum Hydrocarbons (QCLot: 611117)							
ES1622273-001	W1_S_4/10/16	EP080: C6 - C9 Fraction	----	325 µg/L	93.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 606434)							
ES1622273-001	W1_S_4/10/16	EP071: >C10 - C16 Fraction	----	2500 µg/L	99.0	74	150
		EP071: >C16 - C34 Fraction	----	3500 µg/L	102	77	153
		EP071: >C34 - C40 Fraction	----	1500 µg/L	118	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 611117)							
ES1622273-001	W1_S_4/10/16	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	94.4	70	130
EP080: BTEXN (QCLot: 611117)							
ES1622273-001	W1_S_4/10/16	EP080: Benzene	71-43-2	25 µg/L	78.0	70	130
		EP080: Toluene	108-88-3	25 µg/L	91.9	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	90.3	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	94.3	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	93.9	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	86.5	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1622273	Page	: 1 of 9
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 05-Oct-2016
Site	: ----	Issue Date	: 12-Oct-2016
Sampler	: ----	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12

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		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Organotin Compounds (Soluble)	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Dissolved Mercury by FIMS - Low Level	1	21	4.76	5.00	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025-SW)								
W1_S_4/10/16, W2_S_4/10/16, CB1_S_4/10/16, MU1_S_4/10/16, BAY1_S_4/10/16, BAY2_S_4/10/16,	W1_B_4/10/16, W2_B_4/10/16, CB1_B_4/10/16, MU1_B_4/10/16, BAY1_B_4/10/16, BAY2_B_4/10/16	04-Oct-2016	----	----	----	07-Oct-2016	11-Oct-2016	✓
EA045: Turbidity								
Clear Plastic Bottle - Natural (EA045)								
W1_S_4/10/16, W2_S_4/10/16, CB1_S_4/10/16, MU1_S_4/10/16, BAY1_S_4/10/16, BAY2 S_4/10/16,	W1_B_4/10/16, W2_B_4/10/16, CB1_B_4/10/16, MU1_B_4/10/16, BAY1_B_4/10/16, BAY2 B_4/10/16	04-Oct-2016	----	----	----	05-Oct-2016	06-Oct-2016	✓



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
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F-LL) W1_S_4/10/16, W1_B_4/10/16, W2_S_4/10/16, W2_B_4/10/16, CB1_S_4/10/16, CB1_B_4/10/16, MU1_S_4/10/16, MU1_B_4/10/16, BAY1_S_4/10/16, BAY1_B_4/10/16, BAY2_S_4/10/16, BAY2_B_4/10/16	04-Oct-2016	----	----	----	07-Oct-2016	01-Nov-2016	✔
EG035T: Total Mercury by FIMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035T-LL) W1_S_4/10/16, W1_B_4/10/16, W2_S_4/10/16, W2_B_4/10/16, CB1_S_4/10/16, CB1_B_4/10/16, MU1_S_4/10/16, MU1_B_4/10/16, BAY1_S_4/10/16, BAY1_B_4/10/16, BAY2_S_4/10/16, BAY2_B_4/10/16	04-Oct-2016	----	----	----	07-Oct-2016	01-Nov-2016	✔
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093A-F) W1_S_4/10/16, W1_B_4/10/16, W2_S_4/10/16, W2_B_4/10/16, CB1_S_4/10/16, CB1_B_4/10/16, MU1_S_4/10/16, MU1_B_4/10/16, BAY1_S_4/10/16, BAY1_B_4/10/16, BAY2_S_4/10/16, BAY2_B_4/10/16	04-Oct-2016	----	----	----	06-Oct-2016	02-Apr-2017	✔
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-T) W1_S_4/10/16, W1_B_4/10/16, W2_S_4/10/16, W2_B_4/10/16, CB1_S_4/10/16, CB1_B_4/10/16, MU1_S_4/10/16, MU1_B_4/10/16, BAY1_S_4/10/16, BAY1_B_4/10/16, BAY2_S_4/10/16, BAY2_B_4/10/16	04-Oct-2016	06-Oct-2016	02-Apr-2017	✔	06-Oct-2016	02-Apr-2017	✔
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water							
Clear Plastic Bottle - Sulfuric Acid (EK055G-SW) W1_S_4/10/16, W1_B_4/10/16, W2_S_4/10/16, W2_B_4/10/16, CB1_S_4/10/16, CB1_B_4/10/16, MU1_S_4/10/16, MU1_B_4/10/16, BAY1_S_4/10/16, BAY1_B_4/10/16, BAY2_S_4/10/16, BAY2_B_4/10/16	04-Oct-2016	----	----	----	06-Oct-2016	01-Nov-2016	✔



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK262A: Total Nitrogen								
Clear Plastic Bottle - Natural (AS) (EK262PA-SW)		04-Oct-2016	05-Oct-2016	05-Oct-2016	✔	05-Oct-2016	05-Oct-2016	✔
W1_S_4/10/16,	W1_B_4/10/16,							
W2_S_4/10/16,	W2_B_4/10/16,							
CB1_S_4/10/16,	CB1_B_4/10/16,							
MU1_S_4/10/16,	MU1_B_4/10/16,							
BAY1_S_4/10/16,	BAY1_B_4/10/16,							
BAY2_S_4/10/16,	BAY2_B_4/10/16							
EK267A: Total Phosphorus (Persulfate Digestion)								
Clear Plastic Bottle - Natural (AS) (EK267PA-SW)		04-Oct-2016	05-Oct-2016	05-Oct-2016	✔	05-Oct-2016	05-Oct-2016	✔
W1_S_4/10/16,	W1_B_4/10/16,							
W2_S_4/10/16,	W2_B_4/10/16,							
CB1_S_4/10/16,	CB1_B_4/10/16,							
MU1_S_4/10/16,	MU1_B_4/10/16,							
BAY1_S_4/10/16,	BAY1_B_4/10/16,							
BAY2_S_4/10/16,	BAY2_B_4/10/16							
EP008: Chlorophyll a & Pheophytin a								
Opaque Plastic Bottle - Unpreserved (EP008)		04-Oct-2016	----	----	----	06-Oct-2016	06-Oct-2016	✔
W1_S_4/10/16,	W1_B_4/10/16,							
W2_S_4/10/16,	W2_B_4/10/16,							
CB1_S_4/10/16,	CB1_B_4/10/16,							
MU1_S_4/10/16,	MU1_B_4/10/16,							
BAY1_S_4/10/16,	BAY1_B_4/10/16,							
BAY2_S_4/10/16,	BAY2_B_4/10/16							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))		04-Oct-2016	06-Oct-2016	11-Oct-2016	✔	07-Oct-2016	15-Nov-2016	✔
W1_S_4/10/16,	W1_B_4/10/16,							
W2_S_4/10/16,	W2_B_4/10/16,							
CB1_S_4/10/16,	CB1_B_4/10/16,							
MU1_S_4/10/16,	MU1_B_4/10/16,							
BAY1_S_4/10/16,	BAY1_B_4/10/16,							
BAY2 S_4/10/16,	BAY2_B_4/10/16							



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
W1_S_4/10/16, W2_S_4/10/16, CB1_S_4/10/16, MU1_S_4/10/16, BAY1_S_4/10/16, BAY2_S_4/10/16,	W1_B_4/10/16, W2_B_4/10/16, CB1_B_4/10/16, MU1_B_4/10/16, BAY1_B_4/10/16, BAY2_B_4/10/16	04-Oct-2016	06-Oct-2016	11-Oct-2016	✔	07-Oct-2016	15-Nov-2016	✔
Amber VOC Vial - Sulfuric Acid (EP080)								
W1_S_4/10/16, W2_S_4/10/16, CB1_S_4/10/16, MU1_S_4/10/16, BAY1_S_4/10/16, BAY2_S_4/10/16,	W1_B_4/10/16, W2_B_4/10/16, CB1_B_4/10/16, MU1_B_4/10/16, BAY1_B_4/10/16, BAY2_B_4/10/16	04-Oct-2016	11-Oct-2016	18-Oct-2016	✔	11-Oct-2016	18-Oct-2016	✔
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
W1_S_4/10/16, W2_S_4/10/16, CB1_S_4/10/16, MU1_S_4/10/16, BAY1_S_4/10/16, BAY2_S_4/10/16,	W1_B_4/10/16, W2_B_4/10/16, CB1_B_4/10/16, MU1_B_4/10/16, BAY1_B_4/10/16, BAY2_B_4/10/16	04-Oct-2016	06-Oct-2016	11-Oct-2016	✔	07-Oct-2016	15-Nov-2016	✔
Amber VOC Vial - Sulfuric Acid (EP080)								
W1_S_4/10/16, W2_S_4/10/16, CB1_S_4/10/16, MU1_S_4/10/16, BAY1_S_4/10/16, BAY2_S_4/10/16,	W1_B_4/10/16, W2_B_4/10/16, CB1_B_4/10/16, MU1_B_4/10/16, BAY1_B_4/10/16, BAY2_B_4/10/16	04-Oct-2016	11-Oct-2016	18-Oct-2016	✔	11-Oct-2016	18-Oct-2016	✔
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
W1_S_4/10/16, W2_S_4/10/16, CB1_S_4/10/16, MU1_S_4/10/16, BAY1_S_4/10/16, BAY2_S_4/10/16,	W1_B_4/10/16, W2_B_4/10/16, CB1_B_4/10/16, MU1_B_4/10/16, BAY1_B_4/10/16, BAY2_B_4/10/16	04-Oct-2016	11-Oct-2016	18-Oct-2016	✔	11-Oct-2016	18-Oct-2016	✔
EP090: Organotin Compounds (Soluble)								
Amber Glass Bottle - Unpreserved (EP090S)								
W1_B_4/10/16, CB1_B_4/10/16, BAY1_B_4/10/16,	W2_B_4/10/16, MU1_B_4/10/16, BAY2_B_4/10/16	04-Oct-2016	06-Oct-2016	11-Oct-2016	✔	07-Oct-2016	15-Nov-2016	✔



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)							
Ammonia as N (Saline Water)	EK055G-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	3	21	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	0	6	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	3	30	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	2	13	15.38	9.52	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	21	9.52	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	13	7.69	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	21	9.52	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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							
Total Mercury by FIMS - Low Level	EG035T-LL	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	13	7.69	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	21	4.76	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	0	6	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	13	7.69	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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
Suspended Solids - Saline Water	EA025-SW	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Turbidity	EA045	WATER	In house: Referenced to APHA 2130 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Mercury by FIMS - Low Level	EG035F-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS - Low Level	EG035T-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm 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)
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. 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)
Ammonia as N (Saline Water)	EK055G-SW	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.



Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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	In house: Referenced to 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	In house: Referenced to 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)
Organotin Compounds (Soluble)	EP090S	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by GC/MS coupled with high volume injection and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Persulfate Digestion for UT TN and TP for FIA/Saline	EK262/267PA-SW Prep	WATER	In house: Referenced to APHA 4500 P - J. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.
Organotin Sample Preparation	ORG34	WATER	In house. A specified volume of sample is spiked with surrogate, acidified and vacuum filtered. Reagents and solvent are added and the mixture tumbled. The butyltin compounds is derivatisated, extracted and the substitution reaction completed. The extract is transferred to a separatory funnel and further extracted two times with petroleum ether. The resultant extracts are combined and concentrated for analysis.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1622273

Client : ELGIN ASSOCIATES PTY LTD Contact : MR NICK YEE Address : PO BOX 829 BEGA NSW, AUSTRALIA 2550 E-mail : nick.yee@elgin.com.au Telephone : +61 02 8003 4590 Facsimile : +61 03 8648 6336 Project : Eden Baseline Marine Water Quality Order number : --- C-O-C number : --- Site : --- Sampler :	Laboratory : Environmental Division Sydney Contact : Carol Walsh Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : carol.walsh@alsglobal.com Telephone : +61-3-8549 9608 Facsimile : +61-2-8784 8500 Page : 1 of 3 Quote number : EM2016ELGASS0003 (ME/411/16 V4) QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 05-Oct-2016 9:10 AM	Issue Date : 05-Oct-2016
Client Requested Due : 12-Oct-2016	Scheduled Reporting Date : 12-Oct-2016
Date :	

Delivery Details

Mode of Delivery : Undefined	Security Seal : Intact.
No. of coolers/boxes : 4	Temperature : 13.1'C - Ice Bricks present
Receipt Detail :	No. of samples received / analysed : 12 / 12

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).**
- **TBT analysis will be conducted by ALS BRISBANE.**
- 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.

Method Client sample ID	Sample Container Received	Preferred Sample Container for Analysis
Total Phosphorus as P (Persulfate digestion/FIA) (Sea Water) : EK067PA-SW		
W1_S_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
W1_B_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
W2_S_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
W2_B_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
CB1_S_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
CB1_B_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
MU1_S_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
MU1_B_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
BAY1_S_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
BAY1_B_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
BAY2_S_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-
BAY2_B_4/10/16	- Clear Plastic Bottle - Sulfuric Acid	-

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.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA025-SW Suspended Solids - Saline Water	WATER - EK055G-SW Ammonia as N (Sea Water)	WATER - EK262PA-SW Total Nitrogen by Persulfate Digestion	WATER - EP008 Chlorophyll a	WATER - EP075 SIM PAH only SIM - PAH only	WATER - MW-2 (ANZECC) 7 METALS ORC + LL Hg (Marine Water ANZECC)	WATER - MW-2T (ANZECC) 7 METALS ORC Total + LL Hg (Marine Water)
ES1622273-001	04-Oct-2016 14:15	W1_S_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-002	04-Oct-2016 14:00	W1_B_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-003	04-Oct-2016 13:30	W2_S_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-004	04-Oct-2016 13:15	W2_B_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-005	04-Oct-2016 15:00	CB1_S_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-006	04-Oct-2016 14:45	CB1_B_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-007	04-Oct-2016 12:30	MU1_S_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-008	04-Oct-2016 12:00	MU1_B_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-009	04-Oct-2016 11:15	BAY1_S_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-010	04-Oct-2016 11:00	BAY1_B_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-011	04-Oct-2016 10:16	BAY2_S_4/10/16	✓	✓	✓	✓	✓	✓	✓
ES1622273-012	04-Oct-2016 10:00	BAY2_B_4/10/16	✓	✓	✓	✓	✓	✓	✓

ES1622273-001	04-Oct-2016 14:15	W1_S_4/10/16	✓	✓		✓
ES1622273-002	04-Oct-2016 14:00	W1_B_4/10/16	✓	✓	✓	✓
ES1622273-003	04-Oct-2016 13:30	W2_S_4/10/16	✓	✓		✓
ES1622273-004	04-Oct-2016 13:15	W2_B_4/10/16	✓	✓	✓	✓
ES1622273-005	04-Oct-2016 15:00	CB1_S_4/10/16	✓	✓		✓
ES1622273-006	04-Oct-2016 14:45	CB1_B_4/10/16	✓	✓	✓	✓
ES1622273-007	04-Oct-2016 12:30	MU1_S_4/10/16	✓	✓		✓
ES1622273-008	04-Oct-2016 12:00	MU1_B_4/10/16	✓	✓	✓	✓
ES1622273-009	04-Oct-2016 11:15	BAY1_S_4/10/16	✓	✓		✓
ES1622273-010	04-Oct-2016 11:00	BAY1_B_4/10/16	✓	✓	✓	✓
ES1622273-011	04-Oct-2016 10:16	BAY2_S_4/10/16	✓	✓		✓
ES1622273-012	04-Oct-2016 10:00	BAY2_B_4/10/16	✓	✓	✓	✓

[illegible]



CHAIN OF CUSTODY

ALS Laboratory: please tick →

Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph 02 8724 8505 E: samples.sydney@alsenviro.com
Newcastle: 8 Rossignol Rd, Waratah NSW 2304
Ph 02 4958 3433 E: samples.newcastle@alsenviro.com

Brisbane: 33 Shand St, Stafford QLD 4053
Ph 07 3243 7222 E: samples.brisbane@alsenviro.com
Townsville: 14-15 Deana Pl, Bohle QLD 4815
Ph 07 4736 0500 E: townsville@alsenviro.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph 03 8543 5805 E: samples.melbourne@alsenviro.com
Adelaide: 2-1 Burma Rd, Pooraka SA 5095
Ph 08 8353 0360 E: adelaide@alsenviro.com

Perth: 10 Hod Way, Malaga WA 6060
Ph 08 9206 7865 E: samples.perth@alsenviro.com
Launceston: 27 Wellington St, Launceston TAS 7250
Ph 03 6331 2158 E: launceston@alsenviro.com

CLIENT: ELGIN ASSOCIATES

OFFICE: 1st Floor 45-47 Church Street, BEGA, NSW 2550

PROJECT: Eden Baseline Marine Water Quality

ORDER NUMBER:

PROJECT MANAGER: NICHOLAS YEE

SAMPLER: Elgin Associates

COC emailed to ALS? (YES / NO)

Email Reports to: nick.yee@elgin.com.au

Email Invoice to: nick.yee@elgin.com.au

TURNAROUND REQUIREMENTS:

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

ALS QUOTE NO.: ME411/16 V3

CONTACT PH: 0400 385 234

SAMPLER MOBILE:

EDD FORMAT (or default):

RELINQUISHED BY:

N. Yee

DATE/TIME:

16/30

RECEIVED BY:

Dolly

DATE/TIME:

5/10/16 9:10

RELINQUISHED BY:

DATE/TIME:

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?

Yes

No

N/A

Freezer / Frozen / Ice blocks present upon receipt?

Yes

No

N/A

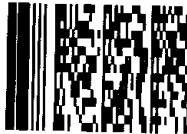
Random Sample Temperature on Receipt

°C

Other comment:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Pls report 'TBT' results in 3-5 days. All other results standard.

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	EA045 - Turbidity	EA025-SW - Suspended solids in seawater (1mg/L LOR)	EK055A-SW - Ammonia in seawater	EK262PA-SW - Total Nitrogen (incl. NOx and TKN) - low level (ALS Sydney)	Total P in seawater ~~EK262-PA50~~	EP008 -Chlorophyll a (ALS Sydney)	MW-2 (ANZECC 95%) - ultra trace dissolved metals in marine water - As, Cd, Cr, Cu, Pb, Ni, Zn, Hg-LL (ALS Sydney)	MW-2T (ANZECC 95%) - ultra trace Total metals in marine water - As, Cd, Cr, Cu, Pb, Ni, Zn, Hg-LL (ALS Sydney)	EP076B (SIM - PAH)	EP071/80 - TPH (C6-C40)	TBT	Environmental Division Sydney Work Order Reference ES162223				Telephone : + 61-2-8784 8555	
1	W1_S_ 4/10/16	4/10 1415	Saline W	3P, 1SP, 2AP, 2VS, 1AG	11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
2	W1_B_ 4/10/16	4/10 1400	Saline W	3P, 1SP, 2AP, 2VS, 1AG	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
3	W2_S_ 4/10/16	4/10 1330	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
4	W2_B_ 4/10/16	4/10 1315	Saline W	3P, 1SP, 2AP, 2VS, 1AG	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
5	CB1_S_ 4/10/16	4/10 1500	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
6	CB1_B_ 4/10/16	4/10 1445	Saline W	3P, 1SP, 2AP, 2VS, 1AG	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
7	MU1_S_ 4/10/16	4/10 1230	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
8	MU1_B_ 4/10/16	4/10 1200	Saline W	3P, 1SP, 2AP, 2VS, 1AG	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
9	BAY1_S_ 4/10/16	4/10 11:15	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
10	BAY1_B_ 4/10/16	4/10 11:00	Saline W	3P, 1SP, 2AP, 2VS, 1AG	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
11	BAY2_S_ 4/10/16	4/10 10:16	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
12	BAY2_B_ 4/10/16	4/10 10:00	Saline W	3P, 1SP, 2AP, 2VS, 1AG	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
TOTAL					116																	
Container Codes: P = Unpreserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; VS = VOA Vial Sulfuric Preserved; SP = Sulfuric Preserved Plastic																						

Water Container Codes: P = Unpreserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; VS = VOA Vial Sulfuric Preserved; SP = Sulfuric Preserved Plastic

Environmental Division
Sydney
Work Order Reference
ES1622273



Telephone: +61-2-8784 8555

TBT

Handwritten notes and stamps on the right side of the form, including 'ES1622273' and 'TBT'.

CERTIFICATE OF ANALYSIS

Work Order : **ES1623516**
Client : **ELGIN ASSOCIATES PTY LTD**
Contact : **MR NICK YEE**
Address : **PO BOX 829**
BEGA NSW, AUSTRALIA 2550
Telephone : **+61 02 8003 4590**
Project : **Eden Baseline Marine Water Quality**
Order number : **----**
C-O-C number : **----**
Sampler : **Elgin Associates**
Site : **----**
Quote number : **----**
No. of samples received : **12**
No. of samples analysed : **12**

Page : 1 of 12
Laboratory : Environmental Division Sydney
Contact : Carol Walsh
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-3-8549 9608
Date Samples Received : 19-Oct-2016 09:30
Date Analysis Commenced : 20-Oct-2016
Issue Date : 25-Oct-2016 13:53



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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

When 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.

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

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

LOR = Limit of reporting

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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EG093: It is recognised that total As, Ni is less than dissolved for samples ES1623516-003, 004, 007, 009, 011, 012. However, the difference is within experimental variation of the methods.
- EK055G: LOR raised for Ammonia on various samples due to sample matrix.
- 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

				W1_S_18/10/16	W1_B_18/10/16	W2_S_18/10/16	W2_B_18/10/16	CB1_S_18/10/16
Client sampling date / time				18-Oct-2016 12:45	18-Oct-2016 12:40	18-Oct-2016 12:10	18-Oct-2016 12:00	18-Oct-2016 13:30
Compound	CAS Number	LOR	Unit	ES1623516-001	ES1623516-002	ES1623516-003	ES1623516-004	ES1623516-005
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.5	0.7	0.3	0.7	0.9
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.8	1.7	1.8	1.9	1.7
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	<0.5	0.5	<0.5	0.8	<0.5
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.8	1.7	1.7	1.8	1.8
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	0.7
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	0.6	0.5	<0.5	<0.5	0.6
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.12	0.10	0.10	0.12	0.12
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	µg/L	1	<1	1	2	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				W1_S_18/10/16	W1_B_18/10/16	W2_S_18/10/16	W2_B_18/10/16	CB1_S_18/10/16
Client sampling date / time				18-Oct-2016 12:45	18-Oct-2016 12:40	18-Oct-2016 12:10	18-Oct-2016 12:00	18-Oct-2016 13:30
Compound	CAS Number	LOR	Unit	ES1623516-001	ES1623516-002	ES1623516-003	ES1623516-004	ES1623516-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				W1_S_18/10/16	W1_B_18/10/16	W2_S_18/10/16	W2_B_18/10/16	CB1_S_18/10/16
Client sampling date / time				18-Oct-2016 12:45	18-Oct-2016 12:40	18-Oct-2016 12:10	18-Oct-2016 12:00	18-Oct-2016 13:30
Compound	CAS Number	LOR	Unit	ES1623516-001	ES1623516-002	ES1623516-003	ES1623516-004	ES1623516-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	18.7	21.2	19.9	18.4	17.8
2-Chlorophenol-D4	93951-73-6	1	%	47.8	57.9	49.9	48.0	48.0
2,4,6-Tribromophenol	118-79-6	1	%	40.0	44.0	41.6	38.8	35.2
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	60.6	65.0	58.8	53.2	46.5
Anthracene-d10	1719-06-8	1	%	60.8	71.4	63.3	57.6	56.5
4-Terphenyl-d14	1718-51-0	1	%	66.9	101	69.8	62.0	55.1
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	110	116	115	112	118
Toluene-D8	2037-26-5	2	%	102	99.6	104	105	106
4-Bromofluorobenzene	460-00-4	2	%	79.4	77.0	80.8	82.1	84.2



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	CB1_B_18/10/16	MU1_S_18/10/16	MU1_B_18/10/16	BAY1_S_18/10/16	BAY1_B_18/10/16
Client sampling date / time					18-Oct-2016 13:20	18-Oct-2016 10:55	18-Oct-2016 10:45	18-Oct-2016 10:25	18-Oct-2016 10:15
Compound	CAS Number	LOR	Unit		ES1623516-006	ES1623516-007	ES1623516-008	ES1623516-009	ES1623516-010
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1
EA045: Turbidity									
Turbidity	----	0.1	NTU		1.2	0.5	0.3	0.5	0.6
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.8	1.8	1.8	1.8	1.8
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		<0.5	0.6	0.6	0.6	<0.5
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.8	1.7	1.9	1.7	1.9
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	10.6	<0.5	<0.5
Copper	7440-50-8	1	µg/L		2	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		0.6	0.7	0.8	0.5	0.6
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.09	0.10	0.08	0.11	0.10
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		<0.005	<0.005	<0.005	<0.005	<0.005
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	µg/L		1	2	2	2	3
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_18/10/16	MU1_S_18/10/16	MU1_B_18/10/16	BAY1_S_18/10/16	BAY1_B_18/10/16
Client sampling date / time				18-Oct-2016 13:20	18-Oct-2016 10:55	18-Oct-2016 10:45	18-Oct-2016 10:25	18-Oct-2016 10:15
Compound	CAS Number	LOR	Unit	ES1623516-006	ES1623516-007	ES1623516-008	ES1623516-009	ES1623516-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_18/10/16	MU1_S_18/10/16	MU1_B_18/10/16	BAY1_S_18/10/16	BAY1_B_18/10/16
Client sampling date / time				18-Oct-2016 13:20	18-Oct-2016 10:55	18-Oct-2016 10:45	18-Oct-2016 10:25	18-Oct-2016 10:15
Compound	CAS Number	LOR	Unit	ES1623516-006	ES1623516-007	ES1623516-008	ES1623516-009	ES1623516-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	21.0	17.4	21.7	19.2	20.6
2-Chlorophenol-D4	93951-73-6	1	%	54.0	46.6	57.6	51.7	53.1
2,4,6-Tribromophenol	118-79-6	1	%	40.6	42.4	42.9	39.8	42.5
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	60.7	54.6	67.0	61.4	63.2
Anthracene-d10	1719-06-8	1	%	64.9	54.6	66.2	62.9	64.6
4-Terphenyl-d14	1718-51-0	1	%	71.0	57.9	70.7	68.1	70.7
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	116	121	109	115	119
Toluene-D8	2037-26-5	2	%	110	106	93.5	103	103
4-Bromofluorobenzene	460-00-4	2	%	84.5	83.1	73.8	78.4	79.6



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BAY2_S_18/10/16	BAY2_B_18/10/16	----	----	----
Client sampling date / time					18-Oct-2016 09:40	18-Oct-2016 09:30	----	----	----
Compound	CAS Number	LOR	Unit		ES1623516-011	ES1623516-012	-----	-----	-----
					Result	Result	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		<1	<1	----	----	----
EA045: Turbidity									
Turbidity	----	0.1	NTU		0.6	0.5	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	----	----	----
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.8	1.9	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L		<1	1	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		0.6	0.7	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.7	2.0	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L		<1	2	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.05	<0.05	----	----	----
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.46	0.13	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		<0.005	<0.005	----	----	----
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	µg/L		1	1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				BAY2_S_18/10/16	BAY2_B_18/10/16	----	----	----
Client sampling date / time				18-Oct-2016 09:40	18-Oct-2016 09:30	----	----	----
Compound	CAS Number	LOR	Unit	ES1623516-011	ES1623516-012	-----	-----	-----
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	----	----	----
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	----	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	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BAY2_S_18/10/16	BAY2_B_18/10/16	----	----	----
Client sampling date / time					18-Oct-2016 09:40	18-Oct-2016 09:30	----	----	----
Compound	CAS Number	LOR	Unit		ES1623516-011	ES1623516-012	-----	-----	-----
					Result	Result	----	----	----
EP080: BTEXN - Continued									
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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		23.1	17.0	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%		60.4	42.9	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%		45.3	39.5	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		68.5	57.2	----	----	----
Anthracene-d10	1719-06-8	1	%		71.3	53.2	----	----	----
4-Terphenyl-d14	1718-51-0	1	%		73.0	58.8	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		110	121	----	----	----
Toluene-D8	2037-26-5	2	%		102	112	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		78.5	85.0	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1623516	Page	: 1 of 10
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 19-Oct-2016
Site	: ----	Issue Date	: 25-Oct-2016
Sampler	: Elgin Associates	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12

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

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.

Matrix: WATER

Outliers : Frequency of Quality Control Samples

Matrix: WATER

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: **WATER**

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

Method <i>Container / Client Sample ID(s)</i>	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025-SW)								
W1_S_18/10/16,	W1_B_18/10/16,	18-Oct-2016	----	----	----	24-Oct-2016	25-Oct-2016	✓
W2_S_18/10/16,	W2_B_18/10/16,							
CB1_S_18/10/16,	CB1_B_18/10/16,							
MU1_S_18/10/16,	MU1_B_18/10/16,							
BAY1_S_18/10/16,	BAY1_B_18/10/16,							
BAY2_S_18/10/16,	BAY2_B_18/10/16,							
EA045: Turbidity								
Clear Plastic Bottle - Natural (EA045)								
W1_S_18/10/16,	W1_B_18/10/16,	18-Oct-2016	----	----	----	20-Oct-2016	20-Oct-2016	✓
W2_S_18/10/16,	W2_B_18/10/16,							
CB1_S_18/10/16,	CB1_B_18/10/16,							
MU1_S_18/10/16,	MU1_B_18/10/16,							
BAY1_S_18/10/16,	BAY1_B_18/10/16,							
BAY2_S_18/10/16,	BAY2_B_18/10/16,							
EG035F: Dissolved Mercury by FIMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F-LL)								
W1_S_18/10/16,	W1_B_18/10/16,	18-Oct-2016	----	----	----	24-Oct-2016	15-Nov-2016	✓
W2_S_18/10/16,	W2_B_18/10/16,							
CB1_S_18/10/16,	CB1_B_18/10/16,							
MU1_S_18/10/16,	MU1_B_18/10/16,							
BAY1_S_18/10/16,	BAY1_B_18/10/16,							
BAY2_S_18/10/16,	BAY2_B_18/10/16,							
EG035T: Total Mercury by FIMS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035T-LL)								
W1_S_18/10/16,	W1_B_18/10/16,	18-Oct-2016	----	----	----	24-Oct-2016	15-Nov-2016	✓
W2_S_18/10/16,	W2_B_18/10/16,							
CB1_S_18/10/16,	CB1_B_18/10/16,							
MU1_S_18/10/16,	MU1_B_18/10/16,							
BAY1_S_18/10/16,	BAY1_B_18/10/16,							
BAY2_S_18/10/16,	BAY2_B_18/10/16,							
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093A-F)								
W1_S_18/10/16,	W1_B_18/10/16,	18-Oct-2016	----	----	----	20-Oct-2016	16-Apr-2017	✓
W2_S_18/10/16,	W2_B_18/10/16,							
CB1_S_18/10/16,	CB1_B_18/10/16,							
MU1_S_18/10/16,	MU1_B_18/10/16,							
BAY1_S_18/10/16,	BAY1_B_18/10/16,							
BAY2_S_18/10/16,	BAY2_B_18/10/16,							



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-T)	18-Oct-2016	20-Oct-2016	16-Apr-2017	✔	20-Oct-2016	16-Apr-2017	✔
W1_S_18/10/16, W1_B_18/10/16,							
W2_S_18/10/16, W2_B_18/10/16,							
CB1_S_18/10/16, CB1_B_18/10/16,							
MU1_S_18/10/16, MU1_B_18/10/16,							
BAY1_S_18/10/16, BAY1_B_18/10/16,							
BAY2_S_18/10/16, BAY2_B_18/10/16,							
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water							
Clear Plastic Bottle - Sulfuric Acid (EK055G-SW)	18-Oct-2016	----	----	----	21-Oct-2016	15-Nov-2016	✔
W1_S_18/10/16, W1_B_18/10/16,							
W2_S_18/10/16, W2_B_18/10/16,							
CB1_S_18/10/16, CB1_B_18/10/16,							
MU1_S_18/10/16, MU1_B_18/10/16,							
BAY1_S_18/10/16, BAY1_B_18/10/16,							
BAY2_S_18/10/16, BAY2_B_18/10/16,							
EK262A: Total Nitrogen							
Clear Plastic Bottle - Natural (AS) (EK262PA-SW)	18-Oct-2016	20-Oct-2016	19-Oct-2016	✖	20-Oct-2016	19-Oct-2016	✖
W1_S_18/10/16, W1_B_18/10/16,							
W2_S_18/10/16, W2_B_18/10/16,							
CB1_S_18/10/16, CB1_B_18/10/16,							
MU1_S_18/10/16, MU1_B_18/10/16,							
BAY1_S_18/10/16, BAY1_B_18/10/16,							
BAY2_S_18/10/16, BAY2_B_18/10/16,							
EK267A: Total Phosphorus (Persulfate Digestion)							
Clear Plastic Bottle - Natural (AS) (EK267PA-SW)	18-Oct-2016	20-Oct-2016	19-Oct-2016	✖	20-Oct-2016	19-Oct-2016	✖
W1_S_18/10/16, W1_B_18/10/16,							
W2_S_18/10/16, W2_B_18/10/16,							
CB1_S_18/10/16, CB1_B_18/10/16,							
MU1_S_18/10/16, MU1_B_18/10/16,							
BAY1_S_18/10/16, BAY1_B_18/10/16,							
BAY2_S_18/10/16, BAY2_B_18/10/16,							
EP008: Chlorophyll a & Pheophytin a							
Opaque Plastic Bottle - Unpreserved (EP008)	18-Oct-2016	----	----	----	20-Oct-2016	20-Oct-2016	✔
W1_S_18/10/16, W1_B_18/10/16,							
W2_S_18/10/16, W2_B_18/10/16,							
CB1_S_18/10/16, CB1_B_18/10/16,							
MU1_S_18/10/16, MU1_B_18/10/16,							
BAY1_S_18/10/16, BAY1_B_18/10/16,							
BAY2_S_18/10/16, BAY2_B_18/10/16,							



Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))		18-Oct-2016	20-Oct-2016	25-Oct-2016	✓	21-Oct-2016	29-Nov-2016	✓
W1_S_18/10/16,	W1_B_18/10/16,							
W2_S_18/10/16,	W2_B_18/10/16,							
CB1_S_18/10/16,	CB1_B_18/10/16,							
MU1_S_18/10/16,	MU1_B_18/10/16,							
BAY1_S_18/10/16,	BAY1_B_18/10/16,							
BAY2_S_18/10/16,	BAY2_B_18/10/16,							
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)		18-Oct-2016	20-Oct-2016	25-Oct-2016	✓	21-Oct-2016	29-Nov-2016	✓
W1_S_18/10/16,	W1_B_18/10/16,							
W2_S_18/10/16,	W2_B_18/10/16,							
CB1_S_18/10/16,	CB1_B_18/10/16,							
MU1_S_18/10/16,	MU1_B_18/10/16,							
BAY1_S_18/10/16,	BAY1_B_18/10/16,							
BAY2_S_18/10/16,	BAY2_B_18/10/16,							
Amber VOC Vial - Sulfuric Acid (EP080)		18-Oct-2016	21-Oct-2016	01-Nov-2016	✓	21-Oct-2016	01-Nov-2016	✓
W1_S_18/10/16,	W1_B_18/10/16,							
W2_S_18/10/16,	W2_B_18/10/16,							
CB1_S_18/10/16,	CB1_B_18/10/16,							
MU1_S_18/10/16,	MU1_B_18/10/16,							
BAY1_S_18/10/16,	BAY1_B_18/10/16,							
BAY2_S_18/10/16,	BAY2_B_18/10/16,							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		18-Oct-2016	20-Oct-2016	25-Oct-2016	✓	21-Oct-2016	29-Nov-2016	✓
W1_S_18/10/16,	W1_B_18/10/16,							
W2_S_18/10/16,	W2_B_18/10/16,							
CB1_S_18/10/16,	CB1_B_18/10/16,							
MU1_S_18/10/16,	MU1_B_18/10/16,							
BAY1_S_18/10/16,	BAY1_B_18/10/16,							
BAY2_S_18/10/16,	BAY2_B_18/10/16,							
Amber VOC Vial - Sulfuric Acid (EP080)		18-Oct-2016	21-Oct-2016	01-Nov-2016	✓	21-Oct-2016	01-Nov-2016	✓
W1_S_18/10/16,	W1_B_18/10/16,							
W2_S_18/10/16,	W2_B_18/10/16,							
CB1_S_18/10/16,	CB1_B_18/10/16,							
MU1_S_18/10/16,	MU1_B_18/10/16,							
BAY1_S_18/10/16,	BAY1_B_18/10/16,							
BAY2 S_18/10/16,	BAY2 B_18/10/16,							

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.



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)							
Ammonia as N (Saline Water)	EK055G-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	12	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	2	12	16.67	9.52	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	12	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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							
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✔	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



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
Suspended Solids - Saline Water	EA025-SW	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Turbidity	EA045	WATER	In house: Referenced to APHA 2130 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Mercury by FIMS - Low Level	EG035F-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS - Low Level	EG035T-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm 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)
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. 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)
Ammonia as N (Saline Water)	EK055G-SW	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.



Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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	In house: Referenced to 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	In house: Referenced to 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
Persulfate Digestion for UT TN and TP for FIA/Saline	EK262/267PA-SW Prep	WATER	In house: Referenced to APHA 4500 P - J. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



Environmental

QUALITY CONTROL REPORT

Work Order	: ES1623516	Page	: 1 of 8
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Contact	: Carol Walsh
Address	: PO BOX 829 BEGA NSW, AUSTRALIA 2550	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8003 4590	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 19-Oct-2016
Order number	: ----	Date Analysis Commenced	: 20-Oct-2016
C-O-C number	: ----	Issue Date	: 25-Oct-2016
Sampler	: Elgin Associates		
Site	: ----		
Quote number	: ----		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This 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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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 (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 628032)									
ES1623516-001	W1_S_18/10/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.00	No Limit
ES1623516-010	BAY1_B_18/10/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	2	82.4	No Limit
EA045: Turbidity (QC Lot: 624733)									
EN1603790-001	Anonymous	EA045: Turbidity	----	0.1	NTU	77.8	77.8	0.00	0% - 20%
ES1623516-006	CB1_B_18/10/16	EA045: Turbidity	----	0.1	NTU	1.2	1.2	0.00	0% - 50%
EG035F: Dissolved Mercury by FIMS (QC Lot: 627848)									
EP1609808-002	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
ES1623516-004	W2_B_18/10/16	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 627810)									
ES1623409-004	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
ES1623516-008	MU1_B_18/10/16	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 623899)									
ES1623516-001	W1_S_18/10/16	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.8	1.7	0.00	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	0.7	34.5	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
ES1623516-011	BAY2_S_18/10/16	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.8	1.9	0.00	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	0.6	0.6	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: 623899) - continued									
ES1623516-011	BAY2_S_18/10/16	EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 623904)									
ES1623516-001	W1_S_18/10/16	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	1.8	1.8	0.00	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	0.6	0.6	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
ES1623516-011	BAY2_S_18/10/16	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	1.7	1.8	7.90	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QC Lot: 626255)									
ES1623516-001	W1_S_18/10/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
ES1623516-010	BAY1_B_18/10/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
EK262A: Total Nitrogen (QC Lot: 624807)									
ES1623516-001	W1_S_18/10/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.12	0.12	0.00	No Limit
ES1623516-011	BAY2_S_18/10/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.46	0.73	45.6	0% - 50%
EK267A: Total Phosphorus (Persulfate Digestion) (QC Lot: 624808)									
ES1623516-001	W1_S_18/10/16	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	0.00	No Limit
ES1623516-011	BAY2_S_18/10/16	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 624092)									
ES1623516-001	W1_S_18/10/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1623516-003	W2_S_18/10/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 624092)									
ES1623516-001	W1_S_18/10/16	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1623516-003	W2_S_18/10/16	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 624092)									
ES1623516-001	W1_S_18/10/16	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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

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 Work Order : ES1623516
 Client : ELGIN ASSOCIATES PTY LTD
 Project : Eden Baseline Marine Water Quality



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: 624092) - continued									
ES1623516-001	W1_S_18/10/16	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1623516-003	W2_S_18/10/16	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

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 Spike (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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
		LCS	Low	High
Result				
<1	150 mg/L	117	86	128
<1	1000 mg/L	108	80	112
<0.1	40 NTU	97.0	91	105
<0.00004	0.0001 mg/L	105	83	105
<0.00004	0.0001 mg/L	102	85	105
<0.5	10 µg/L	104	76	134
<0.2	10 µg/L	90.2	69	117
<0.5	10 µg/L	97.5	76	122
<1	10 µg/L	95.6	71	129
<0.2	10 µg/L	95.0	74	120
<0.5	10 µg/L	106	72	124
<5	10 µg/L	107	70	126
<0.5	10 µg/L	110	89	125
<0.2	10 µg/L	100	82	122
<0.5	10 µg/L	104	85	123
<1	10 µg/L	103	84	128
<0.2	10 µg/L	106	85	125
<0.5	10 µg/L	112	85	125
<5	10 µg/L	115	82	128
<0.02	0.5 mg/L	101	80	120
<0.05	1 mg/L	104	81	111
<0.005	0.44 mg/L	92.6	88	112
<1	20 mg/m³	95.0	70	130



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 623959) - continued								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	75.9	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	80.3	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	83.8	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	92.9	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	93.6	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	91.2	64	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	97.1	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	94.3	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	93.1	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	90.7	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	91.9	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	83.5	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	88.7	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	87.1	60	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	94.3	61	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	91.5	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 623960)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	100	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	88.9	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	90.2	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 624092)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	93.6	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 623960)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	86.2	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	94.4	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	100	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 624092)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	91.7	75	127
EP080: BTEXN (QCLot: 624092)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	93.4	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	95.1	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	91.2	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	90.7	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	92.0	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	99.3	70	120



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**

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
EG035F: Dissolved Mercury by FIMS (QCLot: 627848)							
ES1623516-005	CB1_S_18/10/16	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	94.0	70	130
EG035T: Total Mercury by FIMS (QCLot: 627810)							
ES1623516-009	BAY1_S_18/10/16	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	97.0	70	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 623899)							
ES1623516-002	W1_B_18/10/16	EG093A-F: Arsenic	7440-38-2	50 µg/L	112	70	130
		EG093A-F: Cadmium	7440-43-9	12.5 µg/L	96.2	70	130
		EG093A-F: Chromium	7440-47-3	50 µg/L	103	70	130
		EG093A-F: Copper	7440-50-8	50 µg/L	111	70	130
		EG093A-F: Lead	7439-92-1	50 µg/L	104	70	130
		EG093A-F: Nickel	7440-02-0	50 µg/L	114	70	130
		EG093A-F: Zinc	7440-66-6	50 µg/L	95.3	70	130
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 623904)							
ES1623516-002	W1_B_18/10/16	EG093A-T: Arsenic	7440-38-2	50 µg/L	118	70	130
		EG093A-T: Cadmium	7440-43-9	12.5 µg/L	103	70	130
		EG093A-T: Chromium	7440-47-3	50 µg/L	111	70	130
		EG093A-T: Copper	7440-50-8	50 µg/L	119	70	130
		EG093A-T: Lead	7439-92-1	50 µg/L	111	70	130
		EG093A-T: Nickel	7440-02-0	50 µg/L	120	70	130
		EG093A-T: Zinc	7440-66-6	50 µg/L	99.7	70	130
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 626255)							
ES1623516-001	W1_S_18/10/16	EK055G-SW: Ammonia as N	7664-41-7	1 mg/L	117	70	130
EK262A: Total Nitrogen (QCLot: 624807)							
ES1623516-001	W1_S_18/10/16	EK262PA-SW: Total Nitrogen as N	----	0.5 mg/L	100	70	130
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 624808)							
ES1623516-001	W1_S_18/10/16	EK267PA-SW: Total Phosphorus as P	----	0.5 mg/L	87.2	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 623959)							
ES1623516-001	W1_S_18/10/16	EP075(SIM): Acenaphthene	83-32-9	2 µg/L	73.9	70	130
		EP075(SIM): Pyrene	129-00-0	2 µg/L	92.5	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 623960)							
ES1623516-001	W1_S_18/10/16	EP071: C10 - C14 Fraction	----	2000 µg/L	111	74	150
		EP071: C15 - C28 Fraction	----	2500 µg/L	109	77	153
		EP071: C29 - C36 Fraction	----	2000 µg/L	112	67	153

Page : 8 of 8
 Work Order : ES1623516
 Client : ELGIN ASSOCIATES PTY LTD
 Project : Eden Baseline Marine Water Quality



Sub-Matrix: **WATER**

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 Petroleum Hydrocarbons (QCLot: 624092)							
ES1623516-001	W1_S_18/10/16	EP080: C6 - C9 Fraction	----	325 µg/L	98.8	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 623960)							
ES1623516-001	W1_S_18/10/16	EP071: >C10 - C16 Fraction	----	2500 µg/L	99.6	74	150
		EP071: >C16 - C34 Fraction	----	3500 µg/L	113	77	153
		EP071: >C34 - C40 Fraction	----	1500 µg/L	106	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 624092)							
ES1623516-001	W1_S_18/10/16	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	93.9	70	130
EP080: BTEXN (QCLot: 624092)							
ES1623516-001	W1_S_18/10/16	EP080: Benzene	71-43-2	25 µg/L	101	70	130
		EP080: Toluene	108-88-3	25 µg/L	98.3	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	94.7	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	93.6	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	97.5	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	97.2	70	130

CERTIFICATE OF ANALYSIS

Work Order	: ES1624142	Page	: 1 of 12
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Contact	: Carol Walsh
Address	: PO BOX 829	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	BEGA NSW, AUSTRALIA 2550		
Telephone	: +61 02 8003 4590	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 26-Oct-2016 09:25
Order number	: ----	Date Analysis Commenced	: 26-Oct-2016
C-O-C number	: ----	Issue Date	: 02-Nov-2016 16:02
Sampler	: ELGIN ASSOCIATES		
Site	: ----		
Quote number	: ----		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
RICHARD TEA	Lab technician	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

When 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.

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

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

LOR = Limit of reporting

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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EG093: It is recognised that total concentration of Arsenic and Copper is less than dissolved for samples ES1624142 #005 and 008. However, the difference is within experimental variation of the methods.
- EK055G: LOR raised for Ammonia on various samples due to sample matrix.
- 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: **SALINE WATER**
 (Matrix: **WATER**)

Client sample ID

				W1_S_25/10/16	W1_B_25/10/16	W2_S_25/10/16	W2_B_25/10/16	CB1_S_25/10/16
Client sampling date / time				25-Oct-2016 12:15	25-Oct-2016 12:00	25-Oct-2016 11:40	25-Oct-2016 11:20	25-Oct-2016 12:50
Compound	CAS Number	LOR	Unit	ES1624142-001	ES1624142-002	ES1624142-003	ES1624142-004	ES1624142-005
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	2	3	2	2	2
EA045: Turbidity								
Turbidity	----	0.1	NTU	1.8	2.0	1.5	1.6	2.5
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.5	1.6	1.6	1.7	1.8
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	1	<1	1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.7	1.7	1.7	1.9	1.7
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	1	2	<1	1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	0.6	<0.5	0.6	0.6	<0.5
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.16	0.17	0.15	0.15	0.28
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	0.015
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	mg/m³	1	2	2	1	3
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: SALINE WATER
 (Matrix: WATER)

Client sample ID

				W1_S_25/10/16	W1_B_25/10/16	W2_S_25/10/16	W2_B_25/10/16	CB1_S_25/10/16
Client sampling date / time				25-Oct-2016 12:15	25-Oct-2016 12:00	25-Oct-2016 11:40	25-Oct-2016 11:20	25-Oct-2016 12:50
Compound	CAS Number	LOR	Unit	ES1624142-001	ES1624142-002	ES1624142-003	ES1624142-004	ES1624142-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SALINE WATER
 (Matrix: WATER)

Client sample ID

				W1_S_25/10/16	W1_B_25/10/16	W2_S_25/10/16	W2_B_25/10/16	CB1_S_25/10/16
Client sampling date / time				25-Oct-2016 12:15	25-Oct-2016 12:00	25-Oct-2016 11:40	25-Oct-2016 11:20	25-Oct-2016 12:50
Compound	CAS Number	LOR	Unit	ES1624142-001	ES1624142-002	ES1624142-003	ES1624142-004	ES1624142-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	-----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	20.4	19.0	15.8	20.5	17.2
2-Chlorophenol-D4	93951-73-6	1	%	41.5	44.9	39.5	45.6	40.5
2,4,6-Tribromophenol	118-79-6	1	%	39.7	42.2	50.0	44.9	47.1
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	53.3	57.7	50.3	59.2	44.7
Anthracene-d10	1719-06-8	1	%	58.2	63.8	47.7	66.3	49.5
4-Terphenyl-d14	1718-51-0	1	%	85.9	77.5	51.8	80.4	55.6
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	109	106	100	99.6	102
Toluene-D8	2037-26-5	2	%	126	122	123	110	110
4-Bromofluorobenzene	460-00-4	2	%	114	109	110	101	100



Analytical Results

Sub-Matrix: **SALINE WATER**
 (Matrix: **WATER**)

Client sample ID

				CB1_B_25/10/16	MU1_S_25/10/16	MU1_B_25/10/16	BAY1_S_25/10/16	BAY1_B_25/10/16
Client sampling date / time				25-Oct-2016 12:30	25-Oct-2016 11:00	25-Oct-2016 10:40	25-Oct-2016 10:20	25-Oct-2016 10:00
Compound	CAS Number	LOR	Unit	ES1624142-006	ES1624142-007	ES1624142-008	ES1624142-009	ES1624142-010
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	3	2	2	2	3
EA045: Turbidity								
Turbidity	----	0.1	NTU	3.2	1.7	1.2	1.6	1.5
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.8	1.7	1.8	1.6	1.7
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	0.6	<0.5	0.5	0.5	0.6
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.9	1.9	2.0	1.8	1.9
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	1	2	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	0.6	0.7	0.7	0.5	0.8
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.18	0.19	0.25	0.14	0.14
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	0.005	0.006	<0.005	<0.005	<0.005
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	mg/m³	3	2	3	2	2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: SALINE WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_25/10/16	MU1_S_25/10/16	MU1_B_25/10/16	BAY1_S_25/10/16	BAY1_B_25/10/16
Client sampling date / time				25-Oct-2016 12:30	25-Oct-2016 11:00	25-Oct-2016 10:40	25-Oct-2016 10:20	25-Oct-2016 10:00
Compound	CAS Number	LOR	Unit	ES1624142-006	ES1624142-007	ES1624142-008	ES1624142-009	ES1624142-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SALINE WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_25/10/16	MU1_S_25/10/16	MU1_B_25/10/16	BAY1_S_25/10/16	BAY1_B_25/10/16
Client sampling date / time				25-Oct-2016 12:30	25-Oct-2016 11:00	25-Oct-2016 10:40	25-Oct-2016 10:20	25-Oct-2016 10:00
Compound	CAS Number	LOR	Unit	ES1624142-006	ES1624142-007	ES1624142-008	ES1624142-009	ES1624142-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	21.9	19.8	21.9	22.9	25.6
2-Chlorophenol-D4	93951-73-6	1	%	50.8	47.5	56.4	55.4	61.8
2,4,6-Tribromophenol	118-79-6	1	%	45.6	45.8	42.6	46.9	45.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	57.3	59.7	62.0	67.5	64.2
Anthracene-d10	1719-06-8	1	%	62.1	61.6	63.9	68.0	64.8
4-Terphenyl-d14	1718-51-0	1	%	75.5	72.2	73.4	78.0	75.2
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	108	109	108	115	107
Toluene-D8	2037-26-5	2	%	126	128	128	129	126
4-Bromofluorobenzene	460-00-4	2	%	113	114	110	112	106



Analytical Results

Sub-Matrix: **SALINE WATER**
 (Matrix: **WATER**)

Client sample ID

				BAY2_S_25/10/16	BAY2_B_25/10/16	----	----	----
Client sampling date / time				25-Oct-2016 09:35	25-Oct-2016 09:20	----	----	----
Compound	CAS Number	LOR	Unit	ES1624142-011	ES1624142-012	-----	-----	-----
				Result	Result	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	<1	<1	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.6	0.4	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	----	----	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.8	1.9	----	----	----
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L	<1	3	----	----	----
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L	0.5	0.5	----	----	----
Zinc	7440-66-6	5	µg/L	<5	<5	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.9	1.9	----	----	----
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L	<0.5	1.2	----	----	----
Copper	7440-50-8	1	µg/L	4	3	----	----	----
Lead	7439-92-1	0.2	µg/L	0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L	0.6	0.9	----	----	----
Zinc	7440-66-6	5	µg/L	<5	<5	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	----	----	----
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.14	0.16	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	----	----	----
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	mg/m³	2	1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	----	----	----



Analytical Results

Sub-Matrix: SALINE WATER
 (Matrix: WATER)

Client sample ID

				BAY2_S_25/10/16	BAY2_B_25/10/16	----	----	----
Client sampling date / time				25-Oct-2016 09:35	25-Oct-2016 09:20	----	----	----
Compound	CAS Number	LOR	Unit	ES1624142-011	ES1624142-012	-----	-----	-----
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	----	----	----
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	----	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	----	----	----



Analytical Results

Sub-Matrix: **SALINE WATER**
 (Matrix: **WATER**)

Client sample ID

				BAY2_S_25/10/16	BAY2_B_25/10/16	----	----	----
Client sampling date / time				25-Oct-2016 09:35	25-Oct-2016 09:20	----	----	----
Compound	CAS Number	LOR	Unit	ES1624142-011	ES1624142-012	-----	-----	-----
				Result	Result	----	----	----
EP080: BTEXN - Continued								
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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	16.1	22.5	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	38.2	49.0	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%	68.5	52.4	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	50.2	51.7	----	----	----
Anthracene-d10	1719-06-8	1	%	51.8	65.0	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	58.7	79.9	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	112	110	----	----	----
Toluene-D8	2037-26-5	2	%	131	122	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	113	106	----	----	----



Surrogate Control Limits

Sub-Matrix: SALINE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1624142	Page	: 1 of 9
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 26-Oct-2016
Site	: ----	Issue Date	: 02-Nov-2016
Sampler	: ELGIN ASSOCIATES	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12

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

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.

Matrix: WATER

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 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.

Evaluation: ✖ = Holding time breach : ✔ = Within holding time

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025-SW)		25-Oct-2016	----	----	----	31-Oct-2016	01-Nov-2016	✓
W1_S_25/10/16,	W1_B_25/10/16,							
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2 S 25/10/16,	BAY2 B 25/10/16							



Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA045: Turbidity								
Clear Plastic Bottle - Natural (EA045)								
W1_S_25/10/16,	W1_B_25/10/16,	25-Oct-2016	----	----	----	26-Oct-2016	27-Oct-2016	✓
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2_S_25/10/16,	BAY2_B_25/10/16							
EG035F: Dissolved Mercury by FIMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F-LL)								
W1_S_25/10/16,	W1_B_25/10/16,	25-Oct-2016	----	----	----	01-Nov-2016	22-Nov-2016	✓
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2_S_25/10/16,	BAY2_B_25/10/16							
EG035T: Total Mercury by FIMS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035T-LL)								
W1_S_25/10/16,	W1_B_25/10/16,	25-Oct-2016	----	----	----	28-Oct-2016	22-Nov-2016	✓
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2_S_25/10/16,	BAY2_B_25/10/16							
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093A-F)								
W1_S_25/10/16,	W1_B_25/10/16,	25-Oct-2016	----	----	----	27-Oct-2016	23-Apr-2017	✓
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2_S_25/10/16,	BAY2_B_25/10/16							
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-T)								
W1_S_25/10/16,	W1_B_25/10/16,	25-Oct-2016	27-Oct-2016	23-Apr-2017	✓	27-Oct-2016	23-Apr-2017	✓
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2 S_25/10/16,	BAY2_B_25/10/16							



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	
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Clear Plastic Bottle - Sulfuric Acid (EK055G-SW) W1_S_25/10/16, W2_S_25/10/16, CB1_S_25/10/16, MU1_S_25/10/16, BAY1_S_25/10/16, BAY2_S_25/10/16,	W1_B_25/10/16, W2_B_25/10/16, CB1_B_25/10/16, MU1_B_25/10/16, BAY1_B_25/10/16, BAY2_B_25/10/16	25-Oct-2016	----	----	----	27-Oct-2016	22-Nov-2016	✓
EK262A: Total Nitrogen								
Clear Plastic Bottle - Natural (EK262PA-SW) W1_S_25/10/16, W2_S_25/10/16, CB1_S_25/10/16, MU1_S_25/10/16, BAY1_S_25/10/16, BAY2_S_25/10/16,	W1_B_25/10/16, W2_B_25/10/16, CB1_B_25/10/16, MU1_B_25/10/16, BAY1_B_25/10/16, BAY2_B_25/10/16	25-Oct-2016	28-Oct-2016	26-Oct-2016	✗	28-Oct-2016	26-Oct-2016	✗
EK267A: Total Phosphorus (Persulfate Digestion)								
Clear Plastic Bottle - Natural (EK267PA-CM) W1_S_25/10/16, W2_S_25/10/16, CB1_S_25/10/16, MU1_S_25/10/16, BAY1_S_25/10/16, BAY2_S_25/10/16,	W1_B_25/10/16, W2_B_25/10/16, CB1_B_25/10/16, MU1_B_25/10/16, BAY1_B_25/10/16, BAY2_B_25/10/16	25-Oct-2016	27-Oct-2016	26-Oct-2016	✗	27-Oct-2016	26-Oct-2016	✗
EP008: Chlorophyll a & Pheophytin a								
Amber Glass Bottle - Unpreserved (EP008) W1_S_25/10/16, W2_S_25/10/16, CB1_S_25/10/16, MU1_S_25/10/16, BAY1_S_25/10/16, BAY2_S_25/10/16,	W1_B_25/10/16, W2_B_25/10/16, CB1_B_25/10/16, MU1_B_25/10/16, BAY1_B_25/10/16, BAY2_B_25/10/16	25-Oct-2016	----	----	----	26-Oct-2016	27-Oct-2016	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM)) W1_S_25/10/16, W2_S_25/10/16, CB1_S_25/10/16, MU1_S_25/10/16, BAY1_S_25/10/16, BAY2_S_25/10/16,	W1_B_25/10/16, W2_B_25/10/16, CB1_B_25/10/16, MU1_B_25/10/16, BAY1_B_25/10/16, BAY2_B_25/10/16	25-Oct-2016	27-Oct-2016	01-Nov-2016	✓	30-Oct-2016	06-Dec-2016	✓



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)		25-Oct-2016	27-Oct-2016	01-Nov-2016	✓	29-Oct-2016	06-Dec-2016	✓
W1_S_25/10/16,	W1_B_25/10/16,							
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2_S_25/10/16,	BAY2_B_25/10/16,							
Amber VOC Vial - Sulfuric Acid (EP080)		25-Oct-2016	01-Nov-2016	08-Nov-2016	✓	01-Nov-2016	08-Nov-2016	✓
W1_S_25/10/16,	W1_B_25/10/16,							
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2_S_25/10/16,	BAY2_B_25/10/16,							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		25-Oct-2016	27-Oct-2016	01-Nov-2016	✓	29-Oct-2016	06-Dec-2016	✓
W1_S_25/10/16,	W1_B_25/10/16,							
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2_S_25/10/16,	BAY2_B_25/10/16,							
Amber VOC Vial - Sulfuric Acid (EP080)		25-Oct-2016	01-Nov-2016	08-Nov-2016	✓	01-Nov-2016	08-Nov-2016	✓
W1_S_25/10/16,	W1_B_25/10/16,							
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2_S_25/10/16,	BAY2_B_25/10/16,							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		25-Oct-2016	01-Nov-2016	08-Nov-2016	✓	01-Nov-2016	08-Nov-2016	✓
W1_S_25/10/16,	W1_B_25/10/16,							
W2_S_25/10/16,	W2_B_25/10/16,							
CB1_S_25/10/16,	CB1_B_25/10/16,							
MU1_S_25/10/16,	MU1_B_25/10/16,							
BAY1_S_25/10/16,	BAY1_B_25/10/16,							
BAY2 S_25/10/16,	BAY2 B_25/10/16,							



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)							
Ammonia as N (Saline Water)	EK055G-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	2	12	16.67	9.52	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus(Persulfate Digestion) - Ultra-Trace for CM	EK267PA-CM	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	2	29	6.90	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus(Persulfate Digestion) - Ultra-Trace for CM	EK267PA-CM	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	2	29	6.90	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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							
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus(Persulfate Digestion) - Ultra-Trace for CM	EK267PA-CM	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus(Persulfate Digestion) - Ultra-Trace for CM	EK267PA-CM	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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
Suspended Solids - Saline Water	EA025-SW	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Turbidity	EA045	WATER	In house: Referenced to APHA 2130 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Mercury by FIMS - Low Level	EG035F-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS - Low Level	EG035T-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm 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)
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. 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)
Ammonia as N (Saline Water)	EK055G-SW	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus(Persulfate Digestion) - Ultra-Trace for CM	EK267PA-CM	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.



Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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	In house: Referenced to 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	In house: Referenced to 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
Persulfate Digestion for UT TN and TP for FIA finish.	EK262/267-PA Prep	WATER	In house: Referenced to APHA 4500 P - J. This method is compliant with NEPM (2013) Schedule B(3)
Persulfate Digestion for UT TN and TP for FIA/Saline	EK262/267PA-SW Prep	WATER	In house: Referenced to APHA 4500 P - J. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QUALITY CONTROL REPORT

Work Order	: ES1624142	Page	: 1 of 9
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Contact	: Carol Walsh
Address	: PO BOX 829 BEGA NSW, AUSTRALIA 2550	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8003 4590	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 26-Oct-2016
Order number	: ----	Date Analysis Commenced	: 26-Oct-2016
C-O-C number	: ----	Issue Date	: 02-Nov-2016
Sampler	: ELGIN ASSOCIATES		
Site	: ----		
Quote number	: ----		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This 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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
RICHARD TEA	Lab technician	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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 (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 636053)									
ES1624142-001	W1_S_25/10/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	2	2	0.00	No Limit
ES1624142-010	BAY1_B_25/10/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	3	3	0.00	No Limit
EA045: Turbidity (QC Lot: 631383)									
ES1624038-002	Anonymous	EA045: Turbidity	----	0.1	NTU	0.9	0.9	0.00	No Limit
ES1624142-001	W1_S_25/10/16	EA045: Turbidity	----	0.1	NTU	1.8	2.0	8.42	0% - 50%
EA045: Turbidity (QC Lot: 631384)									
ES1624142-005	CB1_S_25/10/16	EA045: Turbidity	----	0.1	NTU	2.5	2.6	4.74	0% - 20%
ES1624143-002	Anonymous	EA045: Turbidity	----	0.1	NTU	<0.1	<0.1	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 637039)									
EP1610160-001	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
ES1624142-004	W2_B_25/10/16	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 632879)									
ES1624142-001	W1_S_25/10/16	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
ES1624142-011	BAY2_S_25/10/16	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 632171)									
ES1624142-001	W1_S_25/10/16	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.5	1.7	13.8	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
ES1624142-011	BAY2_S_25/10/16	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	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 (%)
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 632171) - continued									
ES1624142-011	BAY2_S_25/10/16	EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.8	1.8	0.00	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	0.5	0.5	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 632181)									
ES1624142-001	W1_S_25/10/16	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	1.7	1.7	0.00	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	0.6	0.6	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	1	1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
ES1624142-011	BAY2_S_25/10/16	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	1.9	1.9	0.00	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	0.6	0.6	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	4	<1	116	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QC Lot: 632783)									
ES1624142-001	W1_S_25/10/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
ES1624142-010	BAY1_B_25/10/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
EK262A: Total Nitrogen (QC Lot: 633657)									
ES1624142-001	W1_S_25/10/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.16	0.17	0.00	No Limit
ES1624142-011	BAY2_S_25/10/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.14	0.15	0.00	No Limit
EK267A: Total Phosphorus (Persulfate Digestion) (QC Lot: 632293)									
ES1624142-001	W1_S_25/10/16	EK267PA-CM: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.006	24.6	No Limit
ES1624142-010	BAY1_B_25/10/16	EK267PA-CM: Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 630893)									
ES1624142-001	W1_S_25/10/16	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit



Sub-Matrix: **WATER**

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 (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 630893) - continued									
ES1624142-001	W1_S_25/10/16	EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	<1.0	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
ES1624142-010	BAY1_B_25/10/16	EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	<1.0	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit		
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 630894)									
ES1624142-001	W1_S_25/10/16	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
ES1624142-010	BAY1_B_25/10/16	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 632859)									
ES1624070-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1624142-010	BAY1_B_25/10/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 630894)									
ES1624142-001	W1_S_25/10/16	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
ES1624142-010	BAY1_B_25/10/16	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit

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 Work Order : ES1624142
 Client : ELGIN ASSOCIATES PTY LTD
 Project : Eden Baseline Marine Water Quality



Sub-Matrix: **WATER**

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 Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 630894) - continued									
ES1624142-010	BAY1_B_25/10/16	EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 632859)									
ES1624070-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1624142-010	BAY1_B_25/10/16	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 632859)									
ES1624070-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
ES1624142-010	BAY1_B_25/10/16	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

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 Spike (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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
		LCS	Low	High
Result				
<1	150 mg/L	105	86	128
<1	1000 mg/L	95.2	80	112
<0.1	40 NTU	100	91	105
<0.1	40 NTU	100	91	105
<0.00004	0.0001 mg/L	94.0	83	105
<0.00004	0.0001 mg/L	103	85	105
<0.5	10 µg/L	107	76	134
<0.2	10 µg/L	103	69	117
<0.5	10 µg/L	101	76	122
<1	10 µg/L	102	71	129
<0.2	10 µg/L	104	74	120
<0.5	10 µg/L	103	72	124
<5	10 µg/L	99.8	70	126
<0.5	10 µg/L	104	89	125
<0.2	10 µg/L	103	82	122
<0.5	10 µg/L	98.3	85	123
<1	10 µg/L	99.5	84	128
<0.2	10 µg/L	102	85	125
<0.5	10 µg/L	99.8	85	125
<5	10 µg/L	109	82	128
<0.02	0.5 mg/L	100	80	120
<0.05	1 mg/L	92.2	81	111
<0.005	0.44 mg/L	110	88	114



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP008: Chlorophyll (QCLot: 630957) - continued								
EP008: Chlorophyll a	----	1	mg/m³	<1	20 mg/m³	105	70	130
EP008: Chlorophyll (QCLot: 630958)								
EP008: Chlorophyll a	----	1	mg/m³	<1	20 mg/m³	90.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 630893)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	72.8	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	70.4	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	65.7	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	69.4	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	67.7	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	69.0	64	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	75.6	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	72.9	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	72.3	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	75.9	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	77.7	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	96.5	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	72.4	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	76.1	60	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	77.8	61	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	78.0	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 630894)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	93.9	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	94.4	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	95.5	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 632859)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	76.5	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 630894)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	99.8	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	100	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	98.0	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 632859)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	77.7	75	127
EP080: BTEXN (QCLot: 632859)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	93.0	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	85.9	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	86.1	70	120

Matrix Spike (MS) Report

Sub-Matrix: **WATER**

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
EG035F: Dissolved Mercury by FIMS (QCLot: 637039)							
EP1610161-001	Anonymous	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	81.0	70	130
EG035T: Total Mercury by FIMS (QCLot: 632879)							
WN1603720-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	91.0	70	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 632171)							
ES1624142-002	W1_B_25/10/16	EG093A-F: Arsenic	7440-38-2	50 µg/L	112	70	130
		EG093A-F: Cadmium	7440-43-9	12.5 µg/L	106	70	130
		EG093A-F: Chromium	7440-47-3	50 µg/L	102	70	130
		EG093A-F: Copper	7440-50-8	50 µg/L	110	70	130
		EG093A-F: Lead	7439-92-1	50 µg/L	105	70	130
		EG093A-F: Nickel	7440-02-0	50 µg/L	106	70	130
		EG093A-F: Zinc	7440-66-6	50 µg/L	104	70	130
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 632181)							
ES1624142-002	W1_B_25/10/16	EG093A-T: Arsenic	7440-38-2	50 µg/L	114	70	130
		EG093A-T: Cadmium	7440-43-9	12.5 µg/L	105	70	130
		EG093A-T: Chromium	7440-47-3	50 µg/L	106	70	130
		EG093A-T: Copper	7440-50-8	50 µg/L	112	70	130
		EG093A-T: Lead	7439-92-1	50 µg/L	109	70	130
		EG093A-T: Nickel	7440-02-0	50 µg/L	111	70	130
		EG093A-T: Zinc	7440-66-6	50 µg/L	108	70	130
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 632783)							
ES1624142-001	W1_S_25/10/16	EK055G-SW: Ammonia as N	7664-41-7	1 mg/L	120	70	130
EK262A: Total Nitrogen (QCLot: 633657)							
ES1624142-001	W1_S_25/10/16	EK262PA-SW: Total Nitrogen as N	----	0.5 mg/L	120	70	130
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 632293)							



Sub-Matrix: **WATER**

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
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 632293) - continued							
ES1624142-001	W1_S_25/10/16	EK267PA-CM: Total Phosphorus as P	----	0.5 mg/L	104	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 630893)							
ES1624142-001	W1_S_25/10/16	EP075(SIM): Acenaphthene	83-32-9	2 µg/L	74.8	70	130
		EP075(SIM): Pyrene	129-00-0	2 µg/L	87.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 630894)							
ES1624142-001	W1_S_25/10/16	EP071: C10 - C14 Fraction	----	2000 µg/L	112	74	150
		EP071: C15 - C28 Fraction	----	2500 µg/L	107	77	153
		EP071: C29 - C36 Fraction	----	2000 µg/L	90.9	67	153
EP080/071: Total Petroleum Hydrocarbons (QCLot: 632859)							
ES1624070-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	88.1	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 630894)							
ES1624142-001	W1_S_25/10/16	EP071: >C10 - C16 Fraction	----	2500 µg/L	113	74	150
		EP071: >C16 - C34 Fraction	----	3500 µg/L	101	77	153
		EP071: >C34 - C40 Fraction	----	1500 µg/L	79.4	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 632859)							
ES1624070-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	90.7	70	130
EP080: BTEXN (QCLot: 632859)							
ES1624070-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	73.0	70	130
		EP080: Toluene	108-88-3	25 µg/L	77.6	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	86.2	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	84.4	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	86.9	70	130
	EP080: Naphthalene	91-20-3	25 µg/L	94.1	70	130	

**SAMPLE RECEIPT NOTIFICATION (SRN)****Work Order : ES1624142**

Client : **ELGIN ASSOCIATES PTY LTD**
Contact : MR NICK YEE
Address : PO BOX 829
BEGA NSW, AUSTRALIA 2550

E-mail : nick.yee@elgin.com.au
Telephone : +61 02 8003 4590
Facsimile : +61 03 8648 6336

Project : Eden Baseline Marine Water Quality
Order number : ----
C-O-C number : ----
Site : ----
Sampler : ELGIN ASSOCIATES

Laboratory : Environmental Division Sydney
Contact : Carol Walsh
Address : 277-289 Woodpark Road Smithfield
NSW Australia 2164

E-mail : carol.walsh@alsglobal.com
Telephone : +61-3-8549 9608
Facsimile : +61-2-8784 8500

Page : 1 of 3
Quote number : EM2016ELGASS0003 (ME/411/16 V4)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 26-Oct-2016 9:25 AM
Client Requested Due : 02-Nov-2016
Date

Issue Date : 26-Oct-2016
Scheduled Reporting Date : **02-Nov-2016**

Delivery Details

Mode of Delivery : Undefined
No. of coolers/boxes : 3
Receipt Detail :

Security Seal : Intact.
Temperature : 14.5°C - Ice present
No. of samples received / analysed : 12 / 12

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.

Method Client sample ID	Sample Container Received	Preferred Sample Container for Analysis
Total Phosphorus as P (Persulfate digestion/FIA) (Sea Water) : EK067PA-SW		
W1_S_25/10/16	- Clear Plastic Bottle - Natural	-
W1_B_25/10/16	- Clear Plastic Bottle - Natural	-
W2_S_25/10/16	- Clear Plastic Bottle - Natural	-
W2_B_25/10/16	- Clear Plastic Bottle - Natural	-
CB1_S_25/10/16	- Clear Plastic Bottle - Natural	-
CB1_B_25/10/16	- Clear Plastic Bottle - Natural	-
MU1_S_25/10/16	- Clear Plastic Bottle - Natural	-
MU1_B_25/10/16	- Clear Plastic Bottle - Natural	-
BAY1_S_25/10/16	- Clear Plastic Bottle - Natural	-
BAY1_B_25/10/16	- Clear Plastic Bottle - Natural	-
BAY2_S_25/10/16	- Clear Plastic Bottle - Natural	-
BAY2_B_25/10/16	- Clear Plastic Bottle - Natural	-

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.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA025-SW Suspended Solids - Saline Water	WATER - EK067PA-SW Total Phosphorus as P (Persulfate digestion/FIA)	WATER - EK262PA-SW Total Nitrogen by Persulfate Digestion	WATER - EP008 Chlorophyll a	WATER - EP075 SIM PAH only SIM - PAH only	WATER - MW-2(ANZECC) 7 METALS ORC + LL Hg (Marine Water ANZECC)	WATER - MW-2T (ANZECC) 7 METALS ORC Total + LL Hg (Marine Water)
ES1624142-001	25-Oct-2016 12:15	W1_S_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-002	25-Oct-2016 12:00	W1_B_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-003	25-Oct-2016 11:40	W2_S_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-004	25-Oct-2016 11:20	W2_B_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-005	25-Oct-2016 12:50	CB1_S_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-006	25-Oct-2016 12:30	CB1_B_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-007	25-Oct-2016 11:00	MU1_S_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-008	25-Oct-2016 10:40	MU1_B_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-009	25-Oct-2016 10:20	BAY1_S_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-010	25-Oct-2016 10:00	BAY1_B_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-011	25-Oct-2016 09:35	BAY2_S_25/10/16	✓	✓	✓	✓	✓	✓	✓
ES1624142-012	25-Oct-2016 09:20	BAY2_B_25/10/16	✓	✓	✓	✓	✓	✓	✓

ES1624142-001	25-Oct-2016 12:15	W1_S_25/10/16	✓	✓	✓
ES1624142-002	25-Oct-2016 12:00	W1_B_25/10/16	✓	✓	✓
ES1624142-003	25-Oct-2016 11:40	W2_S_25/10/16	✓	✓	✓
ES1624142-004	25-Oct-2016 11:20	W2_B_25/10/16	✓	✓	✓
ES1624142-005	25-Oct-2016 12:50	CB1_S_25/10/16	✓	✓	✓
ES1624142-006	25-Oct-2016 12:30	CB1_B_25/10/16	✓	✓	✓
ES1624142-007	25-Oct-2016 11:00	MU1_S_25/10/16	✓	✓	✓
ES1624142-008	25-Oct-2016 10:40	MU1_B_25/10/16	✓	✓	✓
ES1624142-009	25-Oct-2016 10:20	BAY1_S_25/10/16	✓	✓	✓
ES1624142-010	25-Oct-2016 10:00	BAY1_B_25/10/16	✓	✓	✓
ES1624142-011	25-Oct-2016 09:35	BAY2_S_25/10/16	✓	✓	✓
ES1624142-012	25-Oct-2016 09:20	BAY2_B_25/10/16	✓	✓	✓

[illegible]



CHAIN OF CUSTODY

ALS Laboratory please tick ->

☒ Sydney: 27 Wronham Rd, Sutherland NSW 2175
Ph: 02 9554 8100 Fax: 02 9554 8101
☐ Newcastle: 100-102 Newcastle Rd, Newcastle NSW 2300
Ph: 02 4959 3433 Fax: 02 4959 3434

☐ Brisbane: 30 Strand St, Sinnamon QLD 4033
Ph: 07 5535 7222 Fax: 07 5535 7223
☐ Townsville: 14-15 Dorman Ct, Bowen QLD 4801
Ph: 07 4730 0600 Fax: 07 4730 0601

☐ Melbourne: 24 Warrall Rd, Springvale VIC 3177
Ph: 03 9593 1600 Fax: 03 9593 1601
☐ Adelaide: 2-4 Danden Rd, Port Adelaide SA 5013
Ph: 08 8253 1000 Fax: 08 8253 1001

☐ Perth: 10 Hootway, Mirrabooka WA 6050
Ph: 08 9407 7000 Fax: 08 9407 7001
☐ Launceston: 27 Newington St, Launceston TAS 7250
Ph: 03 6331 2790 Fax: 03 6331 2791

CLIENT - ELGIN ASSOCIATES

OFFICE: 1st Floor 45-47 Church Street, BEGA, NSW 2550

(Standard TAT may be longer for some tests e.g. Urea Trace Elements)

PROJECT: Eden Baseline Marine Water Quality

ALS QUOTE NO.: MEAT116 V4

ORDER NUMBER:

PROJECT MANAGER: NICHOLAS YEE

CONTACT PH: 0400 365 234

SAMPLER: Elgin Associates

SAMPLER MOBILE:

COC emailed to ALS? YES / NO

EDD FORMAT (for default):

Email Reports to: n.yee@elgin.com.au

RELINQUISHED BY: 14:37 N.Y.

RECEIVED BY: JESSIE

RELINQUISHED BY:

RECEIVED BY:

Comments/SPECIAL HANDLING/STORAGE OR DISPOSAL:

FOR LABORATORY USE ONLY (Circled)

Circled, Blank, Initials

Free ice frozen - ice to be kept separate upon receipt?

Random Sample Retention - 21 Days

Other Comments

Yes No N/A

Yes No N/A

Yes No N/A

Yes No N/A

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 Matrix are required specify Total (unfiltered bottles required) or Dissolved (filtered bottles required).

Additional Information

LAB ID

SAMPLE ID

DATE / TIME

MATRIX

TYPE & PRESERVATIVE
(refer to codes below)

TOTAL
BOTTLES

EA045 - Turbidity

EA025-SW - Suspended solids in seawater
(1mg/L LOR)

EK055A-SW - Ammonia in seawater

EK262PA-SW - Total Nitrogen (incl. NOx and
TKN) - low level (ALS Sydney)

EK262-SW - Total P in seawater **EK267 - PAS**

EP008 - Chlorophyll a (ALS Sydney)

MW-2 (ANZECC 95%) - ultra trace dissolved
metals in marine water - As, Cd, Cr, Cu, Pb, Ni,
Zn, Hg-LL (ALS Sydney)

MW-2T (ANZECC 95%) - ultra trace Total
metals in marine water - As, Cd, Cr, Cu, Pb, Ni,
Zn, Hg-LL (ALS Sydney)

EP075B (SIM - PAH)

EP071/80 - TPH (C6-C40).

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W1_S_25/10/16

25/10 12:15

Saline W

30 100 200 200, 100

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W1_B_25/10/16

12:00

Saline W

30 100 200 200, 100

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W2_S_25/10/16

11/40

Saline W

30 100 200 200, 100

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W2_B_25/10/16

11/20

Saline W

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CB1_S_25/10/16

12:50

Saline W

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CB1_B_25/10/16

12:30

Saline W

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MU1_S_25/10/16

11:00

Saline W

30 100 200 200, 100

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MU1_B_25/10/16

10:40

Saline W

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BAY1_S_25/10/16

10:30

Saline W

30 100 200 200, 100

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CERTIFICATE OF ANALYSIS

Work Order : **ES1624788**
Client : **ELGIN ASSOCIATES PTY LTD**
Contact : **MR NICK YEE**
Address : **PO BOX 829**
BEGA NSW, AUSTRALIA 2550
Telephone : **+61 02 8003 4590**
Project : **Eden Baseline Marine Water Quality**
Order number : **----**
C-O-C number : **----**
Sampler : **ELGIN ASSOCIATES**
Site : **----**
Quote number : **----**
No. of samples received : **12**
No. of samples analysed : **12**

Page : 1 of 12
Laboratory : Environmental Division Sydney
Contact : Carol Walsh
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-3-8549 9608
Date Samples Received : 02-Nov-2016 09:40
Date Analysis Commenced : 02-Nov-2016
Issue Date : 09-Nov-2016 16:33



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

When 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.

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

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

LOR = Limit of reporting

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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EG093: It is recognised that total concentration of Nickel is less than dissolved for samples ES1624788 #001, 004, 008. However, the difference is within experimental variation of the methods.
- EK055G: LOR raised for Ammonia on various samples due to sample matrix.
- 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: **SALINE WATER**
 (Matrix: **WATER**)

Client sample ID

				W1_S_1/11/16	W1_B_1/11/16	W2_S_1/11/16	W2_B_1/11/16	CB1_S_1/11/16
Client sampling date / time				01-Nov-2016 13:00	01-Nov-2016 12:40	01-Nov-2016 12:30	01-Nov-2016 12:15	01-Nov-2016 13:30
Compound	CAS Number	LOR	Unit	ES1624788-001	ES1624788-002	ES1624788-003	ES1624788-004	ES1624788-005
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	2	2	1	2	1
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.9	1.0	0.8	0.9	0.8
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.7	1.8	1.8	1.7	1.7
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	2	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	0.6	<0.5	<0.5	0.8	0.6
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.8	2.0	1.8	1.9	2.0
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	1	1	<1	2	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	0.5	<0.5	0.7	0.6	0.7
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.10	0.12	0.11	0.11	0.12
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	mg/m³	<1	1	<1	<1	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: SALINE WATER
 (Matrix: WATER)

Client sample ID

				W1_S_1/11/16	W1_B_1/11/16	W2_S_1/11/16	W2_B_1/11/16	CB1_S_1/11/16
Client sampling date / time				01-Nov-2016 13:00	01-Nov-2016 12:40	01-Nov-2016 12:30	01-Nov-2016 12:15	01-Nov-2016 13:30
Compound	CAS Number	LOR	Unit	ES1624788-001	ES1624788-002	ES1624788-003	ES1624788-004	ES1624788-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SALINE WATER
 (Matrix: WATER)

Client sample ID

				W1_S_1/11/16	W1_B_1/11/16	W2_S_1/11/16	W2_B_1/11/16	CB1_S_1/11/16
Client sampling date / time				01-Nov-2016 13:00	01-Nov-2016 12:40	01-Nov-2016 12:30	01-Nov-2016 12:15	01-Nov-2016 13:30
Compound	CAS Number	LOR	Unit	ES1624788-001	ES1624788-002	ES1624788-003	ES1624788-004	ES1624788-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	28.4	25.6	28.0	23.7	27.7
2-Chlorophenol-D4	93951-73-6	1	%	66.6	71.1	61.8	55.9	71.7
2,4,6-Tribromophenol	118-79-6	1	%	52.2	46.8	40.0	40.5	46.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	79.4	85.8	80.1	85.9	97.3
Anthracene-d10	1719-06-8	1	%	95.1	97.7	87.4	95.3	97.7
4-Terphenyl-d14	1718-51-0	1	%	87.5	91.5	87.5	87.3	85.7
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	111	116	110	112	90.4
Toluene-D8	2037-26-5	2	%	125	128	122	122	84.2
4-Bromofluorobenzene	460-00-4	2	%	105	110	104	105	99.8



Analytical Results

Sub-Matrix: **SALINE WATER**
 (Matrix: **WATER**)

Client sample ID

				CB1_B_1/11/16	MU1_S_1/11/16	MU1_B_1/11/16	BAY1_S_1/11/16	BAY1_B_1/11/16
Client sampling date / time				01-Nov-2016 13:10	01-Nov-2016 11:10	01-Nov-2016 10:55	01-Nov-2016 10:30	01-Nov-2016 10:15
Compound	CAS Number	LOR	Unit	ES1624788-006	ES1624788-007	ES1624788-008	ES1624788-009	ES1624788-010
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	2	1	<1	<1	<1
EA045: Turbidity								
Turbidity	----	0.1	NTU	1.3	0.8	1.0	1.4	1.3
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.8	1.7	1.8	1.6	1.8
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	0.7	<0.5	0.6	0.6	0.5
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.8	1.8	2.0	1.7	2.0
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	2	<1	13	<1	1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.4	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	0.7	0.6	0.5	0.7	0.5
Zinc	7440-66-6	5	µg/L	<5	<5	8	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.11	0.11	0.11	0.10	0.12
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	mg/m³	<1	<1	<1	<1	1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: SALINE WATER
 (Matrix: WATER)

Client sample ID

Client sampling date / time				CB1_B_1/11/16	MU1_S_1/11/16	MU1_B_1/11/16	BAY1_S_1/11/16	BAY1_B_1/11/16
				01-Nov-2016 13:10	01-Nov-2016 11:10	01-Nov-2016 10:55	01-Nov-2016 10:30	01-Nov-2016 10:15
Compound	CAS Number	LOR	Unit	ES1624788-006	ES1624788-007	ES1624788-008	ES1624788-009	ES1624788-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SALINE WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_1/11/16	MU1_S_1/11/16	MU1_B_1/11/16	BAY1_S_1/11/16	BAY1_B_1/11/16
Client sampling date / time				01-Nov-2016 13:10	01-Nov-2016 11:10	01-Nov-2016 10:55	01-Nov-2016 10:30	01-Nov-2016 10:15
Compound	CAS Number	LOR	Unit	ES1624788-006	ES1624788-007	ES1624788-008	ES1624788-009	ES1624788-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	-----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	27.4	26.6	28.3	27.1	27.1
2-Chlorophenol-D4	93951-73-6	1	%	70.3	74.0	61.6	70.8	56.9
2,4,6-Tribromophenol	118-79-6	1	%	47.0	44.2	54.2	42.6	54.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	92.0	86.3	78.3	89.6	74.0
Anthracene-d10	1719-06-8	1	%	92.7	94.2	83.9	106	108
4-Terphenyl-d14	1718-51-0	1	%	81.7	91.6	88.0	76.3	87.5
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	104	98.9	106	105	104
Toluene-D8	2037-26-5	2	%	109	98.8	108	111	108
4-Bromofluorobenzene	460-00-4	2	%	118	108	113	116	116



Analytical Results

Sub-Matrix: **SALINE WATER**
 (Matrix: **WATER**)

Client sample ID

				BAY2_S_1/11/16	BAY2_B_1/11/16	----	----	----
Client sampling date / time				01-Nov-2016 09:50	01-Nov-2016 09:20	----	----	----
Compound	CAS Number	LOR	Unit	ES1624788-011	ES1624788-012	-----	-----	-----
				Result	Result	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	<1	2	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.8	0.5	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	----	----	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.8	1.7	----	----	----
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L	<1	4	----	----	----
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L	0.6	0.6	----	----	----
Zinc	7440-66-6	5	µg/L	<5	<5	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.9	1.9	----	----	----
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L	<1	4	----	----	----
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L	0.6	0.6	----	----	----
Zinc	7440-66-6	5	µg/L	<5	<5	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	----	----	----
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.09	0.12	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	----	----	----
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	mg/m³	<1	<1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	----	----	----



Analytical Results

Sub-Matrix: SALINE WATER
 (Matrix: WATER)

Client sample ID

				BAY2_S_1/11/16	BAY2_B_1/11/16	----	----	----
Client sampling date / time				01-Nov-2016 09:50	01-Nov-2016 09:20	----	----	----
Compound	CAS Number	LOR	Unit	ES1624788-011	ES1624788-012	-----	-----	-----
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	----	----	----
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	----	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	----	----	----



Analytical Results

Sub-Matrix: **SALINE WATER**
 (Matrix: **WATER**)

Client sample ID

				BAY2_S_1/11/16	BAY2_B_1/11/16	----	----	----
Client sampling date / time				01-Nov-2016 09:50	01-Nov-2016 09:20	----	----	----
Compound	CAS Number	LOR	Unit	ES1624788-011	ES1624788-012	-----	-----	-----
				Result	Result	----	----	----
EP080: BTEXN - Continued								
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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	16.2	29.4	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	37.2	81.3	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%	35.9	46.9	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	50.9	90.6	----	----	----
Anthracene-d10	1719-06-8	1	%	68.3	105	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	60.7	76.2	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	109	105	----	----	----
Toluene-D8	2037-26-5	2	%	106	101	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	115	111	----	----	----



Surrogate Control Limits

Sub-Matrix: SALINE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1624788	Page	: 1 of 9
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 02-Nov-2016
Site	: ----	Issue Date	: 09-Nov-2016
Sampler	: ELGIN ASSOCIATES	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12

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		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	1	12	8.33	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	12	8.33	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025-SW)								
MU1_S_1/11/16, BAY1_S_1/11/16, BAY2_S_1/11/16	MU1_B_1/11/16, BAY1_B_1/11/16,	01-Nov-2016	----	----	----	03-Nov-2016	08-Nov-2016	✔
Clear Plastic Bottle - Natural (EA025-SW)								
W1_S_1/11/16, W2_S_1/11/16, CB1_S_1/11/16, BAY2_B_1/11/16	W1_B_1/11/16, W2_B_1/11/16, CB1_B_1/11/16,	01-Nov-2016	----	----	----	07-Nov-2016	08-Nov-2016	✔
EA045: Turbidity								
Clear Plastic Bottle - Natural (EA045)								
W1_S_1/11/16, W2_S_1/11/16, CB1_S_1/11/16, MU1_S_1/11/16, BAY1_S_1/11/16, BAY2 S_1/11/16,	W1_B_1/11/16, W2_B_1/11/16, CB1_B_1/11/16, MU1_B_1/11/16, BAY1_B_1/11/16, BAY2 B_1/11/16	01-Nov-2016	----	----	----	02-Nov-2016	03-Nov-2016	✔



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
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F-LL) W1_S_1/11/16, W1_B_1/11/16, W2_S_1/11/16, W2_B_1/11/16, CB1_S_1/11/16, CB1_B_1/11/16, MU1_S_1/11/16, MU1_B_1/11/16, BAY1_S_1/11/16, BAY1_B_1/11/16, BAY2_S_1/11/16, BAY2_B_1/11/16	01-Nov-2016	----	----	----	03-Nov-2016	29-Nov-2016	✓
EG035T: Total Mercury by FIMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035T-LL) W1_S_1/11/16, W1_B_1/11/16, W2_S_1/11/16, W2_B_1/11/16, CB1_S_1/11/16, CB1_B_1/11/16, MU1_S_1/11/16, MU1_B_1/11/16, BAY1_S_1/11/16, BAY1_B_1/11/16, BAY2_S_1/11/16, BAY2_B_1/11/16	01-Nov-2016	----	----	----	03-Nov-2016	29-Nov-2016	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093A-F) W1_S_1/11/16, W1_B_1/11/16, W2_S_1/11/16, W2_B_1/11/16, CB1_S_1/11/16, CB1_B_1/11/16, MU1_S_1/11/16, MU1_B_1/11/16, BAY1_S_1/11/16, BAY1_B_1/11/16, BAY2_S_1/11/16, BAY2_B_1/11/16	01-Nov-2016	----	----	----	03-Nov-2016	30-Apr-2017	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-T) W1_S_1/11/16, W1_B_1/11/16, W2_S_1/11/16, W2_B_1/11/16, CB1_S_1/11/16, CB1_B_1/11/16, MU1_S_1/11/16, MU1_B_1/11/16, BAY1_S_1/11/16, BAY1_B_1/11/16, BAY2_S_1/11/16, BAY2_B_1/11/16	01-Nov-2016	03-Nov-2016	30-Apr-2017	✓	03-Nov-2016	30-Apr-2017	✓
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water							
Clear Plastic Bottle - Sulfuric Acid (EK055G-SW) W1_S_1/11/16, W1_B_1/11/16, W2_S_1/11/16, W2_B_1/11/16, CB1_S_1/11/16, CB1_B_1/11/16, MU1_S_1/11/16, MU1_B_1/11/16, BAY1_S_1/11/16, BAY1_B_1/11/16, BAY2_S_1/11/16, BAY2_B_1/11/16	01-Nov-2016	----	----	----	02-Nov-2016	29-Nov-2016	✓



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK262A: Total Nitrogen								
Clear Plastic Bottle - Natural (EK262PA-SW)								
W1_S_1/11/16,	W1_B_1/11/16,	01-Nov-2016	02-Nov-2016	02-Nov-2016	✓	02-Nov-2016	02-Nov-2016	✓
W2_S_1/11/16,	W2_B_1/11/16,							
CB1_S_1/11/16,	CB1_B_1/11/16,							
MU1_S_1/11/16,	MU1_B_1/11/16,							
BAY1_S_1/11/16,	BAY1_B_1/11/16,							
BAY2_S_1/11/16,	BAY2_B_1/11/16							
EK267A: Total Phosphorus (Persulfate Digestion)								
Clear Plastic Bottle - Natural (EK267PA-SW)								
W1_S_1/11/16,	W1_B_1/11/16,	01-Nov-2016	02-Nov-2016	02-Nov-2016	✓	02-Nov-2016	02-Nov-2016	✓
W2_S_1/11/16,	W2_B_1/11/16,							
CB1_S_1/11/16,	CB1_B_1/11/16,							
MU1_S_1/11/16,	MU1_B_1/11/16,							
BAY1_S_1/11/16,	BAY1_B_1/11/16,							
BAY2_S_1/11/16,	BAY2_B_1/11/16							
EP008: Chlorophyll a & Pheophytin a								
Opaque Plastic Bottle - Unpreserved (EP008)								
W1_S_1/11/16,	W1_B_1/11/16,	01-Nov-2016	----	----	----	03-Nov-2016	03-Nov-2016	✓
W2_S_1/11/16,	W2_B_1/11/16,							
CB1_S_1/11/16,	CB1_B_1/11/16,							
MU1_S_1/11/16,	MU1_B_1/11/16,							
BAY1_S_1/11/16,	BAY1_B_1/11/16,							
BAY2_S_1/11/16,	BAY2_B_1/11/16							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
W1_S_1/11/16,	W1_B_1/11/16,	01-Nov-2016	03-Nov-2016	08-Nov-2016	✓	03-Nov-2016	13-Dec-2016	✓
W2_S_1/11/16,	W2_B_1/11/16,							
CB1_S_1/11/16,	CB1_B_1/11/16,							
MU1_S_1/11/16,	MU1_B_1/11/16,							
BAY1_S_1/11/16,	BAY1_B_1/11/16,							
BAY2 S_1/11/16,	BAY2_B_1/11/16							



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)		01-Nov-2016	03-Nov-2016	08-Nov-2016	✓	03-Nov-2016	13-Dec-2016	✓
W1_S_1/11/16,	W1_B_1/11/16,							
W2_S_1/11/16,	W2_B_1/11/16,							
CB1_S_1/11/16,	CB1_B_1/11/16,							
MU1_S_1/11/16,	MU1_B_1/11/16,							
BAY1_S_1/11/16,	BAY1_B_1/11/16,							
BAY2_S_1/11/16,	BAY2_B_1/11/16,							
Amber VOC Vial - Sulfuric Acid (EP080)		01-Nov-2016	03-Nov-2016	15-Nov-2016	✓	03-Nov-2016	15-Nov-2016	✓
W1_S_1/11/16,	W1_B_1/11/16,							
W2_S_1/11/16,	W2_B_1/11/16,							
CB1_S_1/11/16,	CB1_B_1/11/16,							
MU1_S_1/11/16,	MU1_B_1/11/16,							
BAY1_S_1/11/16,	BAY1_B_1/11/16,							
BAY2_S_1/11/16,	BAY2_B_1/11/16,							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		01-Nov-2016	03-Nov-2016	08-Nov-2016	✓	03-Nov-2016	13-Dec-2016	✓
W1_S_1/11/16,	W1_B_1/11/16,							
W2_S_1/11/16,	W2_B_1/11/16,							
CB1_S_1/11/16,	CB1_B_1/11/16,							
MU1_S_1/11/16,	MU1_B_1/11/16,							
BAY1_S_1/11/16,	BAY1_B_1/11/16,							
BAY2_S_1/11/16,	BAY2_B_1/11/16,							
Amber VOC Vial - Sulfuric Acid (EP080)		01-Nov-2016	03-Nov-2016	15-Nov-2016	✓	03-Nov-2016	15-Nov-2016	✓
W1_S_1/11/16,	W1_B_1/11/16,							
W2_S_1/11/16,	W2_B_1/11/16,							
CB1_S_1/11/16,	CB1_B_1/11/16,							
MU1_S_1/11/16,	MU1_B_1/11/16,							
BAY1_S_1/11/16,	BAY1_B_1/11/16,							
BAY2_S_1/11/16,	BAY2_B_1/11/16,							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		01-Nov-2016	03-Nov-2016	15-Nov-2016	✓	03-Nov-2016	15-Nov-2016	✓
W1_S_1/11/16,	W1_B_1/11/16,							
W2_S_1/11/16,	W2_B_1/11/16,							
CB1_S_1/11/16,	CB1_B_1/11/16,							
MU1_S_1/11/16,	MU1_B_1/11/16,							
BAY1_S_1/11/16,	BAY1_B_1/11/16,							
BAY2 S_1/11/16,	BAY2 B_1/11/16,							



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)							
Ammonia as N (Saline Water)	EK055G-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	3	23	13.04	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	2	13	15.38	9.52	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	23	8.70	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	4	12	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	13	7.69	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	23	8.70	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	13	7.69	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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							
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	23	8.70	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	13	7.69	4.76	✔	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



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
Suspended Solids - Saline Water	EA025-SW	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Turbidity	EA045	WATER	In house: Referenced to APHA 2130 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Mercury by FIMS - Low Level	EG035F-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS - Low Level	EG035T-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm 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)
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. 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)
Ammonia as N (Saline Water)	EK055G-SW	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.



Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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	In house: Referenced to 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	In house: Referenced to 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
Persulfate Digestion for UT TN and TP for FIA/Saline	EK262/267PA-SW Prep	WATER	In house: Referenced to APHA 4500 P - J. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QUALITY CONTROL REPORT

Work Order	: ES1624788	Page	: 1 of 9
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Contact	: Carol Walsh
Address	: PO BOX 829 BEGA NSW, AUSTRALIA 2550	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8003 4590	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 02-Nov-2016
Order number	: ----	Date Analysis Commenced	: 02-Nov-2016
C-O-C number	: ----	Issue Date	: 09-Nov-2016
Sampler	: ELGIN ASSOCIATES		
Site	: ----		
Quote number	: ----		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This 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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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 (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 640486)									
ES1624788-007	MU1_S_1/11/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	1	<1	0.00	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 643960)									
ES1624788-001	W1_S_1/11/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	2	1	0.00	No Limit
EA045: Turbidity (QC Lot: 638730)									
EN1604019-001	Anonymous	EA045: Turbidity	----	0.1	NTU	34.4	34.3	0.291	0% - 20%
ES1624788-001	W1_S_1/11/16	EA045: Turbidity	----	0.1	NTU	0.9	0.9	0.00	No Limit
EA045: Turbidity (QC Lot: 638731)									
ES1624788-006	CB1_B_1/11/16	EA045: Turbidity	----	0.1	NTU	1.3	1.2	9.38	0% - 50%
ES1624792-004	Anonymous	EA045: Turbidity	----	0.1	NTU	10.3	10.2	0.976	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 640099)									
EP1610146-001	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EP1610349-001	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 640100)									
ES1624788-010	BAY1_B_1/11/16	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 638741)									
ES1624788-001	W1_S_1/11/16	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.00006	46.2	No Limit
ES1624788-011	BAY2_S_1/11/16	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 639570)									
ES1624788-010	BAY1_B_1/11/16	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.8	1.8	0.00	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	0.5	0.6	23.8	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: 639570) - continued									
ES1624788-010	BAY1_B_1/11/16	EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EP1610349-001	Anonymous	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.0002	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	0.0004	0.4	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	<0.0005	<0.5	0.00	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	0.0006	0.6	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	0.0007	0.7	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	0.005	5	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 639604)									
ES1624788-001	W1_S_1/11/16	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	1.8	1.8	0.00	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	0.5	0.5	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
ES1624850-001	Anonymous	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	2.0	2.0	0.00	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	0.9	0.8	16.1	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	14	13	0.00	No Limit
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QC Lot: 638704)									
ES1624788-001	W1_S_1/11/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
ES1624788-010	BAY1_B_1/11/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
EK262A: Total Nitrogen (QC Lot: 638668)									
ES1624788-001	W1_S_1/11/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.10	0.10	10.2	No Limit
ES1624788-011	BAY2_S_1/11/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.09	0.10	0.00	No Limit
EK267A: Total Phosphorus (Persulfate Digestion) (QC Lot: 638669)									
ES1624788-001	W1_S_1/11/16	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	0.00	No Limit
ES1624788-011	BAY2_S_1/11/16	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	<0.005	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 638510)									
ES1624788-001	W1_S_1/11/16	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit



Sub-Matrix: **WATER**

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 (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 638510) - continued									
ES1624788-001	W1_S_1/11/16	EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	<1.0	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 638511)									
ES1624788-001	W1_S_1/11/16	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 639954)									
ES1624788-001	W1_S_1/11/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1624788-006	CB1_B_1/11/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 638511)									
ES1624788-001	W1_S_1/11/16	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 639954)									
ES1624788-001	W1_S_1/11/16	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1624788-006	CB1_B_1/11/16	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 639954)									
ES1624788-001	W1_S_1/11/16	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
ES1624788-006	CB1_B_1/11/16	EP080: Napthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						



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: 639954) - continued									
ES1624788-006	CB1_B_1/11/16	EP080: ortho-Xylene	95-47-6	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 Spike (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**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 640486)								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	105	86	128
				<1	1000 mg/L	101	80	112
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 643960)								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	88.7	86	128
				<1	1000 mg/L	94.7	80	112
EA045: Turbidity (QCLot: 638730)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	100	91	105
EA045: Turbidity (QCLot: 638731)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	100	91	105
EG035F: Dissolved Mercury by FIMS (QCLot: 640099)								
EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	101	83	105
EG035F: Dissolved Mercury by FIMS (QCLot: 640100)								
EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	97.0	83	105
EG035T: Total Mercury by FIMS (QCLot: 638741)								
EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	90.0	85	105
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 639570)								
EG093A-F: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	107	76	134
EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	10 µg/L	102	69	117
EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	10 µg/L	105	76	122
EG093A-F: Copper	7440-50-8	1	µg/L	<1	10 µg/L	99.2	71	129
EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	105	74	120
EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	102	72	124
EG093A-F: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	104	70	126
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 639604)								
EG093A-T: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	108	89	125
EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	10 µg/L	102	82	122
EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	10 µg/L	107	85	123
EG093A-T: Copper	7440-50-8	1	µg/L	<1	10 µg/L	103	84	128
EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	111	85	125
EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	103	85	125
EG093A-T: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	106	82	128
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 638704)								
EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.02	0.5 mg/L	99.0	80	120



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EK262A: Total Nitrogen (QCLot: 638668)								
EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	<0.05	1 mg/L	99.7	81	111
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 638669)								
EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.44 mg/L	97.4	88	112
EP008: Chlorophyll (QCLot: 640414)								
EP008: Chlorophyll a	----	1	mg/m³	<1	20 mg/m³	115	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 638510)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	67.2	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	71.7	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	70.0	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	72.8	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	70.1	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	73.7	64	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	89.1	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	89.9	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	92.9	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	67.1	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	67.2	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	69.1	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	70.2	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	66.1	60	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	71.7	61	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	71.3	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 638511)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	86.9	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	100	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	97.2	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 639954)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	95.7	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 638511)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	102	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	103	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	105	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 639954)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	98.2	75	127
EP080: BTEXN (QCLot: 639954)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	95.2	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	98.3	69	123



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EP080: BTEXN (QCLot: 639954) - continued								
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	92.1	70	120
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	89.5	69	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	93.4	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	101	70	120

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**

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
EG035F: Dissolved Mercury by FIMS (QCLot: 640099)							
EP1610146-002	Anonymous	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	72.0	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 640100)							
ES1624788-011	BAY2_S_1/11/16	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	74.0	70	130
EG035T: Total Mercury by FIMS (QCLot: 638741)							
ES1624788-002	W1_B_1/11/16	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	81.0	70	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 639570)							
ES1624788-001	W1_S_1/11/16	EG093A-F: Arsenic	7440-38-2	50 µg/L	119	70	130
		EG093A-F: Cadmium	7440-43-9	12.5 µg/L	114	70	130
		EG093A-F: Chromium	7440-47-3	50 µg/L	121	70	130
		EG093A-F: Copper	7440-50-8	50 µg/L	120	70	130
		EG093A-F: Lead	7439-92-1	50 µg/L	121	70	130
		EG093A-F: Nickel	7440-02-0	50 µg/L	114	70	130
		EG093A-F: Zinc	7440-66-6	50 µg/L	120	70	130
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 639604)							
ES1624788-002	W1_B_1/11/16	EG093A-T: Arsenic	7440-38-2	50 µg/L	128	70	130
		EG093A-T: Cadmium	7440-43-9	12.5 µg/L	119	70	130
		EG093A-T: Chromium	7440-47-3	50 µg/L	125	70	130
		EG093A-T: Copper	7440-50-8	50 µg/L	130	70	130
		EG093A-T: Lead	7439-92-1	50 µg/L	127	70	130
		EG093A-T: Nickel	7440-02-0	50 µg/L	125	70	130
		EG093A-T: Zinc	7440-66-6	50 µg/L	124	70	130
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 638704)							
ES1624788-001	W1_S_1/11/16	EK055G-SW: Ammonia as N	7664-41-7	1 mg/L	102	70	130



Sub-Matrix: **WATER**

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
EK262A: Total Nitrogen (QCLot: 638668)							
ES1624788-001	W1_S_1/11/16	EK262PA-SW: Total Nitrogen as N	----	0.5 mg/L	119	70	130
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 638669)							
ES1624788-001	W1_S_1/11/16	EK267PA-SW: Total Phosphorus as P	----	0.5 mg/L	96.5	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 638510)							
ES1624788-001	W1_S_1/11/16	EP075(SIM): Acenaphthene	83-32-9	2 µg/L	82.6	70	130
		EP075(SIM): Pyrene	129-00-0	2 µg/L	81.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 638511)							
ES1624788-001	W1_S_1/11/16	EP071: C10 - C14 Fraction	----	2000 µg/L	84.4	74	150
		EP071: C15 - C28 Fraction	----	2500 µg/L	105	77	153
		EP071: C29 - C36 Fraction	----	2000 µg/L	100	67	153
EP080/071: Total Petroleum Hydrocarbons (QCLot: 639954)							
ES1624788-001	W1_S_1/11/16	EP080: C6 - C9 Fraction	----	325 µg/L	102	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 638511)							
ES1624788-001	W1_S_1/11/16	EP071: >C10 - C16 Fraction	----	2500 µg/L	83.7	74	150
		EP071: >C16 - C34 Fraction	----	3500 µg/L	95.4	77	153
		EP071: >C34 - C40 Fraction	----	1500 µg/L	97.8	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 639954)							
ES1624788-001	W1_S_1/11/16	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	97.5	70	130
EP080: BTEXN (QCLot: 639954)							
ES1624788-001	W1_S_1/11/16	EP080: Benzene	71-43-2	25 µg/L	86.3	70	130
		EP080: Toluene	108-88-3	25 µg/L	88.6	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	95.5	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	96.6	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	97.6	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	90.0	70	130

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1624788

Client : ELGIN ASSOCIATES PTY LTD Contact : MR NICK YEE Address : PO BOX 829 BEGA NSW, AUSTRALIA 2550 E-mail : nick.yee@elgin.com.au Telephone : +61 02 8003 4590 Facsimile : +61 03 8648 6336 Project : Eden Baseline Marine Water Quality Order number : ---- C-O-C number : ---- Site : ---- Sampler : ELGIN ASSOCIATES	Laboratory : Environmental Division Sydney Contact : Carol Walsh Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : carol.walsh@alsglobal.com Telephone : +61-3-8549 9608 Facsimile : +61-2-8784 8500 Page : 1 of 3 Quote number : EM2016ELGASS0003 (ME/411/16 V4) QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 02-Nov-2016 9:40 AM	Issue Date : 02-Nov-2016
Client Requested Due : 09-Nov-2016	Scheduled Reporting Date : 09-Nov-2016
Date	

Delivery Details

Mode of Delivery : Undefined	Security Seal : Intact.
No. of coolers/boxes : 4	Temperature : 6.1°C - Ice present
Receipt Detail :	No. of samples received / analysed : 12 / 12

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 exists.

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.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA025-SW Suspended Solids - Saline Water	WATER - EK055G-SW Ammonia as N (Sea Water)	WATER - EK262PA-SW Total Nitrogen by Persulfate Digestion	WATER - EP008 Chlorophyll a	WATER - EP075 SIM PAH only SIM - PAH only	WATER - MW-2(ANZECC) 7 METALS ORC + LL Hg (Marine Water ANZECC)	WATER - MW-2T (ANZECC) 7 METALS ORC Total + LL Hg (Marine Water)
ES1624788-001	01-Nov-2016 13:00	W1_S_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-002	01-Nov-2016 12:40	W1_B_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-003	01-Nov-2016 12:30	W2_S_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-004	01-Nov-2016 12:15	W2_B_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-005	01-Nov-2016 13:30	CB1_S_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-006	01-Nov-2016 13:10	CB1_B_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-007	01-Nov-2016 11:10	MU1_S_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-008	01-Nov-2016 10:55	MU1_B_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-009	01-Nov-2016 10:30	BAY1_S_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-010	01-Nov-2016 10:15	BAY1_B_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-011	01-Nov-2016 09:50	BAY2_S_1/11/16	✓	✓	✓	✓	✓	✓	✓
ES1624788-012	01-Nov-2016 09:20	BAY2_B_1/11/16	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA045 Turbidity	WATER - EK267PA-SW Total Phosphorus by Persulfate Digestion	WATER - TPH TRH (C6-C40)
ES1624788-001	01-Nov-2016 13:00	W1_S_1/11/16	✓	✓	✓
ES1624788-002	01-Nov-2016 12:40	W1_B_1/11/16	✓	✓	✓
ES1624788-003	01-Nov-2016 12:30	W2_S_1/11/16	✓	✓	✓
ES1624788-004	01-Nov-2016 12:15	W2_B_1/11/16	✓	✓	✓
ES1624788-005	01-Nov-2016 13:30	CB1_S_1/11/16	✓	✓	✓
ES1624788-006	01-Nov-2016 13:10	CB1_B_1/11/16	✓	✓	✓
ES1624788-007	01-Nov-2016 11:10	MU1_S_1/11/16	✓	✓	✓
ES1624788-008	01-Nov-2016 10:55	MU1_B_1/11/16	✓	✓	✓
ES1624788-009	01-Nov-2016 10:30	BAY1_S_1/11/16	✓	✓	✓
ES1624788-010	01-Nov-2016 10:15	BAY1_B_1/11/16	✓	✓	✓
ES1624788-011	01-Nov-2016 09:50	BAY2_S_1/11/16	✓	✓	✓
ES1624788-012	01-Nov-2016 09:20	BAY2_B_1/11/16	✓	✓	✓



CHAIN OF CUSTODY

ALS Laboratory, please tick →

Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8734 8505 E: samples.sydney@alsenviro.com
Ph: 02 8734 8505 E: samples.sydney@alsenviro.com
Ph: 02 4568 3433 E: samples.nsw@alsenviro.com

Brisbane: 22 Shand St, Stafford QLD 4053
Ph: 07 5243 7222 E: samples.brisbane@alsenviro.com
Ph: 07 5243 7222 E: samples.brisbane@alsenviro.com
Ph: 07 4735 0500 E: samples.melbourne@alsenviro.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8543 9300 E: samples.melbourne@alsenviro.com
Ph: 03 8543 9300 E: samples.melbourne@alsenviro.com
Ph: 03 8543 9300 E: samples.melbourne@alsenviro.com

Perth: 10 Rod Way, Malaga WA 6060
Ph: 08 9206 7665 E: samples.perth@alsenviro.com
Ph: 08 9206 7665 E: samples.perth@alsenviro.com
Ph: 08 9206 7665 E: samples.perth@alsenviro.com

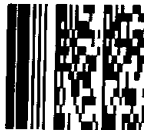
Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2158 E: samples.launceston@alsenviro.com
Ph: 03 6331 2158 E: samples.launceston@alsenviro.com

CLIENT: ELGIN ASSOCIATES		TURNAROUND REQUIREMENTS:		FOR LABORATORY USE ONLY (Circle)	
OFFICE: 1st Floor 45-47 Church Street, BEGA, NSW 2550		(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)		COC SEQUENCE NUMBER (Circle)	
PROJECT: Eden Baseline Marine Water Quality		ALS QUOTE NO.: ME411/16 V3		COC: ① 2 3 4 5 7	
ORDER NUMBER:				OF: ① 2 3 4 5 7	
PROJECT MANAGER: NICHOLAS YEE		CONTACT PH: 0400 365 234		RECEIVED BY: J. Cready	
SAMPLER: Elgin Associates		SAMPLER MOBILE:		DATE/TIME: 2/11/16 09:40	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		RELINQUISHED BY:	
Email Reports to: nick.yee@elgin.com.au				DATE/TIME:	
Email Invoice to: nick.yee@elgin.com.au				RECEIVED BY:	
				DATE/TIME:	

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	EA045 - Turbidity	EA025-SW - Suspended solids in seawater (1mg/L LOR)	EK055A-SW - Ammonia in seawater	EK262PA-SW - Total Nitrogen (incl. NOx and TKN) - low level (ALS Sydney)	EK067-SW - Total P in seawater	EP008 -Chlorophyll a (ALS Sydney)	MW-2 (ANZECC 95%) - ultra trace dissolved metals in marine water - As, Cd, Cr, Cu, Pb, Ni, Zn, Hg-LL (ALS Sydney)	MW-2T (ANZECC 95%) - ultra trace Total metals in marine water - As, Cd, Cr, Cu, Pb, Ni, Zn, Hg-LL (ALS Sydney)	EP075B (SIM - PAH	EP07180 - TPH (C6-C40).				
1	W1_S_ 1/11/16	1/11 13:00	Saline W	3P, 1SP, 2AP, 2VS, 1AG	11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
2	W1_B_ 1/11/16	12:40	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
3	W2_S_ 1/11/16	12:30	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
4	W2_B_ 1/11/16	12:15	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
5	CB1_S_ 1/11/16	13:30	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
6	CB1_B_ 1/11/16	13:10	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
7	MU1_S_ 1/11/16	11:10	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
8	MU1_B_ 1/11/16	10:55	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
9	BAY1_S_ 1/11/16	10:30	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
10	BAY1_B_ 1/11/16	10:15	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
11	BAY2_S_ 1/11/16	9:50	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
12	BAY2_B_ 1/11/16	9:20	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
TOTAL						110													

Environmental
Sydney
Work Order Ref
ES162



Telephone : + 61-2-8794

Water Container Codes: P = Unpreserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; VS = VOA Vial Sulfuric Preserved; SP = Sulfuric Preserved Plastic

Environmental Division
Sydney
Work Order Reference
ES1624788



Telephone: +61-2-8784 8555

CERTIFICATE OF ANALYSIS

Work Order : **ES1626072**
Client : **ELGIN ASSOCIATES PTY LTD**
Contact : **MR NICK YEE**
Address : **PO BOX 829**
BEGA NSW, AUSTRALIA 2550
Telephone : **+61 02 8003 4590**
Project : **Eden Baseline Marine Water Quality**
Order number : **----**
C-O-C number : **----**
Sampler : **Elgin**
Site : **----**
Quote number : **----**
No. of samples received : **12**
No. of samples analysed : **12**

Page : 1 of 12
Laboratory : Environmental Division Sydney
Contact : Carol Walsh
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-3-8549 9608
Date Samples Received : 16-Nov-2016 09:20
Date Analysis Commenced : 17-Nov-2016
Issue Date : 22-Nov-2016 16:01



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

When 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.

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

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

LOR = Limit of reporting

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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EG093: It is recognised that total concentrations are less than dissolved for some elements. However, the difference is within experimental variation of the methods.
- EG093: Samples ES1626072 #006, 007 were run on EG094 method due to low TDS content.
- EK055G: LOR raised for Ammonia on various samples due to sample matrix.
- 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	W1_S_15/11/2016	W1_B_15/11/2016	W2_S_15/11/2016	W2_B_15/11/2016	CB1_S_15/11/2016
Client sampling date / time					15-Nov-2016 12:45	15-Nov-2016 12:25	15-Nov-2016 12:05	15-Nov-2016 11:45	15-Nov-2016 13:15
Compound	CAS Number	LOR	Unit		ES1626072-001	ES1626072-002	ES1626072-003	ES1626072-004	ES1626072-005
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		5	4	1	3	1
EA045: Turbidity									
Turbidity	----	0.1	NTU		0.5	0.5	0.3	0.5	0.4
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.7	1.8	1.9	1.8	1.8
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		0.5	1.4	1.9	0.9	1.2
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	1.0
Copper	7440-50-8	1	µg/L		<1	1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.14	0.16	0.14	0.15	0.14
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		0.013	0.015	0.009	0.010	0.010
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	µg/L		1	<1	<1	<1	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				W1_S_15/11/2016	W1_B_15/11/2016	W2_S_15/11/2016	W2_B_15/11/2016	CB1_S_15/11/2016
Client sampling date / time				15-Nov-2016 12:45	15-Nov-2016 12:25	15-Nov-2016 12:05	15-Nov-2016 11:45	15-Nov-2016 13:15
Compound	CAS Number	LOR	Unit	ES1626072-001	ES1626072-002	ES1626072-003	ES1626072-004	ES1626072-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				W1_S_15/11/2016	W1_B_15/11/2016	W2_S_15/11/2016	W2_B_15/11/2016	CB1_S_15/11/2016
Client sampling date / time				15-Nov-2016 12:45	15-Nov-2016 12:25	15-Nov-2016 12:05	15-Nov-2016 11:45	15-Nov-2016 13:15
Compound	CAS Number	LOR	Unit	ES1626072-001	ES1626072-002	ES1626072-003	ES1626072-004	ES1626072-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	26.2	26.1	26.4	21.7	23.1
2-Chlorophenol-D4	93951-73-6	1	%	43.5	41.1	45.8	37.8	39.0
2,4,6-Tribromophenol	118-79-6	1	%	56.8	47.3	58.6	52.4	51.1
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	68.2	63.2	69.1	62.0	67.1
Anthracene-d10	1719-06-8	1	%	79.0	79.8	74.6	65.5	84.8
4-Terphenyl-d14	1718-51-0	1	%	71.7	59.8	73.2	63.8	66.6
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	112	122	111	116	117
Toluene-D8	2037-26-5	2	%	111	109	109	103	113
4-Bromofluorobenzene	460-00-4	2	%	109	110	107	102	108



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				CB1_B_15/11/2016	MU1_S_15/11/2016	MU1_B_15/11/2016	BAY1_S_15/11/2016	BAY1_B_15/11/2016
Client sampling date / time				15-Nov-2016 13:00	15-Nov-2016 11:15	15-Nov-2016 10:50	15-Nov-2016 10:35	15-Nov-2016 10:10
Compound	CAS Number	LOR	Unit	ES1626072-006	ES1626072-007	ES1626072-008	ES1626072-009	ES1626072-010
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	2	<1	6	2	<1
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.4	0.3	0.4	0.6	0.6
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	2.2	2.2	1.8	2.0	1.8
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	3	2	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	2.3	2.3	1.5	0.7	1.8
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	4	2	2	<1	3
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.15	0.16	0.17	0.16	0.17
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	0.010	0.010	0.010	0.009	0.013
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	µg/L	<1	<1	<1	1	1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_15/11/2016	MU1_S_15/11/2016	MU1_B_15/11/2016	BAY1_S_15/11/2016	BAY1_B_15/11/2016
Client sampling date / time				15-Nov-2016 13:00	15-Nov-2016 11:15	15-Nov-2016 10:50	15-Nov-2016 10:35	15-Nov-2016 10:10
Compound	CAS Number	LOR	Unit	ES1626072-006	ES1626072-007	ES1626072-008	ES1626072-009	ES1626072-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				CB1_B_15/11/2016	MU1_S_15/11/2016	MU1_B_15/11/2016	BAY1_S_15/11/2016	BAY1_B_15/11/2016
Client sampling date / time				15-Nov-2016 13:00	15-Nov-2016 11:15	15-Nov-2016 10:50	15-Nov-2016 10:35	15-Nov-2016 10:10
Compound	CAS Number	LOR	Unit	ES1626072-006	ES1626072-007	ES1626072-008	ES1626072-009	ES1626072-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	-----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	19.8	26.6	22.8	27.0	18.4
2-Chlorophenol-D4	93951-73-6	1	%	36.0	42.3	37.7	44.7	39.9
2,4,6-Tribromophenol	118-79-6	1	%	42.9	50.1	41.6	51.0	48.9
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	57.7	69.2	60.4	66.6	52.6
Anthracene-d10	1719-06-8	1	%	91.1	78.9	84.2	89.6	99.1
4-Terphenyl-d14	1718-51-0	1	%	70.9	81.6	64.7	75.1	69.6
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	120	116	117	123	117
Toluene-D8	2037-26-5	2	%	108	108	110	104	104
4-Bromofluorobenzene	460-00-4	2	%	107	104	105	107	104



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BAY2_S_15/11/2016	BAY2_B_15/11/2016	----	----	----
Client sampling date / time					15-Nov-2016 09:50	15-Nov-2016 09:30	----	----	----
Compound	CAS Number	LOR	Unit		ES1626072-011	ES1626072-012	-----	-----	-----
				Result	Result		----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		<1	<1	----	----	----
EA045: Turbidity									
Turbidity	----	0.1	NTU		0.2	0.3	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	----	----	----
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.8	1.9	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L		<1	3	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		0.7	0.8	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L		<1	1	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.05	<0.05	----	----	----
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.13	0.14	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		0.011	0.008	----	----	----
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	µg/L		<1	<1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				BAY2_S_15/11/2016	BAY2_B_15/11/2016	----	----	----
Client sampling date / time				15-Nov-2016 09:50	15-Nov-2016 09:30	----	----	----
Compound	CAS Number	LOR	Unit	ES1626072-011	ES1626072-012	-----	-----	-----
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	----	----	----
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	----	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	----	----	----



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				BAY2_S_15/11/2016	BAY2_B_15/11/2016	----	----	----
Client sampling date / time				15-Nov-2016 09:50	15-Nov-2016 09:30	----	----	----
Compound	CAS Number	LOR	Unit	ES1626072-011	ES1626072-012	-----	-----	-----
				Result	Result	----	----	----
EP080: BTEXN - Continued								
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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	22.6	25.3	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	36.7	41.4	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%	38.5	44.8	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	61.0	63.0	----	----	----
Anthracene-d10	1719-06-8	1	%	88.9	88.9	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	63.3	67.9	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	123	121	----	----	----
Toluene-D8	2037-26-5	2	%	116	113	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	107	104	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1626072	Page	: 1 of 10
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 16-Nov-2016
Site	: ----	Issue Date	: 22-Nov-2016
Sampler	: Elgin	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12

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

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK262A: Total Nitrogen							
Clear Plastic Bottle - Natural (AS)		17-Nov-2016	16-Nov-2016	1	17-Nov-2016	16-Nov-2016	1
W1_S_15/11/2016,	W1_B_15/11/2016,						
W2_S_15/11/2016,	W2_B_15/11/2016,						
CB1_S_15/11/2016,	CB1_B_15/11/2016,						
MU1_S_15/11/2016,	MU1_B_15/11/2016,						
BAY1_S_15/11/2016,	BAY1_B_15/11/2016,						
BAY2_S_15/11/2016,	BAY2_B_15/11/2016						
EK267A: Total Phosphorus (Persulfate Digestion)							
Clear Plastic Bottle - Natural (AS)		17-Nov-2016	16-Nov-2016	1	17-Nov-2016	16-Nov-2016	1
W1_S_15/11/2016,	W1_B_15/11/2016,						
W2_S_15/11/2016,	W2_B_15/11/2016,						
CB1_S_15/11/2016,	CB1_B_15/11/2016,						
MU1_S_15/11/2016,	MU1_B_15/11/2016,						
BAY1_S_15/11/2016,	BAY1_B_15/11/2016,						
BAY2 S_15/11/2016,	BAY2 B_15/11/2016						

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)	1	12	8.33	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	12	8.33	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025-SW)								
W1_S_15/11/2016,	W1_B_15/11/2016,	15-Nov-2016	----	----	----	18-Nov-2016	22-Nov-2016	✓
W2_S_15/11/2016,	W2_B_15/11/2016,							
CB1_S_15/11/2016,	CB1_B_15/11/2016,							
MU1_S_15/11/2016,	MU1_B_15/11/2016,							
BAY1_S_15/11/2016,	BAY1_B_15/11/2016,							
BAY2_S_15/11/2016,	BAY2_B_15/11/2016							
EA045: Turbidity								
Clear Plastic Bottle - Natural (EA045)								
W1_S_15/11/2016,	W1_B_15/11/2016,	15-Nov-2016	----	----	----	17-Nov-2016	17-Nov-2016	✓
W2_S_15/11/2016,	W2_B_15/11/2016,							
CB1_S_15/11/2016,	CB1_B_15/11/2016,							
MU1_S_15/11/2016,	MU1_B_15/11/2016,							
BAY1_S_15/11/2016,	BAY1_B_15/11/2016,							
BAY2_S_15/11/2016,	BAY2_B_15/11/2016							
EG035F: Dissolved Mercury by FIMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F-LL)								
W1_S_15/11/2016,	W1_B_15/11/2016,	15-Nov-2016	----	----	----	17-Nov-2016	13-Dec-2016	✓
W2_S_15/11/2016,	W2_B_15/11/2016,							
CB1_S_15/11/2016,	CB1_B_15/11/2016,							
MU1_S_15/11/2016,	MU1_B_15/11/2016,							
BAY1_S_15/11/2016,	BAY1_B_15/11/2016,							
BAY2_S_15/11/2016,	BAY2_B_15/11/2016							
EG035T: Total Mercury by FIMS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035T-LL)								
W1_S_15/11/2016,	W1_B_15/11/2016,	15-Nov-2016	----	----	----	17-Nov-2016	13-Dec-2016	✓
W2_S_15/11/2016,	W2_B_15/11/2016,							
CB1_S_15/11/2016,	CB1_B_15/11/2016,							
MU1_S_15/11/2016,	MU1_B_15/11/2016,							
BAY1_S_15/11/2016,	BAY1_B_15/11/2016,							
BAY2_S_15/11/2016,	BAY2_B_15/11/2016							
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093A-F)								
W1_S_15/11/2016,	W1_B_15/11/2016,	15-Nov-2016	----	----	----	17-Nov-2016	14-May-2017	✓
W2_S_15/11/2016,	W2_B_15/11/2016,							
CB1_S_15/11/2016,	CB1_B_15/11/2016,							
MU1_S_15/11/2016,	MU1_B_15/11/2016,							
BAY1_S_15/11/2016,	BAY1_B_15/11/2016,							
BAY2_S_15/11/2016,	BAY2_B_15/11/2016							



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
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-T) W1_S_15/11/2016, W1_B_15/11/2016, W2_S_15/11/2016, W2_B_15/11/2016, CB1_S_15/11/2016, CB1_B_15/11/2016, MU1_S_15/11/2016, MU1_B_15/11/2016, BAY1_S_15/11/2016, BAY1_B_15/11/2016, BAY2_S_15/11/2016, BAY2_B_15/11/2016	15-Nov-2016	17-Nov-2016	14-May-2017	✔	17-Nov-2016	14-May-2017	✔
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water							
Clear Plastic Bottle - Sulfuric Acid (EK055G-SW) W1_S_15/11/2016, W1_B_15/11/2016, W2_S_15/11/2016, W2_B_15/11/2016, CB1_S_15/11/2016, CB1_B_15/11/2016, MU1_S_15/11/2016, MU1_B_15/11/2016, BAY1_S_15/11/2016, BAY1_B_15/11/2016, BAY2_S_15/11/2016, BAY2_B_15/11/2016	15-Nov-2016	----	----	----	17-Nov-2016	13-Dec-2016	✔
EK262A: Total Nitrogen							
Clear Plastic Bottle - Natural (AS) (EK262PA-SW) W1_S_15/11/2016, W1_B_15/11/2016, W2_S_15/11/2016, W2_B_15/11/2016, CB1_S_15/11/2016, CB1_B_15/11/2016, MU1_S_15/11/2016, MU1_B_15/11/2016, BAY1_S_15/11/2016, BAY1_B_15/11/2016, BAY2_S_15/11/2016, BAY2_B_15/11/2016	15-Nov-2016	17-Nov-2016	16-Nov-2016	✖	17-Nov-2016	16-Nov-2016	✖
EK267A: Total Phosphorus (Persulfate Digestion)							
Clear Plastic Bottle - Natural (AS) (EK267PA-SW) W1_S_15/11/2016, W1_B_15/11/2016, W2_S_15/11/2016, W2_B_15/11/2016, CB1_S_15/11/2016, CB1_B_15/11/2016, MU1_S_15/11/2016, MU1_B_15/11/2016, BAY1_S_15/11/2016, BAY1_B_15/11/2016, BAY2_S_15/11/2016, BAY2_B_15/11/2016	15-Nov-2016	17-Nov-2016	16-Nov-2016	✖	17-Nov-2016	16-Nov-2016	✖
EP008: Chlorophyll a & Pheophytin a							
Opaque Plastic Bottle - Unpreserved (EP008) W1_S_15/11/2016, W1_B_15/11/2016, W2_S_15/11/2016, W2_B_15/11/2016, CB1_S_15/11/2016, CB1_B_15/11/2016, MU1_S_15/11/2016, MU1_B_15/11/2016, BAY1_S_15/11/2016, BAY1_B_15/11/2016, BAY2_S_15/11/2016, BAY2_B_15/11/2016	15-Nov-2016	----	----	----	17-Nov-2016	17-Nov-2016	✔



Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))		15-Nov-2016	17-Nov-2016	22-Nov-2016	✓	17-Nov-2016	27-Dec-2016	✓
W1_S_15/11/2016, W2_S_15/11/2016, CB1_S_15/11/2016, MU1_S_15/11/2016, BAY1_S_15/11/2016, BAY2_S_15/11/2016,	W1_B_15/11/2016, W2_B_15/11/2016, CB1_B_15/11/2016, MU1_B_15/11/2016, BAY1_B_15/11/2016, BAY2_B_15/11/2016							
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)		15-Nov-2016	17-Nov-2016	22-Nov-2016	✓	18-Nov-2016	27-Dec-2016	✓
W1_S_15/11/2016, W2_S_15/11/2016, CB1_S_15/11/2016, MU1_S_15/11/2016, BAY1_S_15/11/2016, BAY2_S_15/11/2016,	W1_B_15/11/2016, W2_B_15/11/2016, CB1_B_15/11/2016, MU1_B_15/11/2016, BAY1_B_15/11/2016, BAY2_B_15/11/2016							
Amber VOC Vial - Sulfuric Acid (EP080)		15-Nov-2016	21-Nov-2016	29-Nov-2016	✓	21-Nov-2016	29-Nov-2016	✓
W1_S_15/11/2016, W2_S_15/11/2016, CB1_S_15/11/2016, MU1_S_15/11/2016, BAY1_S_15/11/2016, BAY2_S_15/11/2016,	W1_B_15/11/2016, W2_B_15/11/2016, CB1_B_15/11/2016, MU1_B_15/11/2016, BAY1_B_15/11/2016, BAY2_B_15/11/2016							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		15-Nov-2016	17-Nov-2016	22-Nov-2016	✓	18-Nov-2016	27-Dec-2016	✓
W1_S_15/11/2016, W2_S_15/11/2016, CB1_S_15/11/2016, MU1_S_15/11/2016, BAY1_S_15/11/2016, BAY2_S_15/11/2016,	W1_B_15/11/2016, W2_B_15/11/2016, CB1_B_15/11/2016, MU1_B_15/11/2016, BAY1_B_15/11/2016, BAY2_B_15/11/2016							
Amber VOC Vial - Sulfuric Acid (EP080)		15-Nov-2016	21-Nov-2016	29-Nov-2016	✓	21-Nov-2016	29-Nov-2016	✓
W1_S_15/11/2016, W2_S_15/11/2016, CB1_S_15/11/2016, MU1_S_15/11/2016, BAY1_S_15/11/2016, BAY2 S_15/11/2016,	W1_B_15/11/2016, W2_B_15/11/2016, CB1_B_15/11/2016, MU1_B_15/11/2016, BAY1_B_15/11/2016, BAY2 B_15/11/2016							



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
W1_S_15/11/2016,	W1_B_15/11/2016,	15-Nov-2016	21-Nov-2016	29-Nov-2016	✔	21-Nov-2016	29-Nov-2016	✔
W2_S_15/11/2016,	W2_B_15/11/2016,							
CB1_S_15/11/2016,	CB1_B_15/11/2016,							
MU1_S_15/11/2016,	MU1_B_15/11/2016,							
BAY1_S_15/11/2016,	BAY1_B_15/11/2016,							
BAY2_S_15/11/2016,	BAY2_B_15/11/2016							



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)							
Ammonia as N (Saline Water)	EK055G-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	3	28	10.71	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	2	12	16.67	9.52	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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							
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	28	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✔	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



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
Suspended Solids - Saline Water	EA025-SW	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Turbidity	EA045	WATER	In house: Referenced to APHA 2130 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Mercury by FIMS - Low Level	EG035F-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS - Low Level	EG035T-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm 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)
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. 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)
Ammonia as N (Saline Water)	EK055G-SW	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.



Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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	In house: Referenced to 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	In house: Referenced to 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
Persulfate Digestion for UT TN and TP for FIA/Saline	EK262/267PA-SW Prep	WATER	In house: Referenced to APHA 4500 P - J. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QUALITY CONTROL REPORT

Work Order	: ES1626072	Page	: 1 of 8
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Contact	: Carol Walsh
Address	: PO BOX 829 BEGA NSW, AUSTRALIA 2550	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8003 4590	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 16-Nov-2016
Order number	: ----	Date Analysis Commenced	: 17-Nov-2016
C-O-C number	: ----	Issue Date	: 22-Nov-2016
Sampler	: Elgin		
Site	: ----		
Quote number	: ----		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This 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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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 (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 659303)									
ES1626072-001	W1_S_15/11/2016	EA025-SW: Suspended Solids (SS)	----	1	mg/L	5	4	0.00	No Limit
ES1626072-010	BAY1_B_15/11/2016	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	1	0.00	No Limit
EA045: Turbidity (QC Lot: 658202)									
ES1626072-001	W1_S_15/11/2016	EA045: Turbidity	----	0.1	NTU	0.5	0.6	21.9	No Limit
ES1626072-010	BAY1_B_15/11/2016	EA045: Turbidity	----	0.1	NTU	0.6	0.6	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 657865)									
ES1626072-001	W1_S_15/11/2016	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
ES1626072-011	BAY2_S_15/11/2016	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 657198)									
EP1610801-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
ES1625922-006	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 657199)									
ES1626072-005	CB1_S_15/11/2016	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 656940)									
ES1626072-003	W2_S_15/11/2016	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.9	1.8	0.00	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EP1610878-001	Anonymous	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	5.6	5.2	7.12	0% - 50%



Sub-Matrix: **WATER**

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: 656940) - continued									
EP1610878-001	Anonymous	EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 656985)									
ES1626072-001	W1_S_15/11/2016	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	0.5	1.2	77.0	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
ES1626072-011	BAY2_S_15/11/2016	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	0.7	0.6	19.5	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QC Lot: 657628)									
ES1626072-001	W1_S_15/11/2016	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
ES1626072-010	BAY1_B_15/11/2016	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
EK262A: Total Nitrogen (QC Lot: 658031)									
ES1626072-001	W1_S_15/11/2016	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.14	0.13	0.00	No Limit
ES1626072-011	BAY2_S_15/11/2016	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.13	0.13	0.00	No Limit
EK267A: Total Phosphorus (Persulfate Digestion) (QC Lot: 658032)									
ES1626072-001	W1_S_15/11/2016	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	0.013	0.012	0.00	No Limit
ES1626072-011	BAY2_S_15/11/2016	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	0.011	0.010	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 656011)									
ES1626072-001	W1_S_15/11/2016	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	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 (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 656011) - continued									
ES1626072-001	W1_S_15/11/2016	EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	<1.0	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 656012)									
ES1626072-001	W1_S_15/11/2016	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 659041)									
ES1626072-001	W1_S_15/11/2016	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1626072-011	BAY2_S_15/11/2016	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 656012)									
ES1626072-001	W1_S_15/11/2016	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 659041)									
ES1626072-001	W1_S_15/11/2016	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1626072-011	BAY2_S_15/11/2016	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 659041)									
ES1626072-001	W1_S_15/11/2016	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
ES1626072-011	BAY2_S_15/11/2016	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit		

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 Spike (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 Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 659303)								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	96.7	86	128
				<1	1000 mg/L	94.8	80	112
EA045: Turbidity (QCLot: 658202)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	98.8	91	105
EG035F: Dissolved Mercury by FIMS (QCLot: 657865)								
EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	90.0	83	105
EG035T: Total Mercury by FIMS (QCLot: 657198)								
EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	95.0	85	105
EG035T: Total Mercury by FIMS (QCLot: 657199)								
EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	96.0	85	105
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 656940)								
EG093A-F: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	125	76	134
EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	10 µg/L	115	69	117
EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	10 µg/L	114	76	122
EG093A-F: Copper	7440-50-8	1	µg/L	<1	10 µg/L	115	71	129
EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	114	74	120
EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	109	72	124
EG093A-F: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	103	70	126
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 656985)								
EG093A-T: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	93.8	89	125
EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	10 µg/L	91.7	82	122
EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	10 µg/L	92.6	85	123
EG093A-T: Copper	7440-50-8	1	µg/L	<1	10 µg/L	90.3	84	128
EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	87.6	85	125
EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	89.3	85	125
EG093A-T: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	86.5	82	128
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 657628)								
EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.02	0.5 mg/L	100	80	120
EK262A: Total Nitrogen (QCLot: 658031)								
EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	<0.05	1 mg/L	96.0	81	111
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 658032)								
EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.44 mg/L	100	88	112
EP008: Chlorophyll (QCLot: 657407)								



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP008: Chlorophyll (QCLot: 657407) - continued								
EP008: Chlorophyll a	----	1	mg/m³	<1	20 mg/m³	110	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 656011)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	74.3	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	81.0	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	76.2	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	80.7	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	94.3	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	94.8	64	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	92.6	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	92.6	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	93.8	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	88.0	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	79.1	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	85.3	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	87.0	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	88.3	60	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	89.9	61	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	82.4	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 656012)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	76.8	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	98.6	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	96.3	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 659041)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	104	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 656012)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	100	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	101	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	96.2	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 659041)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	106	75	127
EP080: BTEXN (QCLot: 659041)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	96.4	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	100	69	123
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	103	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	101	72	122

Method Blank (MB) Report

Spike

Spike Recovery (%)

Recovery Limits (%)

Matrix Spike (MS) Report

Sub-Matrix: **WATER**

Matrix Spike (MS) Report



Sub-Matrix: **WATER**

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
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 658032) - continued							
ES1626072-001	W1_S_15/11/2016	EK267PA-SW: Total Phosphorus as P	----	0.5 mg/L	106	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 656011)							
ES1626072-001	W1_S_15/11/2016	EP075(SIM): Acenaphthene	83-32-9	2 µg/L	76.2	70	130
		EP075(SIM): Pyrene	129-00-0	2 µg/L	79.5	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 656012)							
ES1626072-001	W1_S_15/11/2016	EP071: C10 - C14 Fraction	----	2000 µg/L	122	74	150
		EP071: C15 - C28 Fraction	----	2500 µg/L	105	77	153
		EP071: C29 - C36 Fraction	----	2000 µg/L	82.5	67	153
EP080/071: Total Petroleum Hydrocarbons (QCLot: 659041)							
ES1626072-001	W1_S_15/11/2016	EP080: C6 - C9 Fraction	----	325 µg/L	125	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 656012)							
ES1626072-001	W1_S_15/11/2016	EP071: >C10 - C16 Fraction	----	2500 µg/L	113	74	150
		EP071: >C16 - C34 Fraction	----	3500 µg/L	96.3	77	153
		EP071: >C34 - C40 Fraction	----	1500 µg/L	81.3	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 659041)							
ES1626072-001	W1_S_15/11/2016	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	122	70	130
EP080: BTEXN (QCLot: 659041)							
ES1626072-001	W1_S_15/11/2016	EP080: Benzene	71-43-2	25 µg/L	106	70	130
		EP080: Toluene	108-88-3	25 µg/L	104	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	110	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	108	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	109	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	107	70	130

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1626072

Client : ELGIN ASSOCIATES PTY LTD Contact : MR NICK YEE Address : PO BOX 829 BEGA NSW, AUSTRALIA 2550 E-mail : nick.yee@elgin.com.au Telephone : +61 02 8003 4590 Facsimile : +61 03 8648 6336 Project : Eden Baseline Marine Water Quality Order number : ---- C-O-C number : ---- Site : ---- Sampler : Elgin	Laboratory : Environmental Division Sydney Contact : Carol Walsh Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : carol.walsh@alsglobal.com Telephone : +61-3-8549 9608 Facsimile : +61-2-8784 8500 Page : 1 of 3 Quote number : EM2016ELGASS0003 (ME/411/16 V4) QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 16-Nov-2016 9:20 AM	Issue Date : 16-Nov-2016
Client Requested Due : 22-Nov-2016	Scheduled Reporting Date : 22-Nov-2016
Date	

Delivery Details

Mode of Delivery : Undefined	Security Seal : Intact.
No. of coolers/boxes : 4	Temperature : 17.1°C - Ice Bricks present
Receipt Detail :	No. of samples received / analysed : 12 / 12

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
- **Insufficient volume provided for TBT analysis; therefore analysis has been cancelled.**
- **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 exists.

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.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA025-SW Suspended Solids - Saline Water	WATER - EK055G-SW Ammonia as N (Sea Water)	WATER - EK262PA-SW Total Nitrogen by Persulfate Digestion	WATER - EP008 Chlorophyll a	WATER - EP075 SIM PAH only SIM - PAH only	WATER - MW-2(ANZECC) 7 METALS ORC + LL Hg (Marine Water ANZECC)	WATER - MW-2T (ANZECC) 7 METALS ORC Total + LL Hg (Marine Water)
ES1626072-001	15-Nov-2016 12:45	W1_S_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-002	15-Nov-2016 12:25	W1_B_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-003	15-Nov-2016 12:05	W2_S_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-004	15-Nov-2016 11:45	W2_B_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-005	15-Nov-2016 13:15	CB1_S_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-006	15-Nov-2016 13:00	CB1_B_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-007	15-Nov-2016 11:15	MU1_S_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-008	15-Nov-2016 10:50	MU1_B_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-009	15-Nov-2016 10:35	BAY1_S_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-010	15-Nov-2016 10:10	BAY1_B_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-011	15-Nov-2016 09:50	BAY2_S_15/11/2016	✓	✓	✓	✓	✓	✓	✓
ES1626072-012	15-Nov-2016 09:30	BAY2_B_15/11/2016	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA045 Turbidity	WATER - EK267PA-SW Total Phosphorus by Persulfate Digestion	WATER - TPH TRH (C6-C40)
ES1626072-001	15-Nov-2016 12:45	W1_S_15/11/2016	✓	✓	✓
ES1626072-002	15-Nov-2016 12:25	W1_B_15/11/2016	✓	✓	✓
ES1626072-003	15-Nov-2016 12:05	W2_S_15/11/2016	✓	✓	✓
ES1626072-004	15-Nov-2016 11:45	W2_B_15/11/2016	✓	✓	✓
ES1626072-005	15-Nov-2016 13:15	CB1_S_15/11/2016	✓	✓	✓
ES1626072-006	15-Nov-2016 13:00	CB1_B_15/11/2016	✓	✓	✓
ES1626072-007	15-Nov-2016 11:15	MU1_S_15/11/2016	✓	✓	✓
ES1626072-008	15-Nov-2016 10:50	MU1_B_15/11/2016	✓	✓	✓
ES1626072-009	15-Nov-2016 10:35	BAY1_S_15/11/2016	✓	✓	✓
ES1626072-010	15-Nov-2016 10:10	BAY1_B_15/11/2016	✓	✓	✓
ES1626072-011	15-Nov-2016 09:50	BAY2_S_15/11/2016	✓	✓	✓
ES1626072-012	15-Nov-2016 09:30	BAY2_B_15/11/2016	✓	✓	✓



CHAIN OF CUSTODY

ALS Laboratory, please tick →

□ Sydney, 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 9784 8559 E: samples@elsalabservicio.com
□ Newcastle, 5 Rosagum Rd, Waratah NSW 2304
Ph: 02 4988 8433 E: samples@elsalabservicio.com

□ Brisbane, 32 Sharn Rd, Stafford QLD 4053
Ph: 07 3243 7222 E: samples@elsalabservicio.com
□ Townsville, 14-15 Dwyer Ct, Bala QLD 4813
Ph: 07 4746 0600 E: townsville@elsalabservicio.com

□ Melbourne, 2-4 West Rd, Springvale VIC 3171
Ph: 03 859 9810 E: samples@elsalabservicio.com
□ Adelaide, 2-4 Birnie Rd, Forasak SA 5095
Ph: 08 8359 0000 E: adelaide@elsalabservicio.com

□ Perth, 10-12 West Way, Maida Vale WA 6052
Ph: 08 9220 7658 E: samples@elsalabservicio.com
□ Launceston, 27 Wallington St, Launceston TAS 7250
Ph: 03 6331 2198 E: launceston@elsalabservicio.com

CLIENT: ELGIN ASSOCIATES

OFFICE: 1st Floor 45-47 Church Street, BEGA, NSW 2550

PROJECT: Eden Baseline Marine Water Quality

ORDER NUMBER:

PROJECT MANAGER: NICHOLAS YEE

SAMPLER: Elgin Associates

COC emailed to ALS? (YES / NO)

Email Reports to: nick.yee@elgin.com.au

Email Invoice to: nick.yee@elgin.com.au

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS:

(Standard "AT" may be longer for some tests e.g. Ultra Trace Organics)

ALS QUOTE NO.: ME/411/16 V4

CONTACT PH: 0400 365 234

SAMPLER MOBILE:

EDD FORMAT (or default):

COC SEQUENCE NUMBER (Circle)

COC 1 2 3 4 5 7

OF: 1 2 3 4 5 7

RECEIVED BY:

N. Yee

DATE/TIME:

4/10/2016 1600

RELINQUISHED BY:

Dolly

DATE/TIME:

16/11/16 920

RECEIVED BY:

DATE/TIME:

FOR LABORATORY USE ONLY (Circle)

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 (filtered bottle required).

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Environmental Division
Sydney
Work Order Reference
ES1626072



Telephone : + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; VS = VOA Val Sulfuric Preserved; SP = Sulfuric Preserved Plastic

TOTAL

110

CERTIFICATE OF ANALYSIS

Work Order : **ES1627383**
Client : **ELGIN ASSOCIATES PTY LTD**
Contact : **MR NICK YEE**
Address : **PO BOX 829**
BEGA NSW, AUSTRALIA 2550
Telephone : **+61 02 8003 4590**
Project : **Eden Baseline Marine Water Quality**
Order number : **----**
C-O-C number : **----**
Sampler : **ELGIN**
Site : **----**
Quote number : **----**
No. of samples received : **18**
No. of samples analysed : **18**

Page : 1 of 15
Laboratory : Environmental Division Sydney
Contact : Carol Walsh
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-3-8549 9608
Date Samples Received : 30-Nov-2016 09:45
Date Analysis Commenced : 01-Dec-2016
Issue Date : 06-Dec-2016 14:54



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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

When 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.

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

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

LOR = Limit of reporting

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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EG093: It is recognised that total concentration is less than dissolved for Arsenic on sample ES1627383 #004. However, the difference is within experimental variation of the methods.
- EK055G: LOR raised for Ammonia on various samples due to sample matrix.
- EP008, LOR raised for chlorophyll-a samples 11 and 12 due to insufficient volume.
- 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	W1_S_29/11/16	W1_B_29/11/16	W2_S_29/11/16	W2_B_29/11/16	CB1_S_29/11/16
Client sampling date / time					29-Nov-2016 14:15	29-Nov-2016 14:00	29-Nov-2016 12:45	29-Nov-2016 12:30	29-Nov-2016 13:50
Compound	CAS Number	LOR	Unit		ES1627383-001	ES1627383-002	ES1627383-003	ES1627383-004	ES1627383-005
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	<1	<1
EA045: Turbidity									
Turbidity	----	0.1	NTU		0.3	0.5	0.2	0.2	0.2
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.6	1.5	1.6	1.8	1.6
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.6	1.7	1.8	1.7	1.7
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		<0.2	0.4	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L		<5	10	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.14	0.14	0.13	0.13	0.14
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		0.011	0.010	0.007	0.007	0.009
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	µg/L		1	1	<1	<1	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				W1_S_29/11/16	W1_B_29/11/16	W2_S_29/11/16	W2_B_29/11/16	CB1_S_29/11/16
Client sampling date / time				29-Nov-2016 14:15	29-Nov-2016 14:00	29-Nov-2016 12:45	29-Nov-2016 12:30	29-Nov-2016 13:50
Compound	CAS Number	LOR	Unit	ES1627383-001	ES1627383-002	ES1627383-003	ES1627383-004	ES1627383-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				W1_S_29/11/16	W1_B_29/11/16	W2_S_29/11/16	W2_B_29/11/16	CB1_S_29/11/16
Client sampling date / time				29-Nov-2016 14:15	29-Nov-2016 14:00	29-Nov-2016 12:45	29-Nov-2016 12:30	29-Nov-2016 13:50
Compound	CAS Number	LOR	Unit	ES1627383-001	ES1627383-002	ES1627383-003	ES1627383-004	ES1627383-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	-----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	22.8	24.9	25.3	24.4	22.4
2-Chlorophenol-D4	93951-73-6	1	%	46.7	49.8	49.2	49.1	45.8
2,4,6-Tribromophenol	118-79-6	1	%	54.4	61.2	61.4	57.3	54.5
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	64.9	71.0	70.3	67.2	69.1
Anthracene-d10	1719-06-8	1	%	79.6	83.1	85.0	83.3	79.2
4-Terphenyl-d14	1718-51-0	1	%	76.7	80.7	81.8	83.6	77.8
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	104	117	112	105	112
Toluene-D8	2037-26-5	2	%	99.5	108	103	97.6	110
4-Bromofluorobenzene	460-00-4	2	%	90.5	107	91.5	94.4	95.9



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				CB1_B_29/11/16	MU1_S_29/11/16	MU1_B_29/11/16	BAY1_S_29/11/16	BAY1_B_29/11/16
Client sampling date / time				29-Nov-2016 13:30	29-Nov-2016 12:15	29-Nov-2016 12:00	29-Nov-2016 11:00	29-Nov-2016 10:45
Compound	CAS Number	LOR	Unit	ES1627383-006	ES1627383-007	ES1627383-008	ES1627383-009	ES1627383-010
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.2	0.2	0.2	0.3	0.3
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.5	1.6	1.6	1.6	1.7
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.7	1.8	1.8	1.8	1.8
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L	12	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.15	0.12	0.13	0.13	0.14
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	0.008	0.008	0.008	0.008	0.009
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	µg/L	<1	<1	<1	1	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_29/11/16	MU1_S_29/11/16	MU1_B_29/11/16	BAY1_S_29/11/16	BAY1_B_29/11/16
Client sampling date / time				29-Nov-2016 13:30	29-Nov-2016 12:15	29-Nov-2016 12:00	29-Nov-2016 11:00	29-Nov-2016 10:45
Compound	CAS Number	LOR	Unit	ES1627383-006	ES1627383-007	ES1627383-008	ES1627383-009	ES1627383-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_29/11/16	MU1_S_29/11/16	MU1_B_29/11/16	BAY1_S_29/11/16	BAY1_B_29/11/16
Client sampling date / time				29-Nov-2016 13:30	29-Nov-2016 12:15	29-Nov-2016 12:00	29-Nov-2016 11:00	29-Nov-2016 10:45
Compound	CAS Number	LOR	Unit	ES1627383-006	ES1627383-007	ES1627383-008	ES1627383-009	ES1627383-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	-----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	24.1	22.7	24.4	23.9	22.0
2-Chlorophenol-D4	93951-73-6	1	%	47.2	44.2	48.3	49.0	44.2
2,4,6-Tribromophenol	118-79-6	1	%	58.8	58.3	60.6	56.9	51.0
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	69.2	64.4	66.1	63.6	66.2
Anthracene-d10	1719-06-8	1	%	83.4	86.9	87.9	85.7	75.4
4-Terphenyl-d14	1718-51-0	1	%	82.0	86.5	85.1	82.4	73.4
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	104	106	111	106	109
Toluene-D8	2037-26-5	2	%	95.2	111	99.7	92.8	101
4-Bromofluorobenzene	460-00-4	2	%	89.6	104	93.9	87.0	100



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				BAY2_S_29/11/16	BAY2_B_29/11/16	ADCP03_2_29/11/16	ADCP03_10_29/11/16	ADCP01_2_29/11/16
Client sampling date / time				29-Nov-2016 09:40	29-Nov-2016 09:30	29-Nov-2016 10:20	29-Nov-2016 10:18	29-Nov-2016 11:40
Compound	CAS Number	LOR	Unit	ES1627383-011	ES1627383-012	ES1627383-013	ES1627383-014	ES1627383-015
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.2	0.2	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	----	----	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.6	1.7	----	----	----
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L	<1	<1	----	----	----
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	----	----	----
Zinc	7440-66-6	5	µg/L	<5	<5	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.7	1.9	----	----	----
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L	<1	<1	----	----	----
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	----	----	----
Zinc	7440-66-6	5	µg/L	<5	<5	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	----	----	----
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.13	0.14	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	0.007	0.009	----	----	----
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	µg/L	<2	<2	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				BAY2_S_29/11/16	BAY2_B_29/11/16	ADCP03_2_29/11/16	ADCP03_10_29/11/16	ADCP01_2_29/11/16
Client sampling date / time				29-Nov-2016 09:40	29-Nov-2016 09:30	29-Nov-2016 10:20	29-Nov-2016 10:18	29-Nov-2016 11:40
Compound	CAS Number	LOR	Unit	ES1627383-011	ES1627383-012	ES1627383-013	ES1627383-014	ES1627383-015
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	----	----	----
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	----	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	----	----	----



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				BAY2_S_29/11/16	BAY2_B_29/11/16	ADCP03_2_29/11/16	ADCP03_10_29/11/16	ADCP01_2_29/11/16
Client sampling date / time				29-Nov-2016 09:40	29-Nov-2016 09:30	29-Nov-2016 10:20	29-Nov-2016 10:18	29-Nov-2016 11:40
Compound	CAS Number	LOR	Unit	ES1627383-011	ES1627383-012	ES1627383-013	ES1627383-014	ES1627383-015
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	26.5	25.7	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	50.7	51.5	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%	59.4	58.3	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	71.0	71.5	----	----	----
Anthracene-d10	1719-06-8	1	%	85.0	87.9	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	80.8	85.4	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	111	109	----	----	----
Toluene-D8	2037-26-5	2	%	103	104	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	97.1	101	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	ADCP01_10_29/11/16	ADCP02_2_29/11/16	ADCP02_10_29/11/16	----	----
Client sampling date / time					29-Nov-2016 11:37	29-Nov-2016 13:05	29-Nov-2016 13:02	----	----
Compound	CAS Number	LOR	Unit		ES1627383-016	ES1627383-017	ES1627383-018	-----	-----
				Result	Result	Result	Result	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	----	----
EA045: Turbidity									
Turbidity	----	0.1	NTU		----	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		----	----	----	----	----
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		----	----	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		----	----	----	----	----
Cadmium	7440-43-9	0.2	µg/L		----	----	----	----	----
Chromium	7440-47-3	0.5	µg/L		----	----	----	----	----
Copper	7440-50-8	1	µg/L		----	----	----	----	----
Lead	7439-92-1	0.2	µg/L		----	----	----	----	----
Nickel	7440-02-0	0.5	µg/L		----	----	----	----	----
Zinc	7440-66-6	5	µg/L		----	----	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		----	----	----	----	----
Cadmium	7440-43-9	0.2	µg/L		----	----	----	----	----
Chromium	7440-47-3	0.5	µg/L		----	----	----	----	----
Copper	7440-50-8	1	µg/L		----	----	----	----	----
Lead	7439-92-1	0.2	µg/L		----	----	----	----	----
Nickel	7440-02-0	0.5	µg/L		----	----	----	----	----
Zinc	7440-66-6	5	µg/L		----	----	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		----	----	----	----	----
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		----	----	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		----	----	----	----	----
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	µg/L		----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		----	----	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				ADCP01_10_29/11/16	ADCP02_2_29/11/16	ADCP02_10_29/11/16	----	----
Client sampling date / time				29-Nov-2016 11:37	29-Nov-2016 13:05	29-Nov-2016 13:02	----	----
Compound	CAS Number	LOR	Unit	ES1627383-016	ES1627383-017	ES1627383-018	-----	-----
				Result	Result	Result	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
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	----	----	----	----	----
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	----	----	----	----	----
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	----	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	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	ADCP01_10_29/11/16	ADCP02_2_29/11/16	ADCP02_10_29/11/16	----	----
Client sampling date / time					29-Nov-2016 11:37	29-Nov-2016 13:05	29-Nov-2016 13:02	----	----
Compound	CAS Number	LOR	Unit		ES1627383-016	ES1627383-017	ES1627383-018	-----	-----
					Result	Result	Result	----	----
EP080: BTEXN - Continued									
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		----	----	----	----	----
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	%		----	----	----	----	----
Toluene-D8	2037-26-5	2	%		----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1627383	Page	: 1 of 10
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 30-Nov-2016
Site	: ----	Issue Date	: 06-Dec-2016
Sampler	: ELGIN	No. of samples received	: 18
Order number	: ----	No. of samples analysed	: 18

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

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK262A: Total Nitrogen							
Clear Plastic Bottle - Natural (AS)		01-Dec-2016	30-Nov-2016	1	01-Dec-2016	30-Nov-2016	1
W1_S_29/11/16,	W1_B_29/11/16,						
W2_S_29/11/16,	W2_B_29/11/16,						
CB1_S_29/11/16,	CB1_B_29/11/16,						
MU1_S_29/11/16,	MU1_B_29/11/16,						
BAY1_S_29/11/16,	BAY1_B_29/11/16,						
BAY2_S_29/11/16,	BAY2_B_29/11/16						
EK267A: Total Phosphorus (Persulfate Digestion)							
Clear Plastic Bottle - Natural (AS)		01-Dec-2016	30-Nov-2016	1	01-Dec-2016	30-Nov-2016	1
W1_S_29/11/16,	W1_B_29/11/16,						
W2_S_29/11/16,	W2_B_29/11/16,						
CB1_S_29/11/16,	CB1_B_29/11/16,						
MU1_S_29/11/16,	MU1_B_29/11/16,						
BAY1_S_29/11/16,	BAY1_B_29/11/16,						
BAY2 S_29/11/16,	BAY2 B_29/11/16						

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)	1	12	8.33	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	12	8.33	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025-SW)	W1_S_29/11/16, W2_S_29/11/16, CB1_S_29/11/16, MU1_S_29/11/16, BAY1_S_29/11/16, BAY2_S_29/11/16, ADCP03_2_29/11/16, ADCP01_2_29/11/16	W1_B_29/11/16, W2_B_29/11/16, CB1_B_29/11/16, MU1_B_29/11/16, BAY1_B_29/11/16, BAY2_B_29/11/16, ADCP03_10_29/11/16,	29-Nov-2016	----	----	----	01-Dec-2016 06-Dec-2016	✔
Clear Plastic Bottle - Natural (EA025-SW)	ADCP01_10_29/11/16, ADCP02_10_29/11/16	ADCP02_2_29/11/16,	29-Nov-2016	----	----	----	05-Dec-2016 06-Dec-2016	✔
EA045: Turbidity								
Clear Plastic Bottle - Natural (EA045)	W1_S_29/11/16, W2_S_29/11/16, CB1_S_29/11/16, MU1_S_29/11/16, BAY1_S_29/11/16, BAY2_S_29/11/16,	W1_B_29/11/16, W2_B_29/11/16, CB1_B_29/11/16, MU1_B_29/11/16, BAY1_B_29/11/16, BAY2_B_29/11/16	29-Nov-2016	----	----	----	01-Dec-2016 01-Dec-2016	✔
EG035F: Dissolved Mercury by FIMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F-LL)	W1_S_29/11/16, W2_S_29/11/16, CB1_S_29/11/16, MU1_S_29/11/16, BAY1_S_29/11/16, BAY2_S_29/11/16,	W1_B_29/11/16, W2_B_29/11/16, CB1_B_29/11/16, MU1_B_29/11/16, BAY1_B_29/11/16, BAY2_B_29/11/16	29-Nov-2016	----	----	----	02-Dec-2016 27-Dec-2016	✔
EG035T: Total Mercury by FIMS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035T-LL)	W1_S_29/11/16, W2_S_29/11/16, CB1_S_29/11/16, MU1_S_29/11/16, BAY1_S_29/11/16, BAY2_S_29/11/16,	W1_B_29/11/16, W2_B_29/11/16, CB1_B_29/11/16, MU1_B_29/11/16, BAY1_B_29/11/16, BAY2_B_29/11/16	29-Nov-2016	----	----	----	02-Dec-2016 27-Dec-2016	✔



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
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093A-F) W1_S_29/11/16, W1_B_29/11/16, W2_S_29/11/16, W2_B_29/11/16, CB1_S_29/11/16, CB1_B_29/11/16, MU1_S_29/11/16, MU1_B_29/11/16, BAY1_S_29/11/16, BAY1_B_29/11/16, BAY2_S_29/11/16, BAY2_B_29/11/16	29-Nov-2016	----	----	----	01-Dec-2016	28-May-2017	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-T) W1_S_29/11/16, W1_B_29/11/16, W2_S_29/11/16, W2_B_29/11/16, CB1_S_29/11/16, CB1_B_29/11/16, MU1_S_29/11/16, MU1_B_29/11/16, BAY1_S_29/11/16, BAY1_B_29/11/16, BAY2_S_29/11/16, BAY2_B_29/11/16	29-Nov-2016	01-Dec-2016	28-May-2017	✓	01-Dec-2016	28-May-2017	✓
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water							
Clear Plastic Bottle - Sulfuric Acid (EK055G-SW) W1_S_29/11/16, W1_B_29/11/16, W2_S_29/11/16, W2_B_29/11/16, CB1_S_29/11/16, CB1_B_29/11/16, MU1_S_29/11/16, MU1_B_29/11/16, BAY1_S_29/11/16, BAY1_B_29/11/16, BAY2_S_29/11/16, BAY2_B_29/11/16	29-Nov-2016	----	----	----	01-Dec-2016	27-Dec-2016	✓
EK262A: Total Nitrogen							
Clear Plastic Bottle - Natural (AS) (EK262PA-SW) W1_S_29/11/16, W1_B_29/11/16, W2_S_29/11/16, W2_B_29/11/16, CB1_S_29/11/16, CB1_B_29/11/16, MU1_S_29/11/16, MU1_B_29/11/16, BAY1_S_29/11/16, BAY1_B_29/11/16, BAY2_S_29/11/16, BAY2_B_29/11/16	29-Nov-2016	01-Dec-2016	30-Nov-2016	✗	01-Dec-2016	30-Nov-2016	✗
EK267A: Total Phosphorus (Persulfate Digestion)							
Clear Plastic Bottle - Natural (AS) (EK267PA-SW) W1_S_29/11/16, W1_B_29/11/16, W2_S_29/11/16, W2_B_29/11/16, CB1_S_29/11/16, CB1_B_29/11/16, MU1_S_29/11/16, MU1_B_29/11/16, BAY1_S_29/11/16, BAY1_B_29/11/16, BAY2_S_29/11/16, BAY2_B_29/11/16	29-Nov-2016	01-Dec-2016	30-Nov-2016	✗	01-Dec-2016	30-Nov-2016	✗



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP008: Chlorophyll a & Pheophytin a								
Opaque Plastic Bottle - Unpreserved (EP008)		29-Nov-2016	----	----	----	01-Dec-2016	01-Dec-2016	✓
W1_S_29/11/16,	W1_B_29/11/16,							
W2_S_29/11/16,	W2_B_29/11/16,							
CB1_S_29/11/16,	CB1_B_29/11/16,							
MU1_S_29/11/16,	MU1_B_29/11/16,							
BAY1_S_29/11/16,	BAY1_B_29/11/16,							
BAY2_S_29/11/16,	BAY2_B_29/11/16							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))		29-Nov-2016	01-Dec-2016	06-Dec-2016	✓	02-Dec-2016	10-Jan-2017	✓
W1_S_29/11/16,	W1_B_29/11/16,							
W2_S_29/11/16,	W2_B_29/11/16,							
CB1_S_29/11/16,	CB1_B_29/11/16,							
MU1_S_29/11/16,	MU1_B_29/11/16,							
BAY1_S_29/11/16,	BAY1_B_29/11/16,							
BAY2_S_29/11/16,	BAY2_B_29/11/16							
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)		29-Nov-2016	01-Dec-2016	06-Dec-2016	✓	02-Dec-2016	10-Jan-2017	✓
W1_S_29/11/16,	W1_B_29/11/16,							
W2_S_29/11/16,	W2_B_29/11/16,							
CB1_S_29/11/16,	CB1_B_29/11/16,							
MU1_S_29/11/16,	MU1_B_29/11/16,							
BAY1_S_29/11/16,	BAY1_B_29/11/16,							
BAY2_S_29/11/16,	BAY2_B_29/11/16							
Amber VOC Vial - Sulfuric Acid (EP080)		29-Nov-2016	01-Dec-2016	13-Dec-2016	✓	01-Dec-2016	13-Dec-2016	✓
W1_S_29/11/16,	W1_B_29/11/16,							
W2_S_29/11/16,	W2_B_29/11/16,							
CB1_S_29/11/16,	CB1_B_29/11/16,							
MU1_S_29/11/16,	MU1_B_29/11/16,							
BAY1_S_29/11/16,	BAY1_B_29/11/16,							
BAY2_S_29/11/16,	BAY2_B_29/11/16							



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		29-Nov-2016	01-Dec-2016	06-Dec-2016	✔	02-Dec-2016	10-Jan-2017	✔
W1_S_29/11/16,	W1_B_29/11/16,							
W2_S_29/11/16,	W2_B_29/11/16,							
CB1_S_29/11/16,	CB1_B_29/11/16,							
MU1_S_29/11/16,	MU1_B_29/11/16,							
BAY1_S_29/11/16,	BAY1_B_29/11/16,							
BAY2_S_29/11/16,	BAY2_B_29/11/16,							
Amber VOC Vial - Sulfuric Acid (EP080)		29-Nov-2016	01-Dec-2016	13-Dec-2016	✔	01-Dec-2016	13-Dec-2016	✔
W1_S_29/11/16,	W1_B_29/11/16,							
W2_S_29/11/16,	W2_B_29/11/16,							
CB1_S_29/11/16,	CB1_B_29/11/16,							
MU1_S_29/11/16,	MU1_B_29/11/16,							
BAY1_S_29/11/16,	BAY1_B_29/11/16,							
BAY2_S_29/11/16,	BAY2_B_29/11/16,							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		29-Nov-2016	01-Dec-2016	13-Dec-2016	✔	01-Dec-2016	13-Dec-2016	✔
W1_S_29/11/16,	W1_B_29/11/16,							
W2_S_29/11/16,	W2_B_29/11/16,							
CB1_S_29/11/16,	CB1_B_29/11/16,							
MU1_S_29/11/16,	MU1_B_29/11/16,							
BAY1_S_29/11/16,	BAY1_B_29/11/16,							
BAY2 S_29/11/16,	BAY2 B_29/11/16,							



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)							
Ammonia as N (Saline Water)	EK055G-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	4	37	10.81	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	3	18	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	4	33	12.12	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	2	17	11.76	9.52	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	37	5.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	4	18	22.22	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	33	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	17	5.88	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	37	5.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	18	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	33	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	17	5.88	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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							
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	33	6.06	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	17	5.88	4.76	✔	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



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
Suspended Solids - Saline Water	EA025-SW	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Turbidity	EA045	WATER	In house: Referenced to APHA 2130 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Mercury by FIMS - Low Level	EG035F-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS - Low Level	EG035T-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm 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)
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. 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)
Ammonia as N (Saline Water)	EK055G-SW	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.



Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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	In house: Referenced to 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	In house: Referenced to 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
Persulfate Digestion for UT TN and TP for FIA/Saline	EK262/267PA-SW Prep	WATER	In house: Referenced to APHA 4500 P - J. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QUALITY CONTROL REPORT

Work Order	: ES1627383	Page	: 1 of 9
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Contact	: Carol Walsh
Address	: PO BOX 829 BEGA NSW, AUSTRALIA 2550	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8003 4590	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 30-Nov-2016
Order number	: ----	Date Analysis Commenced	: 01-Dec-2016
C-O-C number	: ----	Issue Date	: 06-Dec-2016
Sampler	: ELGIN		
Site	: ----		
Quote number	: ----		
No. of samples received	: 18		
No. of samples analysed	: 18		



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

This 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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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 (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 675716)									
ES1627383-001	W1_S_29/11/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.00	No Limit
ES1627383-010	BAY1_B_29/11/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.00	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 679241)									
ES1627383-016	ADCP01_10_29/11/16	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	2	0.00	No Limit
EA045: Turbidity (QC Lot: 675607)									
ES1627347-001	Anonymous	EA045: Turbidity	----	0.1	NTU	27.6	27.3	1.09	0% - 20%
ES1627383-007	MU1_S_29/11/16	EA045: Turbidity	----	0.1	NTU	0.2	0.2	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 677076)									
EP1611294-001	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EP1611493-001	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 677077)									
ES1627383-010	BAY1_B_29/11/16	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
ES1627502-004	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 676900)									
EP1611294-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EP1611519-002	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 676901)									
ES1627383-010	BAY1_B_29/11/16	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
ES1627566-004	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 674985)									
ES1627383-010	BAY1_B_29/11/16	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.7	1.6	0.00	No Limit

Page : 3 of 9
 Work Order : ES1627383
 Client : ELGIN ASSOCIATES PTY LTD
 Project : Eden Baseline Marine Water Quality



Sub-Matrix: **WATER**

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: 674985) - continued									
ES1627383-010	BAY1_B_29/11/16	EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
ES1627377-001	Anonymous	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.8	1.8	0.00	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	1.7	1.6	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	12	12	0.00	No Limit
		EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 675012)							
ES1627383-010	BAY1_B_29/11/16	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	1.8	1.6	12.6	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
		ES1627377-001	Anonymous	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2
EG093A-T: Lead	7439-92-1			0.2	µg/L	<0.2	<0.2	0.00	No Limit
EG093A-T: Arsenic	7440-38-2			0.5	µg/L	1.9	1.9	0.00	No Limit
EG093A-T: Chromium	7440-47-3			0.5	µg/L	<0.5	<0.5	0.00	No Limit
EG093A-T: Nickel	7440-02-0			0.5	µg/L	1.7	1.7	0.00	No Limit
EG093A-T: Copper	7440-50-8			1	µg/L	<1	<1	0.00	No Limit
EG093A-T: Zinc	7440-66-6			5	µg/L	10	10	0.00	No Limit
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QC Lot: 675579)									
ES1627383-001	W1_S_29/11/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
ES1627383-010	BAY1_B_29/11/16	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.05	<0.05	0.00	No Limit
EK262A: Total Nitrogen (QC Lot: 675211)									
ES1627377-001	Anonymous	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	<0.50	<0.50	0.00	No Limit
ES1627383-010	BAY1_B_29/11/16	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.14	0.14	0.00	No Limit
EK267A: Total Phosphorus (Persulfate Digestion) (QC Lot: 675212)									
ES1627377-001	Anonymous	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	0.030	0.027	8.08	No Limit
ES1627383-010	BAY1_B_29/11/16	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	0.009	0.012	29.1	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 675085)									
ES1627383-001	W1_S_29/11/16	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	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 (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 675085) - continued									
ES1627383-001	W1_S_29/11/16	EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	<1.0	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit		
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 674749)									
ES1627383-001	W1_S_29/11/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1627383-007	MU1_S_29/11/16	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 675086)									
ES1627383-001	W1_S_29/11/16	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 674749)									
ES1627383-001	W1_S_29/11/16	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1627383-007	MU1_S_29/11/16	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: 675086)									
ES1627383-001	W1_S_29/11/16	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080: BTEXN (QC Lot: 674749)									
ES1627383-001	W1_S_29/11/16	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
ES1627383-007	MU1_S_29/11/16	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	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: 674749) - continued									
ES1627383-007	MU1_S_29/11/16	EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	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 Spike (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**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 675716)								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	98.7	86	128
				<1	1000 mg/L	95.0	80	112
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 679241)								
EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	150 mg/L	101	86	128
				<1	1000 mg/L	99.8	80	112
EA045: Turbidity (QCLot: 675607)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	99.8	91	105
EG035F: Dissolved Mercury by FIMS (QCLot: 677076)								
EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	97.0	83	105
EG035F: Dissolved Mercury by FIMS (QCLot: 677077)								
EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	101	83	105
EG035T: Total Mercury by FIMS (QCLot: 676900)								
EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	102	85	105
EG035T: Total Mercury by FIMS (QCLot: 676901)								
EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.0001 mg/L	103	85	105
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 674985)								
EG093A-F: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	100	76	134
EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	10 µg/L	106	69	117
EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	10 µg/L	101	76	122
EG093A-F: Copper	7440-50-8	1	µg/L	<1	10 µg/L	103	71	129
EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	92.3	74	120
EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	101	72	124
EG093A-F: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	99.5	70	126
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 675012)								
EG093A-T: Arsenic	7440-38-2	0.5	µg/L	<0.5	10 µg/L	110	89	125
EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	10 µg/L	120	82	122
EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	10 µg/L	112	85	123
EG093A-T: Copper	7440-50-8	1	µg/L	<1	10 µg/L	111	84	128
EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	105	85	125
EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	10 µg/L	113	85	125
EG093A-T: Zinc	7440-66-6	5	µg/L	<5	10 µg/L	105	82	128
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 675579)								
EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.02	0.5 mg/L	102	80	120



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EK262A: Total Nitrogen (QCLot: 675211)								
EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	<0.05	1 mg/L	88.9	81	111
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 675212)								
EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.44 mg/L	97.8	88	112
EP008: Chlorophyll (QCLot: 676191)								
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	100	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 675085)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	66.6	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	70.7	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	72.0	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	72.7	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	67.2	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	67.8	64	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	69.7	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	72.4	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	68.6	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	65.1	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	67.0	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	66.0	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	78.2	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	69.6	60	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	72.6	61	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	70.0	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 674749)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	97.2	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 675086)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	89.5	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	99.3	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	96.0	75	113
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 674749)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	97.1	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 675086)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	97.4	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	92.2	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	97.1	77	119
EP080: BTEXN (QCLot: 674749)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	98.4	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	99.2	69	123



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
EP080: BTEXN (QCLot: 674749) - continued								
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	96.7	70	120
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	94.6	69	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	95.7	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	97.2	70	120

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**

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
EG035F: Dissolved Mercury by FIMS (QCLot: 677076)							
EP1611294-002	Anonymous	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	77.0	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 677077)							
ES1627383-011	BAY2_S_29/11/16	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	92.0	70	130
EG035T: Total Mercury by FIMS (QCLot: 676900)							
EP1611294-002	Anonymous	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	88.0	70	130
EG035T: Total Mercury by FIMS (QCLot: 676901)							
ES1627383-011	BAY2_S_29/11/16	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	91.0	70	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 674985)							
ES1627383-001	W1_S_29/11/16	EG093A-F: Arsenic	7440-38-2	50 µg/L	76.1	70	130
		EG093A-F: Cadmium	7440-43-9	12.5 µg/L	81.9	70	130
		EG093A-F: Chromium	7440-47-3	50 µg/L	76.3	70	130
		EG093A-F: Copper	7440-50-8	50 µg/L	73.2	70	130
		EG093A-F: Lead	7439-92-1	50 µg/L	70.7	70	130
		EG093A-F: Nickel	7440-02-0	50 µg/L	76.1	70	130
		EG093A-F: Zinc	7440-66-6	50 µg/L	70.3	70	130
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 675012)							
ES1627383-001	W1_S_29/11/16	EG093A-T: Arsenic	7440-38-2	50 µg/L	119	70	130
		EG093A-T: Cadmium	7440-43-9	12.5 µg/L	130	70	130
		EG093A-T: Chromium	7440-47-3	50 µg/L	123	70	130
		EG093A-T: Copper	7440-50-8	50 µg/L	116	70	130
		EG093A-T: Lead	7439-92-1	50 µg/L	114	70	130
		EG093A-T: Nickel	7440-02-0	50 µg/L	121	70	130
		EG093A-T: Zinc	7440-66-6	50 µg/L	112	70	130



Sub-Matrix: **WATER**

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
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 675579)							
ES1627383-001	W1_S_29/11/16	EK055G-SW: Ammonia as N	7664-41-7	1 mg/L	108	70	130
EK262A: Total Nitrogen (QCLot: 675211)							
ES1627377-001	Anonymous	EK262PA-SW: Total Nitrogen as N	----	0.5 mg/L	86.8	70	130
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 675212)							
ES1627377-001	Anonymous	EK267PA-SW: Total Phosphorus as P	----	0.5 mg/L	103	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 675085)							
ES1627383-001	W1_S_29/11/16	EP075(SIM): Acenaphthene	83-32-9	2 µg/L	76.4	70	130
		EP075(SIM): Pyrene	129-00-0	2 µg/L	78.0	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 674749)							
ES1627383-001	W1_S_29/11/16	EP080: C6 - C9 Fraction	----	325 µg/L	117	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 675086)							
ES1627383-001	W1_S_29/11/16	EP071: C10 - C14 Fraction	----	2000 µg/L	98.4	74	150
		EP071: C15 - C28 Fraction	----	2500 µg/L	108	77	153
		EP071: C29 - C36 Fraction	----	2000 µg/L	99.9	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 674749)							
ES1627383-001	W1_S_29/11/16	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	115	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 675086)							
ES1627383-001	W1_S_29/11/16	EP071: >C10 - C16 Fraction	----	2500 µg/L	101	74	150
		EP071: >C16 - C34 Fraction	----	3500 µg/L	99.8	77	153
		EP071: >C34 - C40 Fraction	----	1500 µg/L	93.0	67	153
EP080: BTEXN (QCLot: 674749)							
ES1627383-001	W1_S_29/11/16	EP080: Benzene	71-43-2	25 µg/L	97.7	70	130
		EP080: Toluene	108-88-3	25 µg/L	99.5	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	102	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	100.0	70	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	104	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	94.8	70	130

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1627383

Client : ELGIN ASSOCIATES PTY LTD Contact : MR NICK YEE Address : PO BOX 829 BEGA NSW, AUSTRALIA 2550 E-mail : nick.yee@elgin.com.au Telephone : +61 02 8003 4590 Facsimile : +61 03 8648 6336 Project : Eden Baseline Marine Water Quality Order number : --- C-O-C number : --- Site : --- Sampler : ELGIN	Laboratory : Environmental Division Sydney Contact : Carol Walsh Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : carol.walsh@alsglobal.com Telephone : +61-3-8549 9608 Facsimile : +61-2-8784 8500 Page : 1 of 3 Quote number : EM2016ELGASS0003 (ME/411/16 V4) QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 30-Nov-2016 9:45 AM	Issue Date : 30-Nov-2016
Client Requested Due : 06-Dec-2016	Scheduled Reporting Date : 06-Dec-2016
Date	

Delivery Details

Mode of Delivery : Undefined	Security Seal : Intact.
No. of coolers/boxes : 3	Temperature : 19.2'C - Ice Bricks present
Receipt Detail :	No. of samples received / analysed : 18 / 18

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 exists.

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.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA025-SW Suspended Solids - Saline Water	WATER - EK055G-SW Ammonia as N (Sea Water)	WATER - EK262PA-SW Total Nitrogen by Persulfate Digestion	WATER - EP008 Chlorophyll a	WATER - EP075 SIM PAH only SIM - PAH only	WATER - MW-2(ANZECC) 7 METALS ORC + LL Hg (Marine Water ANZECC)	WATER - MW-2T (ANZECC) 7 METALS ORC Total + LL Hg (Marine Water)
ES1627383-001	29-Nov-2016 14:15	W1_S_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-002	29-Nov-2016 14:00	W1_B_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-003	29-Nov-2016 12:45	W2_S_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-004	29-Nov-2016 12:30	W2_B_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-005	29-Nov-2016 13:50	CB1_S_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-006	29-Nov-2016 13:30	CB1_B_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-007	29-Nov-2016 12:15	MU1_S_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-008	29-Nov-2016 12:00	MU1_B_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-009	29-Nov-2016 11:00	BAY1_S_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-010	29-Nov-2016 10:45	BAY1_B_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-011	29-Nov-2016 09:40	BAY2_S_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-012	29-Nov-2016 09:30	BAY2_B_29/11/16	✓	✓	✓	✓	✓	✓	✓
ES1627383-013	29-Nov-2016 10:20	ADCP03_2_29/11/16	✓						
ES1627383-014	29-Nov-2016 10:18	ADCP03_10_29/11/16	✓						
ES1627383-015	29-Nov-2016 11:40	ADCP01_2_29/11/16	✓						
ES1627383-016	29-Nov-2016 11:37	ADCP01_10_29/11/16	✓						
ES1627383-017	29-Nov-2016 13:05	ADCP02_2_29/11/16	✓						
ES1627383-018	29-Nov-2016 13:02	ADCP02_10_29/11/16	✓						

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA045 Turbidity	WATER - EK267PA-SW Total Phosphorus by Persulfate Digestion	WATER - TPH TRH (C6-C40)
ES1627383-001	29-Nov-2016 14:15	W1_S_29/11/16	✓	✓	✓
ES1627383-002	29-Nov-2016 14:00	W1_B_29/11/16	✓	✓	✓
ES1627383-003	29-Nov-2016 12:45	W2_S_29/11/16	✓	✓	✓
ES1627383-004	29-Nov-2016 12:30	W2_B_29/11/16	✓	✓	✓
ES1627383-005	29-Nov-2016 13:50	CB1_S_29/11/16	✓	✓	✓
ES1627383-006	29-Nov-2016 13:30	CB1_B_29/11/16	✓	✓	✓

[illegible]

- Email luke.finley@elgin.com.au

- [illegible]



CHAIN OF CUSTODY

ALS Laboratory, please tick →

□ Sydney: 277 Woodpark Rd. Smithfield NSW 2136
Ph: 02 8234 6556 E: samples.sydney@alsenviro.com

□ Brisbane: 32 Sham St. Stafford QLD 4055
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com

□ Melbourne: 2-4 Westall Rd. Springvale VIC 3171
Ph: 03 9545 0600 E: samples.melbourne@alsenviro.com

□ Perth: 10 Hed Way. Malaga WA 6060
Ph: 08 9208 7655 E: samples.perth@alsenviro.com

□ Newcastle: 5 Portgum Rd. Warabrook NSW 2284
Ph: 02 4908 9433 E: samples.newcastle@alsenviro.com

□ Townsville: 14-15 Desma Ct. Boffle QLD 4818
Ph: 07 4756 0800 E: samples.townsville@alsenviro.com

□ Adelaide: 2-1 Burnt Rd. Rosebank SA 5095
Ph: 08 4359 0800 E: samples.adelaide@alsenviro.com

□ Launceston: 27 Wellington St. Launceston TAS 7250
Ph: 03 6331 2154 E: samples.launceston@alsenviro.com

CLIENT: ELGIN ASSOCIATES		TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)		FOR LABORATORY USE ONLY (Circle)	
OFFICE: 1st Floor 45-47 Church Street, BEGA, NSW 2550		ALC QUOTE NO.: ME411/16 V4		COC SEQUENCE NUMBER (Circle)	
PROJECT: Eden Baseline Marine Water Quality		COC: ① 2 3 4 5 7		Gustody Sample Intended? Yes No N/A	
ORDER NUMBER:		OF: 1 ② 3 4 5 7		Yes (see frozen ice bricks present upon receipt) Yes No N/A	
PROJECT MANAGER: NICHOLAS YEE		CONTACT PH: 0400 365 234		Random Sample Temperature on Receipt: °C	
SAMPLER: Elgin Associates		SAMPLER MOBILE:		Other comment:	
COC emailed to ALS? YES (NO)		RELINQUISHED BY: N. Yee		RECEIVED BY: Dolly	
Email Reports to: nick.yee@elgin.com.au		DATE/TIME: 29/11/16		DATE/TIME: 30/11/16 9.45	
Email Invoice to: nick.yee@elgin.com.au		DATE/TIME: 30/11/16		DATE/TIME:	
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: 16-30					
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
1	W1_S_29/11/2016	29/11/16 1415	Saline W	3P, 1SP, 2AP, 2VS, 3AG	11
2	W1_B_29/11/2016	29/11/16 1400	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
3	W2_S_29/11/2016	29/11/16 1245	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
4	W2_B_29/11/2016	29/11/16 1230	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
5	CB1_S_29/11/2016	29/11/16 1300	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
6	CB1_B_29/11/2016	29/11/16 1330	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
7	MU1_S_29/11/2016	29/11/16 1215	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
8	MU1_B_29/11/2016	29/11/16 1200	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
9	BAY1_S_29/11/2016	29/11/16 1100	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
10	BAY1_B_29/11/2016	29/11/16 1045	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
11	BAY2_S_29/11/2016	29/11/16 940	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
12	BAY2_B_29/11/2016	29/11/16 930	Saline W	3P, 1SP, 2AP, 2VS, 1AG	9
TOTAL					110

Water Container Codes: P = Unpreserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic, VS = VOA Vial Sulfuric Preserved, SP = Sulfuric Preserved Plastic

Environmental Division
Sydney
Work Order Reference
ES1627383



Telephone: + 61-2-8784 8555

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney 277 Woodpan Rd. Smithfield NSW 2176
 Ph: 02 8784 8555 E: samples.sydney@aiserviro.com

☐ Newcastle 5 Protegen Rd. Waratah NSW 2204
 Ph: 02 4308 5423 E: samples.newcastle@aiserviro.com

☐ Brisbane: 32 Shand St, Stafford Qld 4055
Ph: 07 324 7222 E: samples@drdane@bigpond.com

☐ Townsville: 14-15 Desne St, Boyle Qld 4818
Ph: 07 4756 6800 E: townsville@drdane@bigpond.com

E1 Melbourne: 2-4 Wesley Rd, Springvale VIC 3171
 Ph 03 9549 9600 E samples.melbourne@siserviro.com
 E2 Adelaide: 2-1 Burns Rd, Pooraka SA 5005
 Ph 08 8368 0300 E adelaide@siserviro.com

■ Perth: 10 Hod Way, Malaga WA 6060
 Ph: 08 9208 7655 E: samples.perth@aisenviro.com
 ■ Launceston: 27 Warrington St Launceston TAS 7250
 Ph: 08 3231 2154 E: launceston@aisenviro.com

CLIENT: ELGIN ASSOCIATES		TURNAROUND REQUIREMENTS :		FOR LABORATORY USE ONLY (Circle)	
OFFICE: 1st Floor 45-47 Church Street, BEGA, NSW 2550		(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)		Custody Seal intact? Yes No N/A	
PROJECT: Eden Baseline Marine Water Quality		ALS QUOTE NO.: ME/411/16 V4		Freeze / frozen ice bricks present upon receipt? Yes No N/A	
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)		Random Sample Temperature on Receipt: C	
PROJECT MANAGER: NICHOLAS YEE		CONTACT PH: 0400 365 234		Other comment:	
SAMPLER: Elgin Associates		SAMPLER MOBILE:		RECEIVED BY:	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		DATE/TIME:	
Email Reports to : nick.yee@elgin.com.au		RELINQUISHED BY:		DATE/TIME:	
Email Invoice to : nick.yee@elgin.com.au		N. Yee		DATE/TIME:	
		DATE/TIME: 29/11/16		DATE/TIME:	
		16:30		DATE/TIME:	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

[illegible]

Water Container Codes: P = Unpreserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; VS = VOA Vial Sulfuric Preserved; SP = Sulfuric Preserved Plastic

CERTIFICATE OF ANALYSIS

Work Order : **ES1701119**
Client : **ELGIN ASSOCIATES PTY LTD**
Contact : **MR NICK YEE**
Address : **PO BOX 829**
 BEGA NSW, AUSTRALIA 2550
Telephone : **+61 02 8003 4590**
Project : **Eden Baseline Marine Water Quality**
Order number : **----**
C-O-C number : **----**
Sampler : **ELGIN**
Site : **----**
Quote number : **ME/411/16 V4**
No. of samples received : **12**
No. of samples analysed : **12**

Page : 1 of 12
Laboratory : Environmental Division Sydney
Contact : Carol Walsh
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-3-8549 9608
Date Samples Received : 18-Jan-2017 10:10
Date Analysis Commenced : 18-Jan-2017
Issue Date : 25-Jan-2017 16:54



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
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General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

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

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EG093: It is recognised that total concentration is less than dissolved for Arsenic on sample ES1701119 #002. However, the difference is within experimental variation of the methods.
- EK055G: LOR raised for (Ammonia) due to sample matrix.
- 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

				W1_S_17/1/17	W1_B_17/1/17	W2_S_17/1/17	W2_B_17/1/17	CB1_S_17/1/17
Client sampling date / time				17-Jan-2017 12:00	17-Jan-2017 11:45	17-Jan-2017 11:30	17-Jan-2017 11:10	17-Jan-2017 12:45
Compound	CAS Number	LOR	Unit	ES1701119-001	ES1701119-002	ES1701119-003	ES1701119-004	ES1701119-005
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	1	mg/L	<1	<1	<1	<1	<1
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.5	0.4	0.3	0.3	0.4
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	1.8	2.1	1.9	2.0	1.9
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS								
Arsenic	7440-38-2	0.5	µg/L	2.0	2.0	2.2	2.1	2.2
Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L	<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	0.6
Zinc	7440-66-6	5	µg/L	<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water								
Ammonia as N	7664-41-7	0.02	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
EK262A: Total Nitrogen								
Total Nitrogen as N	----	0.05	mg/L	0.15	0.18	0.14	0.15	0.17
EK267A: Total Phosphorus (Persulfate Digestion)								
Total Phosphorus as P	----	0.005	mg/L	<0.005	0.006	<0.005	<0.005	<0.005
EP008: Chlorophyll a & Pheophytin a								
Chlorophyll a	----	1	µg/L	<1	<1	<1	<1	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1	µg/L	6.4	<1.0	1.9	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				W1_S_17/1/17	W1_B_17/1/17	W2_S_17/1/17	W2_B_17/1/17	CB1_S_17/1/17
Client sampling date / time				17-Jan-2017 12:00	17-Jan-2017 11:45	17-Jan-2017 11:30	17-Jan-2017 11:10	17-Jan-2017 12:45
Compound	CAS Number	LOR	Unit	ES1701119-001	ES1701119-002	ES1701119-003	ES1701119-004	ES1701119-005
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	1.6	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	3.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	11.0	<0.5	1.9	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	460	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	1830	350	430	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	2290	350	430	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	880	<100	110	<100	<100
>C16 - C34 Fraction	----	100	µg/L	1360	220	280	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	2240	220	390	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	880	<100	110	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				W1_S_17/1/17	W1_B_17/1/17	W2_S_17/1/17	W2_B_17/1/17	CB1_S_17/1/17
Client sampling date / time				17-Jan-2017 12:00	17-Jan-2017 11:45	17-Jan-2017 11:30	17-Jan-2017 11:10	17-Jan-2017 12:45
Compound	CAS Number	LOR	Unit	ES1701119-001	ES1701119-002	ES1701119-003	ES1701119-004	ES1701119-005
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	-----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	27.0	23.4	26.2	29.2	22.8
2-Chlorophenol-D4	93951-73-6	1	%	49.8	39.1	45.8	48.7	36.7
2,4,6-Tribromophenol	118-79-6	1	%	50.9	44.0	51.6	63.0	42.8
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	53.6	50.2	54.5	63.9	49.6
Anthracene-d10	1719-06-8	1	%	81.3	69.3	80.8	91.3	64.4
4-Terphenyl-d14	1718-51-0	1	%	80.6	68.3	78.5	86.9	65.8
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	117	123	113	118	121
Toluene-D8	2037-26-5	2	%	130	131	113	124	126
4-Bromofluorobenzene	460-00-4	2	%	111	113	100	102	109



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	CB1_B_17/1/17	MU1_S_17/1/17	MU1_B_17/1/17	BAY1_S_17/1/17	BAY1_B_17/1/17
Client sampling date / time					17-Jan-2017 12:30	17-Jan-2017 23:00	17-Jan-2017 10:30	17-Jan-2017 10:15	17-Jan-2017 09:50
Compound	CAS Number	LOR	Unit		ES1701119-006	ES1701119-007	ES1701119-008	ES1701119-009	ES1701119-010
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		<1	<1	<1	1	<1
EA045: Turbidity									
Turbidity	----	0.1	NTU		0.3	0.4	0.2	0.5	0.3
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		1.9	1.9	1.8	2.0	2.0
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		2.0	2.1	2.2	2.2	2.1
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Copper	7440-50-8	1	µg/L		<1	<1	<1	<1	<1
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	0.6	<0.5	<0.5
Zinc	7440-66-6	5	µg/L		<5	<5	<5	<5	<5
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.17	0.15	0.17	0.19	0.16
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		<0.005	<0.005	<0.005	0.005	<0.005
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	µg/L		<1	<1	<1	<1	<1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_17/1/17	MU1_S_17/1/17	MU1_B_17/1/17	BAY1_S_17/1/17	BAY1_B_17/1/17
Client sampling date / time				17-Jan-2017 12:30	17-Jan-2017 23:00	17-Jan-2017 10:30	17-Jan-2017 10:15	17-Jan-2017 09:50
Compound	CAS Number	LOR	Unit	ES1701119-006	ES1701119-007	ES1701119-008	ES1701119-009	ES1701119-010
				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				CB1_B_17/1/17	MU1_S_17/1/17	MU1_B_17/1/17	BAY1_S_17/1/17	BAY1_B_17/1/17
Client sampling date / time				17-Jan-2017 12:30	17-Jan-2017 23:00	17-Jan-2017 10:30	17-Jan-2017 10:15	17-Jan-2017 09:50
Compound	CAS Number	LOR	Unit	ES1701119-006	ES1701119-007	ES1701119-008	ES1701119-009	ES1701119-010
				Result	Result	Result	Result	Result
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	-----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	23.6	23.8	25.4	26.9	26.1
2-Chlorophenol-D4	93951-73-6	1	%	39.0	38.4	43.1	44.0	43.3
2,4,6-Tribromophenol	118-79-6	1	%	47.8	52.7	53.8	52.8	58.6
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	52.0	49.8	56.5	56.0	54.8
Anthracene-d10	1719-06-8	1	%	72.6	75.0	82.8	80.4	84.2
4-Terphenyl-d14	1718-51-0	1	%	70.3	79.0	79.7	78.5	82.1
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	115	127	124	119	116
Toluene-D8	2037-26-5	2	%	122	124	120	126	125
4-Bromofluorobenzene	460-00-4	2	%	103	112	109	107	106



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BAY2_S_17/1/17	BAY2_B_17/1/17	----	----	----
Client sampling date / time					17-Jan-2017 09:30	17-Jan-2017 09:15	----	----	----
Compound	CAS Number	LOR	Unit		ES1701119-011	ES1701119-012	-----	-----	-----
				Result	Result		----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	1	mg/L		<1	<1	----	----	----
EA045: Turbidity									
Turbidity	----	0.1	NTU		0.3	0.3	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	----	----	----
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.00004	mg/L		<0.00004	<0.00004	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		2.0	2.0	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L		<1	2	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Arsenic	7440-38-2	0.5	µg/L		2.2	2.2	----	----	----
Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	----	----	----
Chromium	7440-47-3	0.5	µg/L		<0.5	<0.5	----	----	----
Copper	7440-50-8	1	µg/L		<1	2	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	<0.2	----	----	----
Nickel	7440-02-0	0.5	µg/L		<0.5	<0.5	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L		<0.10	<0.10	----	----	----
EK262A: Total Nitrogen									
Total Nitrogen as N	----	0.05	mg/L		0.18	0.14	----	----	----
EK267A: Total Phosphorus (Persulfate Digestion)									
Total Phosphorus as P	----	0.005	mg/L		<0.005	<0.005	----	----	----
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	µg/L		1	<1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				BAY2_S_17/1/17	BAY2_B_17/1/17	----	----	----
Client sampling date / time				17-Jan-2017 09:30	17-Jan-2017 09:15	----	----	----
Compound	CAS Number	LOR	Unit	ES1701119-011	ES1701119-012	-----	-----	-----
				Result	Result	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	----	----	----
Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	----	----	----
Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	----	----	----
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	----	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	----	----	----



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				BAY2_S_17/1/17	BAY2_B_17/1/17	----	----	----
Client sampling date / time				17-Jan-2017 09:30	17-Jan-2017 09:15	----	----	----
Compound	CAS Number	LOR	Unit	ES1701119-011	ES1701119-012	-----	-----	-----
				Result	Result	----	----	----
EP080: BTEXN - Continued								
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	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1	%	28.3	26.5	----	----	----
2-Chlorophenol-D4	93951-73-6	1	%	44.4	43.3	----	----	----
2,4,6-Tribromophenol	118-79-6	1	%	58.2	55.3	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1	%	59.4	57.4	----	----	----
Anthracene-d10	1719-06-8	1	%	81.7	83.1	----	----	----
4-Terphenyl-d14	1718-51-0	1	%	78.1	80.6	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	127	120	----	----	----
Toluene-D8	2037-26-5	2	%	120	127	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	113	107	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

QUALITY CONTROL REPORT

Work Order	: ES1701119	Page	: 1 of 8
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Contact	: Carol Walsh
Address	: PO BOX 829 BEGA NSW, AUSTRALIA 2550	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8003 4590	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 18-Jan-2017
Order number	: ----	Date Analysis Commenced	: 18-Jan-2017
C-O-C number	: ----	Issue Date	: 25-Jan-2017
Sampler	: ELGIN		
Site	: ----		
Quote number	: ME/411/16 V4		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This 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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ravineel Chand		Sydney Organics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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 (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 731205)									
ES1701119-001	W1_S_17/1/17	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	<1	0.00	No Limit
ES1701119-010	BAY1_B_17/1/17	EA025-SW: Suspended Solids (SS)	----	1	mg/L	<1	2	84.0	No Limit
EA045: Turbidity (QC Lot: 725844)									
ES1701090-001	Anonymous	EA045: Turbidity	----	0.1	NTU	1.9	2.2	11.7	0% - 20%
ES1701119-008	MU1_B_17/1/17	EA045: Turbidity	----	0.1	NTU	0.2	0.2	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 727749)									
EP1700387-012	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	0.199	0.189	5.15	No Limit
ES1701119-008	MU1_B_17/1/17	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 730374)									
EP1700370-001	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG035T: Total Mercury by FIMS (QC Lot: 725743)									
ES1700969-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
ES1701119-007	MU1_S_17/1/17	EG035T-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 725546)									
ES1701119-001	W1_S_17/1/17	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	1.8	2.0	9.62	No Limit
		EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	28	139	No Limit
ES1701119-011	BAY2_S_17/1/17	EG093A-F: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-F: Arsenic	7440-38-2	0.5	µg/L	2.0	2.0	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: 725546) - continued									
ES1701119-011	BAY2_S_17/1/17	EG093A-F: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-F: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-F: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 725551)									
ES1701119-001	W1_S_17/1/17	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	2.0	2.0	0.00	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
ES1701119-011	BAY2_S_17/1/17	EG093A-T: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Lead	7439-92-1	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG093A-T: Arsenic	7440-38-2	0.5	µg/L	2.2	2.1	0.00	No Limit
		EG093A-T: Chromium	7440-47-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Nickel	7440-02-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EG093A-T: Copper	7440-50-8	1	µg/L	<1	<1	0.00	No Limit
		EG093A-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QC Lot: 725909)									
ES1701119-001	W1_S_17/1/17	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.10	<0.10	0.00	No Limit
ES1701119-010	BAY1_B_17/1/17	EK055G-SW: Ammonia as N	7664-41-7	0.02	mg/L	<0.10	<0.10	0.00	No Limit
EK262A: Total Nitrogen (QC Lot: 724703)									
ES1701119-001	W1_S_17/1/17	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.15	0.15	0.00	No Limit
ES1701119-011	BAY2_S_17/1/17	EK262PA-SW: Total Nitrogen as N	----	0.05	mg/L	0.18	0.18	0.00	No Limit
EK267A: Total Phosphorus (Persulfate Digestion) (QC Lot: 724704)									
ES1701119-001	W1_S_17/1/17	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.008	40.0	No Limit
ES1701119-011	BAY2_S_17/1/17	EK267PA-SW: Total Phosphorus as P	----	0.005	mg/L	<0.005	0.007	31.9	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 725768)									
ES1701119-001	W1_S_17/1/17	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1701119-010	BAY1_B_17/1/17	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 725768)									
ES1701119-001	W1_S_17/1/17	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1701119-010	BAY1_B_17/1/17	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 725768)									
ES1701119-001	W1_S_17/1/17	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

Page : 4 of 8
 Work Order : ES1701119
 Client : ELGIN ASSOCIATES PTY LTD
 Project : Eden Baseline Marine Water Quality



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: 725768) - continued									
ES1701119-001	W1_S_17/1/17	EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1701119-010	BAY1_B_17/1/17	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<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	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

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 Spike (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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
		LCS	Low	High
<1	150 mg/L	103	86	128
<1	1000 mg/L	96.3	80	112
<0.1	40 NTU	99.5	91	105
<0.00004	0.0001 mg/L	105	83	105
<0.00004	0.0001 mg/L	100	83	105
<0.00004	0.0001 mg/L	86.0	85	105
<0.5	10 µg/L	101	76	134
<0.2	10 µg/L	93.7	69	117
<0.5	10 µg/L	90.8	76	122
<1	10 µg/L	86.1	71	129
<0.2	10 µg/L	89.9	74	120
<0.5	10 µg/L	85.9	72	124
<5	10 µg/L	97.7	70	126
<0.5	10 µg/L	120	89	125
<0.2	10 µg/L	113	82	122
<0.5	10 µg/L	110	85	123
<1	10 µg/L	109	84	128
<0.2	10 µg/L	109	85	125
<0.5	10 µg/L	110	85	125
<5	10 µg/L	114	82	128
<0.02	0.5 mg/L	103	80	120
<0.05	1 mg/L	100	81	111
<0.005	0.44 mg/L	106	88	112



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP008: Chlorophyll (QCLot: 726066) - continued								
EP008: Chlorophyll a	----	1	mg/m³	<1	20 mg/m³	90.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 725504)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	68.2	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	70.4	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	70.8	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	70.2	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	78.7	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	73.1	64	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	70.7	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	74.9	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	70.8	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	73.0	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	70.1	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	82.7	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	67.1	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	66.6	60	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	70.3	61	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	68.7	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 725505)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	103	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	98.8	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	100	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 725768)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	90.0	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 725505)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	93.1	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	102	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	95.9	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 725768)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	90.6	75	127
EP080: BTEXN (QCLot: 725768)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	93.0	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	92.0	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	88.6	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	87.2	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	91.1	72	122

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
EG035F: Dissolved Mercury by FIMS (QCLot: 727749)							
EP1700387-013	Anonymous	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	77.0	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 730374)							
EP1700370-002	Anonymous	EG035F-LL: Mercury	7439-97-6	0.0001 mg/L	88.0	70	130
EG035T: Total Mercury by FIMS (QCLot: 725743)							
ES1700969-004	Anonymous	EG035T-LL: Mercury	7439-97-6	0.0001 mg/L	84.0	70	130
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 725546)							
ES1701119-002	W1_B_17/1/17	EG093A-F: Arsenic	7440-38-2	50 µg/L	101	70	130
		EG093A-F: Cadmium	7440-43-9	12.5 µg/L	94.9	70	130
		EG093A-F: Chromium	7440-47-3	50 µg/L	97.4	70	130
		EG093A-F: Copper	7440-50-8	50 µg/L	101	70	130
		EG093A-F: Lead	7439-92-1	50 µg/L	94.2	70	130
		EG093A-F: Nickel	7440-02-0	50 µg/L	101	70	130
		EG093A-F: Zinc	7440-66-6	50 µg/L	99.9	70	130
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 725551)							
ES1701119-002	W1_B_17/1/17	EG093A-T: Arsenic	7440-38-2	50 µg/L	118	70	130
		EG093A-T: Cadmium	7440-43-9	12.5 µg/L	108	70	130
		EG093A-T: Chromium	7440-47-3	50 µg/L	111	70	130
		EG093A-T: Copper	7440-50-8	50 µg/L	110	70	130
		EG093A-T: Lead	7439-92-1	50 µg/L	108	70	130
		EG093A-T: Nickel	7440-02-0	50 µg/L	106	70	130
		EG093A-T: Zinc	7440-66-6	50 µg/L	104	70	130
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water (QCLot: 725909)							
ES1701119-001	W1_S_17/1/17	EK055G-SW: Ammonia as N	7664-41-7	1 mg/L	125	70	130
EK262A: Total Nitrogen (QCLot: 724703)							
ES1701119-001	W1_S_17/1/17	EK262PA-SW: Total Nitrogen as N	----	0.5 mg/L	121	70	130
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 724704)							

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 Work Order : ES1701119
 Client : ELGIN ASSOCIATES PTY LTD
 Project : Eden Baseline Marine Water Quality



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
EK267A: Total Phosphorus (Persulfate Digestion) (QCLot: 724704) - continued							
ES1701119-001	W1_S_17/1/17	EK267PA-SW: Total Phosphorus as P	----	0.5 mg/L	88.7	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 725768)							
ES1701119-001	W1_S_17/1/17	EP080: C6 - C9 Fraction	----	325 µg/L	111	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 725768)							
ES1701119-001	W1_S_17/1/17	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	111	70	130
EP080: BTEXN (QCLot: 725768)							
ES1701119-001	W1_S_17/1/17	EP080: Benzene	71-43-2	25 µg/L	96.0	70	130
		EP080: Toluene	108-88-3	25 µg/L	102	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	101	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	102	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	103	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	98.9	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1701119	Page	: 1 of 9
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR NICK YEE	Telephone	: +61-3-8549 9608
Project	: Eden Baseline Marine Water Quality	Date Samples Received	: 18-Jan-2017
Site	: ----	Issue Date	: 25-Jan-2017
Sampler	: ELGIN	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12

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)					
PAH/Phenols (GC/MS - SIM)	0	18	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	18	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	18	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	18	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025-SW)	17-Jan-2017	----	----	----	24-Jan-2017	24-Jan-2017	✔	
W1_S_17/1/17,								W1_B_17/1/17,
W2_S_17/1/17,								W2_B_17/1/17,
CB1_S_17/1/17,								CB1_B_17/1/17,
MU1_S_17/1/17,								MU1_B_17/1/17,
BAY1_S_17/1/17,								BAY1_B_17/1/17,
BAY2_S_17/1/17,	BAY2_B_17/1/17							
EA045: Turbidity								
Clear Plastic Bottle - Natural (EA045)	17-Jan-2017	----	----	----	19-Jan-2017	19-Jan-2017	✔	
W1_S_17/1/17,								W1_B_17/1/17,
W2_S_17/1/17,								W2_B_17/1/17,
CB1_S_17/1/17,								CB1_B_17/1/17,
MU1_S_17/1/17,								MU1_B_17/1/17,
BAY1_S_17/1/17,								BAY1_B_17/1/17,
BAY2 S_17/1/17,	BAY2 B_17/1/17							



Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F-LL) W1_S_17/1/17, W1_B_17/1/17, W2_S_17/1/17, W2_B_17/1/17, CB1_S_17/1/17, CB1_B_17/1/17, MU1_S_17/1/17, MU1_B_17/1/17, BAY1_S_17/1/17, BAY1_B_17/1/17, BAY2_S_17/1/17, BAY2_B_17/1/17	17-Jan-2017	----	----	----	20-Jan-2017	14-Feb-2017	✓
EG035T: Total Mercury by FIMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG035T-LL) W1_S_17/1/17, W1_B_17/1/17, W2_S_17/1/17, W2_B_17/1/17, CB1_S_17/1/17, CB1_B_17/1/17, MU1_S_17/1/17, MU1_B_17/1/17, BAY1_S_17/1/17, BAY1_B_17/1/17, BAY2_S_17/1/17, BAY2_B_17/1/17	17-Jan-2017	----	----	----	23-Jan-2017	14-Feb-2017	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093A-F) W1_S_17/1/17, W1_B_17/1/17, W2_S_17/1/17, W2_B_17/1/17, CB1_S_17/1/17, CB1_B_17/1/17, MU1_S_17/1/17, MU1_B_17/1/17, BAY1_S_17/1/17, BAY1_B_17/1/17, BAY2_S_17/1/17, BAY2_B_17/1/17	17-Jan-2017	----	----	----	19-Jan-2017	16-Jul-2017	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093A-T) W1_S_17/1/17, W1_B_17/1/17, W2_S_17/1/17, W2_B_17/1/17, CB1_S_17/1/17, CB1_B_17/1/17, MU1_S_17/1/17, MU1_B_17/1/17, BAY1_S_17/1/17, BAY1_B_17/1/17, BAY2_S_17/1/17, BAY2_B_17/1/17	17-Jan-2017	19-Jan-2017	16-Jul-2017	✓	19-Jan-2017	16-Jul-2017	✓
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water							
Clear Plastic Bottle - Sulfuric Acid (EK055G-SW) W1_S_17/1/17, W1_B_17/1/17, W2_S_17/1/17, W2_B_17/1/17, CB1_S_17/1/17, CB1_B_17/1/17, MU1_S_17/1/17, MU1_B_17/1/17, BAY1_S_17/1/17, BAY1_B_17/1/17, BAY2_S_17/1/17, BAY2_B_17/1/17	17-Jan-2017	----	----	----	19-Jan-2017	14-Feb-2017	✓



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK262A: Total Nitrogen								
Clear Plastic Bottle - Natural (AS) (EK262PA-SW)		17-Jan-2017	18-Jan-2017	18-Jan-2017	✓	18-Jan-2017	18-Jan-2017	✓
W1_S_17/1/17,	W1_B_17/1/17,							
W2_S_17/1/17,	W2_B_17/1/17,							
CB1_S_17/1/17,	CB1_B_17/1/17,							
MU1_S_17/1/17,	MU1_B_17/1/17,							
BAY1_S_17/1/17,	BAY1_B_17/1/17,							
BAY2_S_17/1/17,	BAY2_B_17/1/17,							
EK267A: Total Phosphorus (Persulfate Digestion)								
Clear Plastic Bottle - Natural (AS) (EK267PA-SW)		17-Jan-2017	18-Jan-2017	18-Jan-2017	✓	18-Jan-2017	18-Jan-2017	✓
W1_S_17/1/17,	W1_B_17/1/17,							
W2_S_17/1/17,	W2_B_17/1/17,							
CB1_S_17/1/17,	CB1_B_17/1/17,							
MU1_S_17/1/17,	MU1_B_17/1/17,							
BAY1_S_17/1/17,	BAY1_B_17/1/17,							
BAY2_S_17/1/17,	BAY2_B_17/1/17,							
EP008: Chlorophyll a & Pheophytin a								
Opaque Plastic Bottle - Unpreserved (EP008)		17-Jan-2017	----	----	----	19-Jan-2017	19-Jan-2017	✓
W1_S_17/1/17,	W1_B_17/1/17,							
W2_S_17/1/17,	W2_B_17/1/17,							
CB1_S_17/1/17,	CB1_B_17/1/17,							
MU1_S_17/1/17,	MU1_B_17/1/17,							
BAY1_S_17/1/17,	BAY1_B_17/1/17,							
BAY2_S_17/1/17,	BAY2_B_17/1/17,							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))		17-Jan-2017	20-Jan-2017	24-Jan-2017	✓	23-Jan-2017	01-Mar-2017	✓
W1_S_17/1/17,	W1_B_17/1/17,							
W2_S_17/1/17,	W2_B_17/1/17,							
CB1_S_17/1/17,	CB1_B_17/1/17,							
MU1_S_17/1/17,	MU1_B_17/1/17,							
BAY1_S_17/1/17,	BAY1_B_17/1/17,							
BAY2 S_17/1/17,	BAY2_B_17/1/17,							



Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)		17-Jan-2017	20-Jan-2017	24-Jan-2017	✓	23-Jan-2017	01-Mar-2017	✓
W1_S_17/1/17, W2_S_17/1/17, CB1_S_17/1/17, MU1_S_17/1/17, BAY1_S_17/1/17, BAY2_S_17/1/17,	W1_B_17/1/17, W2_B_17/1/17, CB1_B_17/1/17, MU1_B_17/1/17, BAY1_B_17/1/17, BAY2_B_17/1/17							
Amber VOC Vial - Sulfuric Acid (EP080)		17-Jan-2017	19-Jan-2017	31-Jan-2017	✓	19-Jan-2017	31-Jan-2017	✓
W1_S_17/1/17, W2_S_17/1/17, CB1_S_17/1/17, MU1_S_17/1/17, BAY1_S_17/1/17, BAY2_S_17/1/17,	W1_B_17/1/17, W2_B_17/1/17, CB1_B_17/1/17, MU1_B_17/1/17, BAY1_B_17/1/17, BAY2_B_17/1/17							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		17-Jan-2017	20-Jan-2017	24-Jan-2017	✓	23-Jan-2017	01-Mar-2017	✓
W1_S_17/1/17, W2_S_17/1/17, CB1_S_17/1/17, MU1_S_17/1/17, BAY1_S_17/1/17, BAY2_S_17/1/17,	W1_B_17/1/17, W2_B_17/1/17, CB1_B_17/1/17, MU1_B_17/1/17, BAY1_B_17/1/17, BAY2_B_17/1/17							
Amber VOC Vial - Sulfuric Acid (EP080)		17-Jan-2017	19-Jan-2017	31-Jan-2017	✓	19-Jan-2017	31-Jan-2017	✓
W1_S_17/1/17, W2_S_17/1/17, CB1_S_17/1/17, MU1_S_17/1/17, BAY1_S_17/1/17, BAY2_S_17/1/17,	W1_B_17/1/17, W2_B_17/1/17, CB1_B_17/1/17, MU1_B_17/1/17, BAY1_B_17/1/17, BAY2_B_17/1/17							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		17-Jan-2017	19-Jan-2017	31-Jan-2017	✓	19-Jan-2017	31-Jan-2017	✓
W1_S_17/1/17, W2_S_17/1/17, CB1_S_17/1/17, MU1_S_17/1/17, BAY1_S_17/1/17, BAY2 S_17/1/17,	W1_B_17/1/17, W2_B_17/1/17, CB1_B_17/1/17, MU1_B_17/1/17, BAY1_B_17/1/17, BAY2_B_17/1/17							



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)							
Ammonia as N (Saline Water)	EK055G-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	3	25	12.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	18	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	2	12	16.67	9.52	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	18	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids - Saline Water	EA025-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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							
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N (Saline Water)	EK055G-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	18	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS - Low Level	EG035T-LL	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	1	12	8.33	4.76	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	18	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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
Suspended Solids - Saline Water	EA025-SW	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Turbidity	EA045	WATER	In house: Referenced to APHA 2130 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Mercury by FIMS - Low Level	EG035F-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS - Low Level	EG035T-LL	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals in Saline Water -Suite A by ORC-ICPMS	EG093A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm 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)
Total Metals in Saline Water Suite A by ORC-ICPMS	EG093A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. 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)
Ammonia as N (Saline Water)	EK055G-SW	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen/Persulfate Digestion/Ultra-Trace/Saline	EK262PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus/Persulfate Digestion/ Ultra Trace /Saline	EK267PA-SW	WATER	In house: Referenced to APHA 4500-P J. Persulfate Method for Simultaneous Determination of Total Nitrogen and Total Phosphorus. As sample is digested with persulfate under alkaline conditions yielding orthophosphate and nitrate. Following digestion, analytes are determined by flow injection analysis. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.



Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to 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	In house: Referenced to 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	In house: Referenced to 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
Persulfate Digestion for UT TN and TP for FIA/Saline	EK262/267PA-SW Prep	WATER	In house: Referenced to APHA 4500 P - J. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1701119

Client : ELGIN ASSOCIATES PTY LTD Contact : MR NICK YEE Address : PO BOX 829 BEGA NSW, AUSTRALIA 2550 E-mail : nick.yee@elgin.com.au Telephone : +61 02 8003 4590 Facsimile : +61 03 8648 6336 Project : Eden Baseline Marine Water Quality Order number : --- C-O-C number : --- Site : --- Sampler : ELGIN	Laboratory : Environmental Division Sydney Contact : Carol Walsh Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : carol.walsh@alsglobal.com Telephone : +61-3-8549 9608 Facsimile : +61-2-8784 8500 Page : 1 of 3 Quote number : EM2016ELGASS0003 (ME/411/16 V4) QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 18-Jan-2017 10:10	Issue Date : 18-Jan-2017
Client Requested Due : 25-Jan-2017	Scheduled Reporting Date : 25-Jan-2017
Date	

Delivery Details

Mode of Delivery : Undefined	Security Seal : Intact.
No. of coolers/boxes : 3	Temperature : 24.2'C - Ice Bricks present
Receipt Detail :	No. of samples received / analysed : 12 / 12

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 exists.

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.

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

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA025-SW Suspended Solids - Saline Water	WATER - EK055G-SW Ammonia as N (Sea Water)	WATER - EK262PA-SW Total Nitrogen by Persulfate Digestion	WATER - EP008 Chlorophyll a	WATER - EP075 SIM PAH only SIM - PAH only	WATER - MW-2(AZCECC) 7 METALS ORC + LL Hg (Marine Water ANZECC)	WATER - MW-2T (ANZECC) 7 METALS ORC Total + LL Hg (Marine Water)
ES1701119-001	17-Jan-2017 12:00	W1_S_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-002	17-Jan-2017 11:45	W1_B_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-003	17-Jan-2017 11:30	W2_S_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-004	17-Jan-2017 11:10	W2_B_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-005	17-Jan-2017 12:45	CB1_S_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-006	17-Jan-2017 12:30	CB1_B_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-007	17-Jan-2017 23:00	MU1_S_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-008	17-Jan-2017 10:30	MU1_B_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-009	17-Jan-2017 10:15	BAY1_S_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-010	17-Jan-2017 09:50	BAY1_B_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-011	17-Jan-2017 09:30	BAY2_S_17/1/17	✓	✓	✓	✓	✓	✓	✓
ES1701119-012	17-Jan-2017 09:15	BAY2_B_17/1/17	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA045 Turbidity	WATER - EK267PA-SW Total Phosphorus by Persulfate Digestion	WATER - TPH TRH (C6-C40)
ES1701119-001	17-Jan-2017 12:00	W1_S_17/1/17	✓	✓	✓
ES1701119-002	17-Jan-2017 11:45	W1_B_17/1/17	✓	✓	✓
ES1701119-003	17-Jan-2017 11:30	W2_S_17/1/17	✓	✓	✓
ES1701119-004	17-Jan-2017 11:10	W2_B_17/1/17	✓	✓	✓
ES1701119-005	17-Jan-2017 12:45	CB1_S_17/1/17	✓	✓	✓
ES1701119-006	17-Jan-2017 12:30	CB1_B_17/1/17	✓	✓	✓
ES1701119-007	17-Jan-2017 23:00	MU1_S_17/1/17	✓	✓	✓
ES1701119-008	17-Jan-2017 10:30	MU1_B_17/1/17	✓	✓	✓
ES1701119-009	17-Jan-2017 10:15	BAY1_S_17/1/17	✓	✓	✓
ES1701119-010	17-Jan-2017 09:50	BAY1_B_17/1/17	✓	✓	✓
ES1701119-011	17-Jan-2017 09:30	BAY2_S_17/1/17	✓	✓	✓
ES1701119-012	17-Jan-2017 09:15	BAY2_B_17/1/17	✓	✓	✓

CHAIN OF CUSTODY

ALS Laboratory, please tick →

☐ Sydney, 277 Woodward St, Sydney NSW 2000
 Ph: 02 974 6333 Fax: 02 974 6334
☐ Newcastle, 5 Ross St, Newcastle NSW 2300
 Ph: 02 498 4433 Fax: 02 498 4434
☐ Melbourne, 277 Woodward St, Melbourne VIC 3000
 Ph: 03 939 9000 Fax: 03 939 9001
☐ Adelaide, 201 Rundle St, Adelaide SA 5000
 Ph: 08 8359 0000 Fax: 08 8359 0001
☐ Brisbane, 30 Grand St, Brisbane QLD 4000
 Ph: 07 3243 2222 Fax: 07 3243 2223
☐ Perth, 10 Wood St, Perth WA 6000
 Ph: 08 9446 7855 Fax: 08 9446 7856
☐ Launceston, 27 Wellington St, Launceston TAS 7250
 Ph: 03 6331 2150 Fax: 03 6331 2151

CLIENT: ELGIN ASSOCIATES

OFFICE: 1st Floor 45-47 Church Street, BEGA, NSW 2550

PROJECT: Eden Baseline Marine Water Quality

ORDER NUMBER:

PROJECT MANAGER: NICHOLAS YEE

SAMPLER: Equi3300

DATE: 17/11/17

TIME: 16:30

LOCATION: 17/11/17

TIME: 16:30

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TURNAROUND REQUIREMENTS:

(Standard turnaround for some tests e.g. Ultra Trace Metals)

ALS QUOTE NO: MEA11116VZ

CONTRACT NO: 170036524

SAMPLER MOBILE

FED FORM 100

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FOR LABORATORY USE ONLY (Circle)

Quadrant Seal intact?

Free box/frozen box broken present upon receipt?

Reason Sample Temperature incorrect?

Other comment

RECEIVED BY:

DATE/TIME:

RELINQUISHED BY:

DATE/TIME:

RELINQUISHED BY:

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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).

EA045 - Turbidity

EA025-SW - Suspended solids in seawater (1mg/L LOR)

EK055A-SW - Ammonia in seawater

EK262PA-SW - Total Nitrogen (incl. NOx and TKN) - low level (ALS Sydney)

EK067-SW - Total P in seawater

EP008 - Chlorophyll a (ALS Sydney)

MW-2 (ANZECC 95%) - ultra trace dissolved metals in marine water - As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, LL (ALS Sydney)

MW-2T (ANZECC 95%) - ultra trace Total metals in marine water - As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, LL (ALS Sydney)

EP075B (SIM - PAH

EP071/80 - TPH (C6-C40)

Additional Information

HT

Environmental Division

Sydney

Work Order Reference

ES1701119

Barcode

Telephone : + 61-2-8784 8655

Water Container Codes: P = Unpreserved Plastic, AG = Amber Glass Unpreserved, AP = Airfreight Unpreserved Plastic, VS = VOA Vial Sulfuric Preserved, SP = Sulfuric Preserved Plastic