



Selfs Point Sewage Treatment Plant (STP) Expansion Project:
12 Selfs Point Road and part of 10 Selfs Point Road
Contaminated Site Assessment Report

Prepared for
TASWATER CDO
169 MAIN RD
MOONAH TAS 7009

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EXECUTIVE SUMMARY

Elgin Associates Pty Ltd (Elgin) was engaged by ERA Planning and Environment (ERA) to undertake a contaminated site assessment (CSA) for the Selfs Point Sewage Treatment Plant (STP) expansion project, Tasmania. The investigations are required for the TasWater Capital Delivery Office for the preparation of an Environmental Impact Statement (EIS). The findings from the CSA are outlined below.

The land subject to the proposed expansion includes the following:

- 12 Selfs Point Rd (existing STP), owned by TasWater, and
- part of 10 Selfs point Rd (known as the New Town Wetlands), owned by Hobart City Council (HCC) and located to the south and southwest of the STP.

The objectives of the investigation were to:

- Assess the contamination status of groundwater at the site that may be encountered during construction works and identify if concentrations exceed adopted human health and/or environmental criteria.
- Identify if landfill gas is potentially present which may have implications for the proposed STP design and inform whether further investigation into landfill gas is required.
- Identify the location of former underground storage tanks (USTs) (if any).
- Complete a conceptual site model (CSM) for the site.
- Provide a Tier 1 assessment of environmental and health risks and make recommendations for control measures that may be required during construction and operation.

Elgin undertook a gap analysis for the project in March 2022, that included a review of previous investigations completed at the site, to assess if further investigations were required. Based on the Elgin (2022) letter report, several investigations were recommended for the second stage of assessment, including soil, groundwater and landfill gas assessment. This report presents the findings of the groundwater assessment, including a preliminary landfill gas screen, a conceptual site model (CSM), recommendations and control measures to be implemented during construction and operation of the facility, to inform the EIS.

The data gaps identified and recommendations for further sampling are presented below. The recommendations in grey have been completed as part of this report:

Timing	Location	Media	Recommendations for Further Works
Before construction	Northern portion of 12 Selfs Point Road	General	1a. Confirm the location of the UST in the context of proposed earthworks and gather existing information (such as decommissioning information). Recommend UST is decommissioned in-situ, with eduction of residual diesel and foam filling of tank.
	Northern portion of 12 Selfs Point Road, Council depot, 10 Selfs Point Road	Soil	1b. Assessment of soil stockpiles by an appropriately qualified environmental consultant and classification for waste disposal or on-site re-use. Stockpile sampling would be based on the number and size of stockpiles, in accordance with Tasmanian EPA Information Bulletin 105 (IB105). Analytes would include contaminants identified during previous investigations (including the contaminants listed in Table 2 of IB105) and presence/absence for asbestos should suspected asbestos containing material (ACM) be identified.

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Timing	Location	Media	Recommendations for Further Works
	Wetlands, 10 Sels Point Road	Groundwater	2a. Assessment of groundwater for hydrocarbons, including LNAPL, tributyltin, perfluoroalkyl and polyfluoroalkyl substances (PFAS) and dissolved methane and carbon dioxide (CO ₂) (additional investigations to be undertaken by GHD as part of due diligence assessment). The GHD report should be reviewed by Elgin when available and these recommendations updated.
	Wetlands, 10 Sels Point Road	Landfill Gas	2b. Preliminary assessment of landfill gas in subsurface and in nearby existing underground asset locations (stormwater drains, service alignments, utility pits and groundwater monitoring wells) on and surrounding the site.
	Wetlands, 10 Sels Point Road	Landfill Gas	2c. Rapid Screening Risk Assessment (RSRA) of landfill gas of the site, in the context of the Sels Point STP project, in order to identify risks and management and mitigation strategies for final design and construction. Works would include the installation of landfill gas bores around the perimeter of the Wetland parcel to assess presence of landfill gas in the subsurface at the boundary. This data would also inform the scoping of a broader Landfill Gas Risk Assessment (LGRA).
	Wetlands, 10 Sels Point Road and adjacent land parcels	Landfill Gas	2d. Completion of a LGRA. A more thorough assessment that considers the broader environment beyond the immediate implications of the STP project. Noting it is not yet clear how this parcel of work will be commissioned or the areas it would cover.
During construction	Northern portion of 12 Sels Point Road	Soil	3a. Assess excavated soils on-site during earthworks. Soils should be stockpiled in a designated holding area, under the guidance of an appropriately qualified environmental consultant, with any identified landfill/waste material separated from other soils. All soils should be classified for waste disposal or on-site re-use. Analytes would include the contaminants identified during previous investigations, with selected samples tested for PFAS (sum of PFOS & PFHxS and PFOA), leachable contaminants and presence/absence for asbestos should suspected ACM be identified.
	Wetlands, 10 Sels Point Road	Soil	3b. As above. It is proposed that the upper 2 m of dredged fill/clay capping/topsoil material is removed and stockpiled separately from any underlying waste/landfill material. Tributyltin should be included in the analytical suite. Sampling and testing for acid sulfate soils (ASS) should be undertaken if disturbance of over 100 T of soil was proposed in the wetlands area, to confirm the absence of ASS.

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The main findings of the assessment were as follows:

- The underground storage tank (UST) on the site was identified. The UST contains approximately 2,700 L of diesel fuel and does not appear to be used or decommissioned. The UST is not located in an area of proposed expansion works. It is recommended that the UST is decommissioned in-situ, with education and disposal of the residual diesel fuel and foam filling of the tank.
- An anecdotal 1,000 L above-ground storage tank (AST) was noted to have been present in the past, near a historic truck wash bay. The AST was not present during the inspection. It was also noted that effluent was historically discharged into a drainage line that was located in the vicinity of groundwater wells MW1 and MW2. These areas are not expected to be within the vicinity of the proposed expansion works (in the northern section), but there may be some historic impacted soils present, should these areas be disturbed.
- Soil assessment was undertaken as part of previous investigations at 10 and 12 Selfs Point Road carried out by other parties; only limited investigations were undertaken in the wetlands. No soil assessment was undertaken as part of this investigation. While previous investigations did not identify impacted soil at the site above human health investigation levels (with the exception of soil in the northern portion at around 4.5 m below ground level (mbgl) in depth), screening of soil data against the IB105 criteria identified exceedances for metals and polycyclic aromatic hydrocarbons (PAH) above Level 1 and 2 criteria in the fill material across the site. Also, the underlying landfill waste material at the site has not been fully characterised and the existing stockpiles on the site have not been assessed. Previous investigations and the groundwater assessment undertaken for this report did not find any evidence of ASS onsite; however this would need to be confirmed if extensive soil excavation was proposed.
- Groundwater at the site was relatively shallow (between 0.21 and 1.25 mAHD on 12 Selfs Point Road and between 1.24 and 1.56 mAHD within the wetlands at 10 Selfs Point Road) and was inferred to flow towards the north (towards New Town Bay). The groundwater table was likely to lie within the lower portion of the landfill waste material in the wetlands at 10 Selfs Point Road and within the upper fill material present on the STP at 12 Selfs Point Road.
- Contaminants detected in groundwater beneath the site included nickel, zinc, PFOS, hydrocarbons, PAHs, dissolved methane and carbon dioxide:
 - The majority of contaminants were reported below the adopted human health criteria for recreational water use or contact during construction works. The only exception was benzo(a)pyrene in groundwater at MW5s.
 - Nickel, zinc, PFOS and PAH contaminants were reported in groundwater beneath the site that were at concentrations above marine ecosystem protection guidelines. These results indicate a potential risk to the river and aquatic receptors along the shoreline to the north of the site if these contaminants are present at similar concentrations at the point of discharge. Data from new bores to be installed by GHD adjacent to this shoreline will assist in assessing this actual risk.
 - Hydrocarbon contamination in groundwater previously identified at bore MW5s was at lower concentrations in 2022 when compared to 2016. The results did not indicate the presence of LNAPL and indicated that there is a low risk of hydrocarbon vapour intrusion into structures built in vicinity of MW5s as part of the STP expansion works.

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- Dissolved methane and total carbon dioxide was reported in groundwater in all seven bores, with highest concentrations reported in shallow bores and are a line of evidence for the presence of landfill gas in the subsurface of the site.
 - The corrosion classification results for piling installation indicate non-aggressive or mildly corrosive groundwater. The chloride:sulfate ratio does not indicate the presence of ASS at any monitored locations.
- The historical use of the wetlands portion of the site identified the potential for the presence of landfill gas beneath the site, which was confirmed from the results of a preliminary landfill gas screening that was undertaken as part of this assessment, with key findings that included:
 - Methane was detected in the subsurface at bores MW5s (53.9% v/v) and MW6 (45.9% v/v) on the former landfill at the wetlands at elevated levels that exceeded both the action level (1.25% v/v) under the Landfill Sustainability Guide (2004), and methane's lower (5% v/v) and upper (15% v/v) explosive limits published by Safe Work Australia. These results indicate that methane explosive risks may be present should subsurface concentrations fall to within the explosive limit range or fugitive emissions reach the ground surface. Carbon dioxide was also elevated in MW5s and MW6.
 - Methane sweeps of nearby utility pits on two occasions reported the presence of methane between 1.0 ppm and 99,000 ppm (9.9% v/v), and exceeded the action level of 10,000ppm. This upper reading exceeded the action level of 10,000 ppm for landfill gas in a service alignment by a factor of 10 and was within the 5-15% v/v explosive range. The highest concentration of methane was located in vicinity of the tarmac adjacent to the Bridge Club building.
- The preliminary landfill gas screening indicates potential human health and explosive risks from elevated methane and carbon dioxide measured in the subsurface of the wetlands, and that there are also potential migration pathways to nearby utility pits and service alignments (such as stormwater). At a minimum, the results indicate that further investigation and risk assessment is required, in particular on the parcel of land where the rowing sheds and Bridge Club are located.
- The level of risk posed by the landfill gas should be assessed by a two-stage process: (Stage 1) a RSRA, then (Stage 2) a more detailed LGRA.
 1. The RSRA would cover risks to the expansion of the STP onto the wetlands area, including:
 - a) More accurate measurement of landfill gas in subsurface and its potential lateral extent by dedicated landfill gas bores, particularly at the perimeter to inform migration of LFG away from the inferred wetlands source.
 - b) Assessing the risks from the STP expansion design in and near the wetlands area, including installation (if any) of new subsurface pits and/or service lines. For example, where the design includes laying of concrete slab(s), these may present impermeable barrier(s) that could result in LFG present in the unsaturated geology to migrate laterally, increasing the risk to onsite and off-site buildings and utility lines.
 - c) Preliminary assessment of whether landfill gas control measures could be required for the construction of the STP expansion.
 - d) Provide the RSRA for consideration as part of the land acquisition due diligence for the wetlands portion of the site - currently underway by GHD for TasWater - so that potential liabilities associated with landfill gas that may be inherited through such an acquisition are understood.

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2. A more detailed and comprehensive LGRA would investigate landfill gas beyond the wetlands area, with considerations that include:
 - a) Defining the boundary of the landfilling area to determine the potential extent of the LFG source.
 - b) Use of Service Locators and detailed plans to establish the exact alignment of services and utilities such as water, sewage, stormwater, and communications.
 - c) Reviewing the construction details of buildings to understand the likelihood of preferential pathways to be present that may allow LFG inside the building envelope.
 - d) Installation and monitoring of dedicated landfill gas bores adjacent to buildings that already exist, and/or monitoring of the internal air quality to understand risk to occupants.
 - e) Screening for fugitive landfill gas emissions in service alignments, utility pits, nearby buildings, and from passive surface emissions (hotspots) from the known landfill area using methane detection equipment.
- The elevated concentrations of methane and carbon dioxide detected at the wetlands in the subsurface at MW5s and MW6, and detection of methane in service alignments away from the wetlands in the recreational land to the west is considered to trigger the Notification of a Contaminated Site under Section 74B of *Environmental Management and Pollution Control Act 1994* (EMPCA) which requires the owner or occupier of that land to promptly inform the Director, EPA, when they become aware of the contamination. It is not known if EPA Tasmania is already aware of the presence of landfill gas in the subsurface at the wetlands portion of the site.
- A CSM was developed as a basis for a qualitative assessment of human health and ecological risks from soil, groundwater and landfill gas for the STP expansion. A number of environmental management measures were identified for the STP expansion works to manage potential risks identified in the CSM. The majority of these can be included as part of a Construction Environmental Management Plan (CEMP) for the works, including soil and groundwater management. Other measures include the RSRA and LGRA as recommended above, with an outcome of these assessments including gas mitigation measures (if any) that may need to be included in the design for the STP expansion.

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GLOSSARY

ASC-NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999, amended 2013
ASS	Acid Sulfate Soils
CEMP	Construction Environmental Management Plan
CSM	Conceptual Site Model
CSU	Contaminated Sites Unit
DQO	Data Quality Objectives
EPA	Environment Protection Authority
PAH	Polycyclic Aromatic Hydrocarbons
PCL	Potentially Contaminated Land
PFAS	Per and polyfluorinated alkyl substances
PSI	Preliminary Site Investigation
SPOCAS	Suspension Peroxide Oxidation Combined Acidity and Sulfur
SPS	Sewage Pump Station
STP	Sewage Treatment Plant
N/A	Not Applicable
VOC	Volatile Organic Contaminants
ASC-NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999, amended 2013

1 INTRODUCTION

1.1 Background

Elgin Associates Pty Ltd (Elgin) was engaged by ERA Planning and Environment (ERA) to undertake a contaminated site assessment (CSA) for the Selfs Point Sewage Treatment Plant (STP) expansion project, Tasmania. The investigations are required for the preparation of an EIS. The land subject to the proposed expansion includes the following:

- 12 Selfs Point Rd (existing STP), owned by TasWater, and
- part of 10 Selfs point Rd (known as the New Town Wetlands), owned by Hobart City Council (HCC) and located to the south and southwest of the STP.

Elgin undertook a gap analysis for the project in March 2022, that included a review of previous investigations completed at the site, in order to assess if further investigations were required. The findings were provided in the following letter report:

- Selfs Point STP Expansion – Environmental Data Gap Analysis and Recommendations for Further Sampling. Prepared for ERA Planning & Environment by Elgin Associates, 10 March 2022 (Elgin, 2022).

Based on the Elgin (2022) letter report, a number of investigations were recommended for the second stage of assessment, including soil, groundwater and landfill gas assessment. This report presents the findings of the groundwater assessment, including a preliminary landfill gas screen, a conceptual site model (CSM), recommendations and control measures to be implemented during construction and operation of the facility, in order to inform the EIS.

The site layout and location of the proposed infrastructure are shown in attached **Figure A1** and are outlined below in **Table 1**. For the purposes of this report, the site is defined as the proposed project footprint within 10 and 12 Selfs Point Road (referred to as the ‘wetlands’ and the ‘northern portion’ respectively).

1.2 Objectives

The objectives of the investigation were to:

- Assess the contamination status of groundwater at the site that may be encountered during construction works and identify if concentrations exceed adopted human health and/or environmental criteria.
- Identify if landfill gas is potentially present which may have implications for the proposed STP design and inform whether further investigation into landfill gas is required.
- Identify the location of former underground storage tanks (USTs) (if any).
- Complete a CSM for the site.
- Provide a Tier 1 assessment of environmental and health risks and make recommendations for control measures that may be required during construction and operation.

The outcome of the investigation will inform the EIS and the management outcomes required for development and operation of an extension to the Selfs Point facility.

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1.3 Scope of works

The scope of work included the following:

- Conduct a site inspection to confirm presence / absence of USTs and/or refueling infrastructure;
- Complete a groundwater monitoring event (GME) at seven existing groundwater monitoring wells for the contaminants of potential concern (COPC);
- Collect preliminary landfill gas (LFG) screening data from the existing groundwater well network and accessible on and off site underground service pits;
- Preparation of a CSA report to provide an assessment of environmental and health risks which included (but not be limited to):
 - Summary of the gap analysis and recommendations
 - Results of GME and preliminary LFG screening
 - Conceptual Site Model
 - Risk assessment
 - Recommendations for further works, if required, and
 - Control measures to be implemented during construction and operation works.

This report has been prepared with reference to relevant environmental legislation, standards and guidance including (but not limited to):

- Tasmania *Environmental Management and Pollution Control Act 1994* (EMPCA);
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZG 2018, and
- *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (amended 2013)* ('ASC-NEPM').

SITE DETAILS

2 SITE DETAILS

The site is located between the Derwent River and Selfs Point Road, New Town.

Land details are provided in **Table 1** below.

Table 1 Land Details

Property Address	Property ID	Authority	Current Land Use	Proposed Land Use*
12 Selfs Point Road	3286956	TasWater	Selfs Point STP	Selfs Point STP expansion to the area of open space to the north of the property
10 Selfs Point Road	3189590	Local Government Authority	New Town Bay Wetlands Rugby Park Council depot TasCabling depot	The portion known as New Town Bay Wetlands is proposed to be acquired by TasWater for Selfs Point STP expansion to the south

* As described in Drawing 0089-DWG-SELST01-GA-C-0001 dated 21/02/2022

The northern portion of 12 Selfs Point Road (north of the current STP infrastructure) consists of an open space area used for stockpiling of soils and building waste and for the irrigation of treated sewage during peak periods (pers. comm Scott Lucas - TasWater). The area is fenced with no public access. The southern portion of 12 Selfs Point Road consists of the STP plant and associated infrastructure, internal road network and the Selfs Point Laboratory. The laboratory is located on the north western side of the STP, adjacent to the north of the wetlands at 10 Selfs Point Road.

The northern portion of 10 Selfs Point Road (known as the New Town Bay Wetlands) has been most recently used as an artificial wetland, with a portion along Selfs Point Road that has been used by Council for the stockpiling of waste materials. The wetland and stockpiling area are fenced, although there is public access available to the wetlands off Marine Esplanade. The wetland area of 10 Selfs Point Road is heavily vegetated with grasses and blackberries. The remaining portions of 10 Selfs Point Road are used for playing fields (Rugby Park), the Council Depot and commercial use (TasCabling depot).

2.1 Current and proposed land use and zoning

Zoning under the Tasmanian Interim Planning Scheme (2015) as shown on the LIST (2022) is as follows:

- 10 Selfs Point Rd – 18.0 Recreation
- 12 Selfs Point Rd – 28.0 Utilities

2.2 Surrounding land use and zoning

The site is located on the banks of the River Derwent in an industrial area, which includes commercial / industrial land, public open space, a cemetery and recreational land. A summary of surrounding land use is provided in **Table 22**.

Table 2: Surrounding land use

Direction	Zoning	Current land use	Additional information
North	29.0 Environmental Management	River Derwent	

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Direction	Zoning	Current land use	Additional information
East	31.0 Port & Marine	Commercial / Industrial	Former Shell Fuel storage 16 Selfs Point Rd, Crown Land. Unknown if site is active.
South	17.0 Communities	Commercial/ Industrial and then Public open space	HCC depot, animal welfare centre and then cemetery - 27 Queens Walk, New Town, Crown Land
West	18.0 Recreation	Public open space	Recreation - Rugby Grounds and Sports Buildings - Rugby Park, 10 Selfs Point Road

2.3 Topography and Geology

The site has an elevation of approximately 0 to 10 meters Australian Height Datum (m AHD) and is generally level at 12 Selfs Point Road, and elevated, but undulating due to the constructed wetland on the 10 Selfs Point Road portion.

The site is underlain by Cenozoic cover sequences area overlain by reclaimed material of man-made deposits (1:25,000 digital geology map of Tasmania; The List, 2022).

2.4 Soil landscape and acid sulfate soils

The site is dominated by reclaimed land (fill, including historic municipal landfilling), overlaying marine sediments, and deeper basalt. A brief summary of the soil profile is provided in **Table 3** below.

Table 3. Generalised soil profile across the site.

Depth (mbgl)	Soil Profile
12 Selfs Point Road	
0.0-5.0	Fill: high plasticity clay with gravel, cobbles, bricks, basalt and dolerite (reclaimed land).
5.0-12.0	Marine sediment layers of silt, clay, sand and cobbles with shell fragments and weathered basalt and dolerite
11.5-21.0	Continuous basalt
10 Selfs Point Road (wetlands)	
0.0-2.0	Fill: Silty sand and clayey sand
2.0-8.0	Fill: Landfill waste material (various rubbish, brick, wood, metal and paper) through a matrix of silt and clayey sand
8.0-20.0	Organic silt and clay lenses with occasional shell fragments over weathered basalt and dolerite
20.0	Continuous basalt

Note: The soil profile across the site has been documented in the gap analysis report (Elgin, 2022).

2.5 Wetland Construction (circa 2000)

The wetlands were constructed on the site of a historic municipal landfill, which extended from the bay to the hockey fields (now located on the western side of the Brooker Highway), encompassing Rugby Park. This

SITE DETAILS

municipal landfill was known as Hobarts' largest and longest running landfill which operated from around 1930 to 1963. Accounts of municipal waste, trade waste and building rubble was deposited here (Tamvakis, M. 1994).

It was understood that the wetland was constructed on the site at 10 Sells Point Road, in order to reduce the level of contaminated sediment in New Town Bay. Clay material was used to cap the landfill area and also used as a clay base for the deposition of dredge spoils. The dewatered dredged material was placed on top and shaped to create channels and crests. The area was then covered with approximately 0.3 m of a mixture of soil and organic rich sewage biosolids. The maximum depth of the constructed wetland above the landfill material was designed to be 2 m. It was also noted that the local water table was at a depth of around 4 m relative to the channels of the wetland (Koehnken, 2013).

The site is mapped in the ASRIS Atlas of Australian Sulfate Soils (ASS) as having a low probability of ASS occurrence (6-70%). It is also mapped as having low potential for coastal ASS (the LIST, 2022).

2.6 Hydrogeology, surface water and groundwater

The site is located southeast of the New Town Rivulet. New Town Rivulet drains north easterly to New Town Bay and the River Derwent. New Town Rivulet is located approximately 100 m to the north-west and New Town Bay is located approximately 20 m to the north, and west.

The land at 12 Sells Point Road was comprised of unsealed open space, internal roads and the STP infrastructure on-site. A stormwater drain was present near the site office. A swale was present towards the north east of the land, which drained towards New Town Bay. Surface water from rainfall would partly infiltrate groundwater and partly run into the stormwater drain on-site or run-off towards New Town Rivulet and New Town Bay. The land at 10 Sells Point Road was unsealed open space and all surface water was expected to infiltrate to groundwater, with some run-off towards New Town Rivulet.

Groundwater beneath the site would be likely a mix of fresh and sea water, reflecting the nearby estuarine receptor and New Town Rivulet (fresh water).

The Groundwater Information Access Portal was accessed on 20th April 2022 which identified no registered groundwater bores within 1 km of the site. The nearest registered groundwater bore was 1.6km to the southeast (DNRET, 2022).

In 2016, a total of seven groundwater monitoring bores were installed on the site (four on 12 Sells Point Road and three installed on 10 Sells Point Road). Groundwater was encountered in all bores and was found to be shallow (between 0.686 and 1.753 RL at 12 Sells Point Road and 0.721 and 1.033 RL at 10 Sells Point Road). Groundwater conductivity was found to be elevated, reflecting connectivity with the River Derwent.

2.7 Vegetation, flora and fauna

Vegetation at the site is described in TASVEG 3.0 as 'agricultural, urban and exotic vegetation (FUR - urban areas)' (The LIST, 2022). The northern portion is covered by grass, gravel, buildings, concrete and asphalt. The wetland area is vegetated with a mix of native shrubs and grasses as well as some weed species, such as blackberries.

A Natural Values Assessment was completed by ERA for the project (ERA, 2021), which reported that:

- No native vegetation communities were present on the site and the entire area was classed as modified land.

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- The site has a very high representation of introduced flora with five declared weed species noted. No threatened flora was observed and there was a very low probability of any threatened species occurring within the site.
- The site does not provide notable or important habitat for threatened fauna and very limited habitat for non-threatened fauna. There was a slight potential for the swift parrot to occur due to the nectar resources provided by the blue gums, however it was not considered significant nor likely to be nesting or breeding habitat.

It was recommended that:

- The *Eucalyptus globulus* (blue gums) are retained onsite where possible.
- Weed management prior to construction activities are undertaken.

SUMMARY OF SITE HISTORY AND POTENTIAL CONTAMINATION

3 SUMMARY OF SITE HISTORY AND POTENTIAL CONTAMINATION

3.1 Summary of Previous Investigations (extract from Elgin, 2022)

Information of the history of the site and previous investigations was reviewed in a gap analysis prepared by Elgin (2022). In summary of that report, the following previous investigations are detailed below. The review of L. Koehnken (2013) has been encapsulated above in **Section 2.5** above and has not been detailed here.

CH2M HILL (2013)

CH2M HILL completed a preliminary ESA (Phase I ESA) for the STP site at 12 Selfs Point Road. It was reported that the site was reclaimed between 1966 and 1972 by infilling with material from unknown origins, which was expected to include municipal landfill and other rubble. Since 1972 the site had been used as an STP operated by HCC and since 2009, operated by Southern Water (now TasWater). A number of recognised environmental conditions (RECs) were identified for the site, which included:

- The site was completely reclaimed using fill and rubble of unknown origin and historically, ash from onsite incineration of rags and screenings. Dried sewage biosolids had also been disposed onsite. COPC included: heavy metals, asbestos, ammonia and polycyclic aromatic hydrocarbons (PAH).
- Use of the site as an STP included historical operational practices such as chemical use and storage, and onsite disposal of chemicals and treatment by-products such as screenings, sludge and grit which may have impacted the subsurface. Additionally, spills and releases of wastewater may have also directly contributed to subsurface contamination. COPC included: heavy metals, ammonia, PAH, *E.coli* and faecal coliforms.
- There was potential for surface soils across the site to have been impacted as a result of airborne heavy metal containing dusts from offsite operations including from the Nyrstar zinc smelter.
- Operations at adjacent sites may have contributed to contamination at the site. Activities of concern include historical land reclamation, especially adjacent to the west where the former HCC landfill was operated and which had also been used as a repository for heavy-metal contaminated dredge spoil. Petroleum storage operations have also dominated Selfs Point east of the site. COPC include total petroleum hydrocarbons (TPH), heavy metals, volatile organic compounds (VOC) and benzene, toluene, ethylbenzene and xylene (BTEX).
- One 2,000 L UST was located at the site and was used for storage of diesel. The tank replaced another 2,000 L UST previously removed from the site (same location). The condition of both the existing and historical UST was unknown and no soil or groundwater sampling information was available for either the historical or operational UST. COPC include TPH, BTEX and heavy metals.
- Dumping and poor housekeeping was observed in the north-eastern portion of the site on unpaved ground. COPC include asbestos, TPH and heavy metals.

It was recommended that an ESA be completed to assess the contamination status of the site relative to the identified RECs. It was further recommended that the practice of dumping rubble and other refuse in the north-eastern area of the site be reviewed, and best practices such as the use of bins or other containment be investigated to remove the potential for activities in the area to contribute to an ongoing potential for subsurface contamination at the site.

SUMMARY OF SITE HISTORY AND POTENTIAL CONTAMINATION

EM&C (2016)

EM&C completed a detailed ESA (Phase 2 ESA) at the Selfs Point STP and the New Town Bay Wetlands site located respectively at 12 and 10 Selfs Point Road, New Town. A review of previous investigations (prior to 2016) was undertaken by EM&C which identified the following:

- 12 Selfs Point Road (STP site) was used for reclamation purposes using fill, rubble and ash from the onsite incineration of rags and screenings and dried sewage biosolids. Potential deposition of metal impacted dust from the nearby Nystar zinc smelter and the presence of an operational 2kL diesel UST and another abandoned/removed 2kL diesel UST was noted. The locations of the UST(s) were not reported and a request/search for Worksafe records was not undertaken.
- The described history of the wetlands located at 10 Selfs Point Road was consistent with Koehnken (2013)
- A former Shell Fuel Terminal was located at 8 Selfs Point Road, which was adjacent to the site along the north eastern boundary.

Intrusive investigations were undertaken and consisted of 54 surface samples tested in the field by x-ray fluorescence (XRF), with 25% of these analysed by a laboratory. It was reported that six soil bores were drilled and converted to groundwater wells, and another shallow groundwater well installed.

It is noted that not all the drill logs were attached to the report with some missing information, such as soil logs and the depth of some bores. The installation of the shallow/deep groundwater wells (MW5d and MW5s) are not fully understood as the information provided did not indicate evidence of separate aquifers or strata with indicators of impact.

Soil and groundwater samples were analysed for a number of analytes, with only the relevant data reviewed here.

The locations of all investigations relevant to the 75% concept design are shown on attached **Figures 2 and 3**. Only the locations within, or in close proximity to the 75% concept design are discussed below.

The observed soil profile on the site was as shown in **Table 4**.

Table 4 Soil profile derived from previous bore logs

Depth (mbgl)	Soil Profile
12 Selfs Point Road	
0.0-5.0	Fill: high plasticity clay with gravel, cobbles, bricks, basalt and dolerite
5.0-12.0	Marine sediment layers of silt, clay, sand and cobbles with shell fragments and weathered basalt and dolerite
11.5-21.0	Continuous basalt
10 Selfs Point Road (wetlands)	
0.0-2.0	Fill: Silty sand and clayey sand

SUMMARY OF SITE HISTORY AND POTENTIAL CONTAMINATION

Depth (mbgl)	Soil Profile
2.0-8.0	Fill: Landfill waste material (various rubbish, brick, wood, metal and paper) through a matrix of silt and clayey sand
8.0-20.0	Organic silt and clay lenses with occasional shell fragments over weathered basalt and dolerite
20.0	Continuous basalt

It was noted that the wetland sits approximately 3-4 m higher than the Selfs Point STP and slopes gently to the north-west.

Soil

A comparison by Elgin of the surface soil XRF data with the laboratory results indicated inconsistencies between the two datasets, which included XRF results differing by a factor of 4 or more. Therefore the XRF data was not relied upon for the purposes of this review, other than highlighting the presence of copper and zinc, and to a lesser extent chromium, across the surface soils of the site. Of the investigations undertaken, 7 surface soil samples, 3 soil bores and 4 groundwater wells were located in, or close to, the 50% concept design area.

A review of the results relevant to the 50% design concept (75% design not received at the time of this review) indicated that reported concentrations were below the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (amended 2013) ('ASC-NEPM') HSL D and HIL D (commercial/industrial) criteria, with the exception of lead soil concentrations within SPBH16-01/MW1 at 4.4-4.5 mbgl and at SPBH16-03/MW3 at 4.9-5.0 mbgl in the northern portion of the site.

Screening of the data against the Tasmanian EPA Information Bulletin No.105 (IB105) criteria identified that:

- Soils in the Northern portion of 12 Selfs Point Road (SPBH16-01/MW1 and SPBH-03/MW3; GR22, GR24 and GR28) – some metals (arsenic, cadmium and lead) reported concentrations above Level 2 criteria at depths of 4.4-4.5m bgl in SPBH16-01/MW1 and 4.9-5.0m bgl in SPBH16-03/MW3. Total PAH and benzo(a)pyrene (BaP) were reported above Level 1 or Level 2 criteria from 2 m and below in these locations. The corresponding bore logs for these locations were not attached to the report, however, according to the general soil profile logged (above), these depths correspond to the fill layer present in the northern area. No samples were analysed below 5 mbgl. Analysis of surface soil samples across the area identified exceedances of Level 1 criteria for cadmium, chromium, copper, lead, zinc and mercury. A detection of chromium above Level 2 was also identified at GR28.
- Soils in 10 Selfs Point Road (wetlands) (SPBH16-05/MW5s and MW5d and SPBH16-06/MW6; GR39, GR44, GR47 and GR51) – zinc was reported above Level 1 criteria at SPBH16-05/6.2-6.3 mbgl, and copper and zinc were reported above Level 1 criteria in SPBH16-06/4.1-4.2 and 7.2-7.3 mbgl. BaP, TPH C₁₀-C₃₆ and mercury were also reported above Level 1 criteria in the deeper sample SPBH16-06/7.2-7.3 mbgl. These exceedances correspond to the landfilling layer (2.0-8.0 mbgl) present in the wetlands. Metal concentrations were lower in samples collected at 9 – 10 mbgl. Analysis of surface

SUMMARY OF SITE HISTORY AND POTENTIAL CONTAMINATION

soil samples across the area reported exceedances of Level 1 criteria for cadmium, chromium, copper, lead, zinc and mercury.

Asbestos presence was tested in some surface soils and was not detected. No samples were tested for asbestos in soil at depth.

Groundwater

Groundwater was found to be present between 1.3 and 1.6 m below ground level (mbgl) (between 0.68 and 1.75 mAHD) in the northern STP site and between 0.72 and 1.03 mAHD in the southern wetlands area.

- Northern portion of 12 Sells Point Road – some dissolved metals (copper -MW1 only, nickel and zinc) and ammonia were reported above the ANZECC 95% trigger values for protection of marine ecosystems in MW1 and MW3.
- 10 Sells Point Road (wetlands) - concentrations of nickel in MW5s, MW5d and MW6, and zinc and naphthalene (in MW5s only), were reported above the ANZECC 95% trigger values for protection of marine ecosystems. It is noted that elevated concentrations of Total Recoverable Hydrocarbons (TRH) in the >C₁₀-C₁₆ (4.15 mg/L), >C₁₆-C₃₄ (63.7 mg/L) and >C₃₄-C₄₀ (15.5 mg/L) fractions were reported in MW5d (>C₁₀-C₁₆ hydrocarbons higher than the solubility limit at 3 mg/L) and elevated concentrations of naphthalene (0.054 mg/L), BaP (0.498 mg/L) and total PAH (6.41 mg/L) in MW5s. The presence of hydrocarbons at concentrations above the theoretical solubility limit at MW5d indicates the potential for groundwater at this location to be impacted with Light Non-Aqueous Phase Liquid (LNAPL) – that is, free phase hydrocarbons floating on top of the water table. It is noted that the hydrocarbon concentrations reported in MW5s/MW5d may have met the EPA requirements to notify of fuel contamination in groundwater as outlined at: <https://epa.tas.gov.au/business-industry/regulation/underground-fuel-tanks/reporting-fuel-contamination-in-groundwater>. It is not known whether a notification was made to EPA by EM&C or its client.

Acid Sulfate Soils

Six samples were collected for ASS, including two samples from the wetlands. Elgin's interpretation of the results is that although reduced inorganic sulfur was present at some locations, soils at the site contain high levels of acid neutralizing capacity, sufficient to neutralise acid produced. Overall, no sample exceeded the action criteria in the Tasmanian Acid Sulfate Soils Management Guidelines (2009). Groundwater pH, sulphate and chloride levels showed no indications of ASS at the site.

GHD (2021)

GHD completed a contamination assessment as part of a geotechnical investigation program for the concept design of the STP. The project site comprised the two subject areas: the STP at 12 Sells Point Road and the adjacent wetlands at 10 Sells Point Road. Intrusive investigations across the northern and southern portions of the site were completed using large boreholes / test pits as part of geotechnical investigations and to better understand the fill material beneath the site. Locations were excavated up to a depth of 2 mbgl.

The topography of the areas was found to be consistent with the descriptions provided by EM&C (2016) and Koehnken (2013). The observed soil profile on the site was as follows:

SUMMARY OF SITE HISTORY AND POTENTIAL CONTAMINATION

Northern portion of 12 Selfs Point Road – Investigations (CPT07-CPT09 and CPT14) indicated the following general strata:

- Topsoil or fill to –0.2 mbgl
- Fill material from –0.2 – base of investigation

10 Selfs Point Road (wetlands) – Investigations (CPT01-CPT04 and CPT13) identified:

- Topsoil to –0.2 mbgl
- FILL - Sandy Silt from –0.2-0.5 mbgl
- FILL – CLAY, gravelly/sandy from –0.2-1.2 mbgl
- FILL – CLAY with landfill from –0.8-base of investigation

Samples collected were analysed for 8 metals, TRH, BTEX, naphthalene and PAH. Only one sample per location was analysed. The results were consistent with EM&C (2016) where no soil concentrations exceeded the NEPM (2013) commercial/industrial human health criteria (HIL-D/HSL-D or direct contact).

Screening of the data against IB105 criteria identified that:

- Northern portion of 12 Selfs Point Road – In soil, elevated metals (predominantly zinc with some chromium) and BaP were reported above Level 1 criteria in all locations (vicinity of 0.45 m to 1.6m depth), with one location (CPT7_0.6 m) exceeding Level 2 criteria for BaP.
- 10 Selfs Point Road (wetlands) – In soil, elevated metals (predominantly zinc and cadmium with some nickel, copper, mercury, chromium and arsenic) were reported above Level 1 criteria in all locations (vicinity of 0.9 to 1.7 m depth). Concentrations of BaP above Level 1 criteria were also reported with two locations above Level 2 criteria (CPT1_1.5 and CPT13_1.5).

It is noted that CPT1_1.5 reported the highest concentrations of BaP and other PAHs, including detections of TRH C₁₀-C₃₆, which corresponded to the landfill material layer present on site.

3.2 Data Gaps and Recommendations

The planned STP expansion includes the northern portion of 12 Selfs Point Road and the wetland area of 10 Selfs Point Road. During construction, excavated material may require off-site disposal, such as during earthworks, but the exact depths of excavations and volumes of material are currently unknown.

Groundwater in some parts of the site is shallow and may be intercepted during construction depending on excavation depths.

Based on the potential sources of contamination and data gaps identified in the below **Table 5** recommendations for further investigations were provided and have been broken down into those required prior to construction works commencing and those that should be undertaken during earthworks. These are summarised in **Table 6**

The recommendations for further investigations that have been addressed in this report, are highlighted in grey in **Table 6** and discussed in **Section 4**.

SUMMARY OF SITE HISTORY AND POTENTIAL CONTAMINATION

Table 5 Sources of contamination and data gaps

Area	Potential Sources of Contamination	Data Gaps	Identified Potential Risks
Northern portion of 12 Sells Point Road	Fill material present to approx. 5 mbgl. Stockpiles of waste soil and materials. UST and abandoned/decommissioned UST (locations unknown). Potential dumping of sewage treatment wastes. Impacted groundwater.	Leachability analyses have not been undertaken to further inform the potential waste classification of waste soils contaminated by metals and/or benzo(a) pyrene (BaP). The potential presence of Per- and Poly-Fluorinated Alkyl Substances (PFAS) in soil or groundwater has not been considered. These are common contaminants in STP's. Stockpiles have not been assessed for contamination and presence of waste materials. Location and status of abandoned/decommissioned UST is unknown. Groundwater may require management should excavations extend deeper than 0.6 mAHD.	Potential environmental impacts from discharge of contaminated groundwater or sediment/stockpile runoff to adjacent surface waters or land. Potential safety risk from encountering abandoned/decommissioned UST during excavations. Potential environmental impacts from abandoned/decommissioned UST if found to be leaking hydrocarbon liquids. Potential human health risk from exposure of workers to contaminants if present in excavated soils, soil stockpiles and/or ingress of shallow contaminated groundwater into excavations. Financial risk from landfill disposal of waste soils at higher contaminated soil classification level.
10 Sells Point Road (wetlands)	Reclaimed land (~8.0 mbgl to bedrock), landfill material (~2.0-8.0 mbgl), dredged spoil and use of site for disposal of sewage (~2.0 mbgl to surface). Stockpiles of waste soil and materials and potential ACM	Limited investigations of the area characterising the underlying landfill waste material strata and associated contamination. There is also potential for the presence of landfill gas (i.e. methane, carbon dioxide, hydrogen sulfide) from the degradation of the landfilled waste materials (which is understood to include putrescible wastes). Leachability analyses have not been undertaken to further inform the potential waste classification of soils contaminated by metals and/or BaP.	Potential environmental impacts from discharge of contaminated groundwater or sediment/stockpile runoff to adjacent surface waters or land. Potential risk from landfill gas if present from degradation of landfill waste. Potential human health risk from exposure of workers to contaminants (including asbestos) if

SUMMARY OF SITE HISTORY AND POTENTIAL CONTAMINATION

Area	Potential Sources of Contamination	Data Gaps	Identified Potential Risks
	along Selfs Point Road vicinity. Impacted groundwater (elevated hydrocarbon concentrations and potential LNAPL).	No data on the potential presence of tributyltin (TBT) or PFAS contamination in soils and/or groundwater, from historical landfilling of dredge sediments and STP biosolids. Stockpiles have not been assessed for contamination and it is unknown if these are to be removed prior to land acquisition. There is potential for stockpiles to contain suspected ACM, based on observations from site inspection. Only a limited assessment of ASS was undertaken in the wetlands (two samples). Although the results did not indicate the presence of ASS, additional investigations should be undertaken if disturbance of more than 100 tonne of soil was proposed, given the elevated sulfur concentrations and high organic loads previously reported. Groundwater requires further investigation, including to the south (adjacent Rugby Park) to assess for potential offsite impacts from this direction. The reasons for installation of shallow and deep groundwater wells are not fully understood as the information provided did not indicate evidence of separate aquifers, particularly in the context of the reported impacts. The presence of elevated concentrations of hydrocarbons in wells MW5s and MW5d indicates the potential for the presence of LNAPL; it is not known if this hydrocarbon contamination is localised or more extensive. Some hydrocarbons detected at elevated concentrations included volatile C10-C16 fractions and naphthalene which may pose a vapour intrusion risk. Groundwater may require management if excavations extended deeper than 0.6 mAHd.	present in excavated soils, soil stockpiles and/or ingress of shallow contaminated groundwater into excavations. Financial risk from landfill disposal of waste soils at higher contaminated soil classification level. Potential vapour intrusion risk from elevated concentrations of volatile hydrocarbons reported in groundwater.

SUMMARY OF SITE HISTORY AND POTENTIAL CONTAMINATION

Table 6 Data Gaps and Recommendations for Further Sampling

Timing	Location	Media	Recommendations for Further Investigation
Before construction	Northern portion of 12 Sels Point Road	General	1a. Confirm the location of the UST in the context of proposed earthworks and gather existing information (such as decommissioning information).
	Northern portion of 12 Sels Point Road, Council depot, 10 Sels Point Road	Soil	1b. Assessment of soil stockpiles by an appropriately qualified environmental consultant and classification for waste disposal or on-site re-use. Stockpile sampling would be based on the number and size of stockpiles, in accordance with IB105. Analytes would include contaminants identified during previous investigations (including the contaminants listed in Table 2 of IB105) and presence/absence for asbestos should suspected ACM be identified.
	Wetlands, 10 Sels Point Road	Groundwater	2a. Assessment of groundwater for hydrocarbons, including LNAPL, tributyltin, PFAS and dissolved methane and CO ₂ (additional investigations to be undertaken by GHD as part of their due diligence investigation). The GHD report should be reviewed by Elgin when available and these recommendations updated.
	Wetlands, 10 Sels Point Road	Landfill Gas	2b. Preliminary screening assessment of methane at existing underground asset locations (stormwater drains, service alignments, utility pits, and groundwater monitoring wells) on and surrounding the site.
	Wetlands, 10 Sels Point Road	Landfill Gas	2c. Rapid Screening Risk Assessment (RSRA) of landfill gas of the site, in the context of the Sels Point STP project, in order to identify risks and management and mitigation strategies for final design and construction. Works would include the installation of landfill gas bores around the perimeter of the Wetland parcel to assess presence of landfill gas in the subsurface at the boundary. This data would also inform the scoping of a broader Landfill Gas Risk Assessment (LGRA) – see below.
	Wetlands, 10 Sels Point Road and adjacent land parcels	Landfill Gas	2d. Completion of a Landfill Gas Risk Assessment (LGRA). A more thorough LGRA that considers the broader environment beyond the immediate implications of the STP project. Noting it is not yet clear how this parcel of work will be commissioned or the areas it would cover.
During construction	Northern portion of 12 Sels Point Road	Soil	3a. Assess excavated soils on-site during earthworks. Soils should be stockpiled in a designated holding area, under the guidance of an appropriately qualified environmental consultant, with any identified landfill/waste material separated from other soils. All soils should be classified for waste disposal or on-site re-use. Analytes would include the contaminants identified during previous investigations, with selected

SUMMARY OF SITE HISTORY AND POTENTIAL CONTAMINATION

Timing	Location	Media	Recommendations for Further Investigation
			samples tested for PFAS (sum of PFOS & PFHxS and PFOA), leachable contaminants and presence/absence for asbestos should suspected ACM be identified.
	Wetlands, 10 Selfs Point Road	Soil	3b. As above. It is proposed that the upper 2 m of dredged fill/clay capping/topsoil material is removed and stockpiled separately from any underlying waste/landfill material. Tributyltin should be included in the analytical suite. Sampling and testing for ASS should be undertaken if disturbance of over 100 T of soil was proposed in the wetlands area, to confirm the absence of ASS.

SITE INVESTIGATION METHODOLOGY

4 SITE INVESTIGATION METHODOLOGY

4.1 Relevant Guidelines and Standards

The assessment was undertaken in general accordance with the following guidelines and documents:

- AWQG, 2018. Australian Water Quality Guidelines.
- CIRIA, 2007. Assessing Risk Posed by Hazardous Ground Gases to Buildings, Publication C665, Construction Industry Research and Information Association (CIRIA).
- CRC Care, 2011. Technical Report No.10; Health Screening levels for petroleum hydrocarbons in soil and groundwater.
- DPIWE, 2004. Landfill Sustainability Guide. Tasmania September 2004.
- EPA Victoria, 2000. Groundwater Sampling Guidelines, Publication 669: Environment Protection Authority.
- EPA Victoria, 2018. Landfill Gas Fugitive Emissions Monitoring Guidelines, Publication 1684.
- EPA Victoria, 2015. Best Practice Environmental Management (BEPM); Siting, design, operation and rehabilitation of landfills. Publication 788.3.
- HEPA, 2020. PFAS National Environmental Management Plan 2.0.
- National Environmental Protection (Assessment of Site Contamination) Measure 1999 (amended 2013) ('ASC-NEPM')
- NHMRC, 2008. Recreational Water Quality Guidelines.
- NHMRC, 2019. Guidance of PFAS in Recreational Water
- NSW EPA, 2020. Sampling Design Part 1 and Part 2; Contaminated Land Guidelines. Draft for consultation.
- Tasmanian EPA, 2021. DGVs for Aquatic Ecosystems of the Derwent Estuary-Bruny Catchment.
- Tasmanian EPA, 2020. EMPCA (UPSS) Regulations.

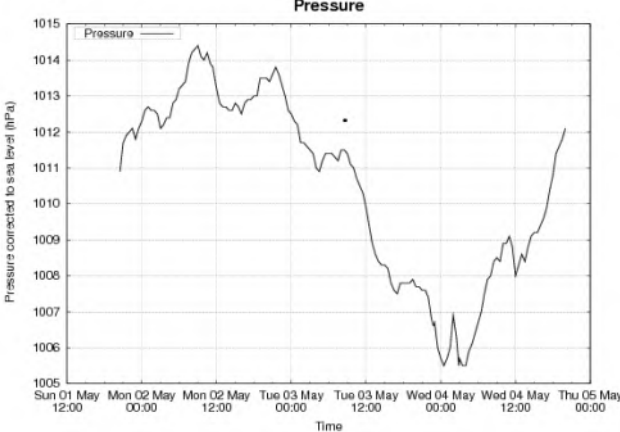
4.2 Fieldwork Methods

Table 7 provides details of the fieldwork investigation methods adopted for this CSA. The location of all groundwater monitoring wells and features of interest are illustrated on attached **Figures A2 and A3**.

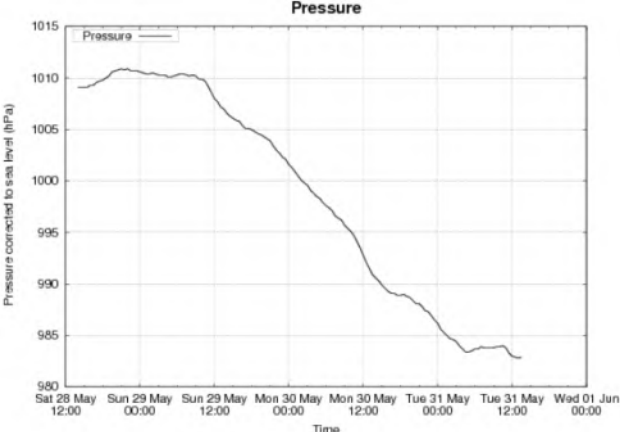
Table 7 Fieldwork Methods

Activity	Method
Site Inspection	5 th April 2022
	Complete an inspection of the site with a TasWater representative to visually identify the location of the UST and the previously installed groundwater monitoring wells.
Groundwater Sampling	7 th April 2022
	Groundwater sampling from six of the seven previously installed groundwater wells (MW1 to MW4, MW5s, MW5d and MW6; well MW3 could not be found, likely buried beneath stockpile). Standing water level was gauged using an electronic interface probe before sampling. The depth of the SWL and non-aqueous phase liquids (NAPL) (if present) was measured at each well, along with total well depth. Groundwater levels were measured relative to the top of the PVC casing and the interface probe decontaminated after each measurement with Liquinox and water. Refer to attached Table B1.0 for gauging measurements. Each groundwater monitoring well was purged using low-flow sampling techniques with dedicated tubing. The depth of the sample inlet tube or pump was recorded

SITE INVESTIGATION METHODOLOGY

Activity	Method
	during sampling and was within the screened section. Groundwater samples were collected from the six groundwater monitoring wells using a low flow pump. Each bore cap was replaced with gas taps. Field parameters (pH, EC, DO, turbidity, redox potential and temperature) were measured at the time of sampling, with water samples collected directly into laboratory supplied containers. Filled sample bottles were transferred into chilled eskies and then dispatched daily under chain of custody documentation to the primary and secondary laboratories for the required analysis.
Preliminary Landfill Gas Screening and utility sweeps	4th May 2022 Preliminary Landfill Gas (LFG) screening was undertaken on available groundwater monitoring bores that had at least some screened section in the unsaturated zone between the water table and ground level. Whilst these bores were not constructed to target landfill gas, they can provide some indication of landfill gas levels in the subsurface in lieu of dedicated landfill gas bores. The groundwater bores were fitted with gas caps, with landfill gas in the bores measured using a calibrated GA5000 landfill gas analyser. Monitoring was undertaken in line with best practice guidance documents. Refer to Attached Table B0.1 and Figure A5 for LFG results. The screening was conducted during falling atmospheric pressure conditions.  Following LFG monitoring, a portable inspection camera inserted into the bore to identify the exact location of the top of the slotted screen and confirm that there was an open pathway to unsaturated geology. Methane gas sweeps of available off-site utility pits was completed on the western and northern side of the wetlands, including utility access points, agricultural pipe outlets and stormwater pits. The methane gas sweeps were undertaken using a Methane Spectra Laser which is highly effective at detecting methane at low concentrations (parts per million). Refer to Attached Table B0.1 for LFG measurements.

SITE INVESTIGATION METHODOLOGY

Follow up Landfill Gas Screening and utility sweeps	31st May 2022 A second LFG sampling and screening event was conducted on MW5s and MW6, as well as a methane screening around the open spaces, carpark, in and around buildings to the west and north of the wetlands. Refer to Attached Table B0.2 and Figure A5 for LFG measurements. The screening was conducted under a very low barometric pressure of 982 hPa. 
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4.3 Analytical testing

Primary sample analysis was undertaken by Australian Laboratory Services (ALS), which is NATA accredited. Analysis included a quality assurance program with internal spikes, duplicates, and method blanks, and reported results at sufficiently low limits of reporting (LOR) to allow comparison with the adopted guidelines.

The laboratory analysis of primary groundwater samples included contaminants of potential concern that were identified in the site history, including:

- Metals (arsenic, cadmium, chromium, copper, lead, nickel, zinc, mercury);
- Sulfate and chloride
- Free and total carbon dioxide
- C1-C4 gases
- Per- and polyfluoroalkyl substances (PFAS).
- Total and recoverable petroleum hydrocarbons (TPH, TRH);
- Benzene, toluene ethylbenzene, xylene, naphthalene (BTEXN);
- Polycyclic aromatic hydrocarbons (PAH's);
- Phenols;
- Tributyltin (TBT); and
- *E.coli* and total coliforms

Additionally, a corrosion suite, sulfate and chloride were analysed to assess risks associated with proposed in-ground structures.

The laboratory certificates of analysis and chain of custody information for groundwater are provided in **Appendix E**.

4.4 Quality Assurance and Quality Control

The analytical data was checked and validated for its reliability and suitability for interpretive use, based on guidance in AS4482 and the NEPM ASC (2013). The data validation review is included in **Appendix F**, along with tabulated field duplicate results with RPD calculations, and rinsate blank results.

Based on the findings of the review, the groundwater dataset is considered reliable and suitable for interpretive use.

5 RESULTS AND DISCUSSION

5.1 Site Inspection to Address Data Gap 1a – UST Location and Groundwater Well Network

The site inspection on 5th April 2022 was conducted in the company of a TasWater representative (S. Lucas). The inspection was completed to investigate the potential location of the decommissioned UST(s) and to inspect the condition of the existing groundwater wells installed in 2016.

Prior to the inspection, records from WorkSafe Tasmania were requested and the location of a 4,500L underground diesel tank identified to be present on site, with no location recorded. The records received from WST are presented in **Appendix C**. The location of the tank was able to be visually identified during the site inspection and has been marked on attached **Figure A2**. Photographs of the tank location and other features of interest are presented below in **Table 8**.

Discussions with TasWater indicated that the tank had been decommissioned in 1973. However, the inspection identified around 2,700 L of diesel remaining in the tank (confirmed by dipping the tank during the inspection), indicating that the tank had not been decommissioned to date. The tank was apparently left *in-situ*, due to its' proximity to a site building, making the removal of the tank unsafe. The location of the UST, in the context of the infrastructure upgrade, is not expected to impact on works in the vicinity of the proposed new balance tank, however, there may be some historic impacted soils in the vicinity of the former AST and drainage line, should these areas be disturbed during upgrade works.

TasWater did not know of any other USTs on site, however, anecdotally an old 1,000 L above ground storage tank (AST) was located in the vicinity of a historic truck wash bay, which was located to the rear of the compost material bays (located 15m to the west of CPT09 – as shown on **Attached Figure A3**). The vehicles were washed down in this area and the water intercepted by a drainage pit. There was no AST present on-site during the inspection.

It was also noted that effluent was historically discharged into a drainage line that was located in the vicinity of groundwater wells MW1 and MW2. The drainage line still exists, running parallel to the New Town Rivulet, from approximately MW2 to MW1, but no longer discharges effluent into New Town Bay.

RESULTS AND DISCUSSION

Table 8 Photographs of the diesel UST, location of compost bays, drainage line and groundwater wells.

Photo 1. Location of diesel UST (concrete pad), adjacent the digesters.

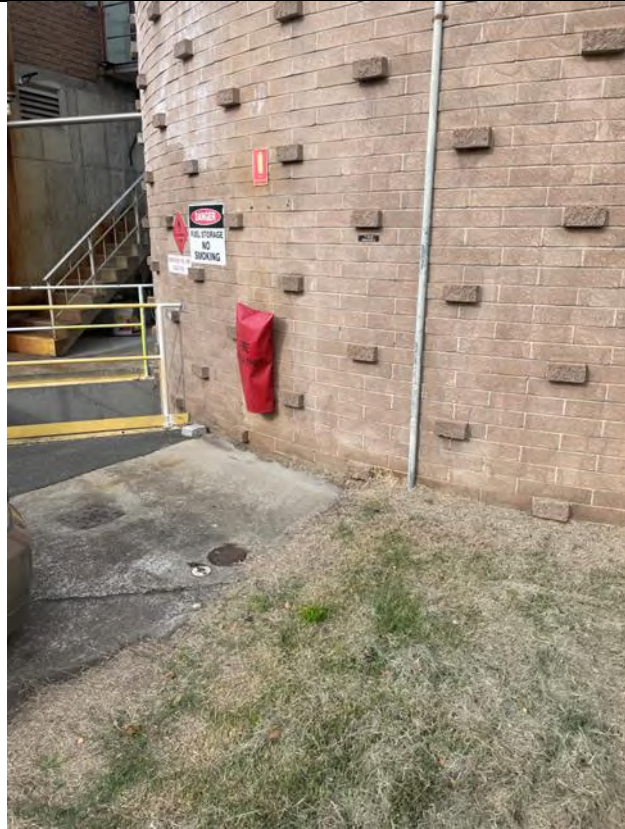


Photo 2. Diesel UST access point.



RESULTS AND DISCUSSION

Photo 3. Approximately 2,700 L of diesel was confirmed to be present in the UST.



Photo 4. Location of proposed new balance tank (gravel surface front photo). The compost bays are located at the center of the photo. The former truck wash area was anecdotally located to the far left of these bays in the photograph. Beyond the bays lay the drainage line that was formerly used for the discharge of effluent.



Photo 5. Drainage line behind compost bays. Photograph looking towards New Town Bay, to the north. The location of MW1 is on the grassed area and marked with a traffic cone.



RESULTS AND DISCUSSION

Photo 6. Location of MW2. Photograph looking west towards the laboratory.



Photo 7. General location of MW3. The well appears to have been lost underneath stockpiles of compost, wipes and sewage sludge deposits.



Photo 8. Location of MW4. The well is located between two trickling filter tanks, adjacent an internal road. Photograph taken looking south.



RESULTS AND DISCUSSION

Photo 9. Entrance to the wetlands, off Marine Esplanade near the rear of the New Town Bay Rowing Centre. Photo looking northwest.



Photo 9. Looking southwest over the wetlands towards monitoring wells MW5s and MW5d (yellow monuments rear photograph)



Photo 10. Looking southwest over the wetlands towards monitoring well MW6 (yellow monument center photograph).



RESULTS AND DISCUSSION

Photo 11. Looking west over the car park and rowing club (right hand side of photo) towards Marine Parade.



5.2 Groundwater Assessment to Address Data Gap 2a

5.2.1 Groundwater assessment criteria

The quality of groundwater in Tasmania is managed under the *State Policy on Water Quality Management (1997)* (DPIWE, 1997) ('the State Policy'). The stated purpose of the State Policy is to "achieve the sustainable management of Tasmania's surface water and groundwater resources by protecting or enhancing their qualities while allowing for sustainable development in accordance with the objectives of Tasmania's Resource Management and Planning System." The State Policy defines a range of Protected Environmental Values (PEVs) for surface and ground waters which are uses of the water resource that are to be protected. For groundwater, PEVs are allocated based upon the salinity (concentration of total dissolved solids) of the groundwater as specified in Table 1 of the State Policy (reproduced in **Table 8** below). The lower the salinity, the greater the number of uses (PEVs) that are likely to apply to the groundwater body. The Tasmanian EPA considers that groundwater is polluted where current and/or future PEVs are precluded, i.e. when the allocated groundwater quality objectives for those PEVs have been exceeded.

Table 9: Aquifer classification based on TDS concentrations (highlighted cells apply to the site).

Beneficial Uses	Classification based on TDS range (mg/L)			
	A (<1,000)	B (1,000-3,500)	C (3,500-13,000)	D (>13,000)
Drinking Water	✓			
Irrigation	✓	✓		
Industry	✓	✓	✓	
Stock	✓	✓	✓	
Ecosystem Protection	✓	✓	✓	✓

Groundwater beneath the site falls predominantly within Category B & C, with PEVs for the site being Irrigation, industry use, stock watering and ecosystem protection. The other consideration for groundwater is potential contact with subsurface structures, such as piles or foundations used in construction. Whilst not a PEV under the policy, there are circumstances where groundwater has the potential to corrode and impact on such structures, and would be applicable for this project where the STP upgrade design includes the installation of piles.

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The impacts on the identified PEVs and other contact with groundwater and their relevance to the assessment of risk for the expansion of the STP, are summarized in **Table 9** below.

Table 10 Protected Environmental Values (PEV) for the site

PEV/groundwater contact	PEV Potentially Precluded (Y/N)	Relevance of Beneficial Use	Comments
Irrigation	Unknown	Unlikely	No irrigation bores present within 1 km of the site. Site in a built-up area with no agriculture or parks/gardens present. Therefore this beneficial use was considered not relevant.
Industry	N	Unlikely	No industrial bores present within 1 km of the site. Therefore this beneficial use was considered not relevant.
Stock	N	Unlikely	No stock watering bores present within 1 km of the site. Site in a built-up area with no agriculture or stock present. Therefore this beneficial use was considered not relevant.
Ecosystem Protection	Y (zinc, nickel, PFOS and PAH)	Relevant at point of discharge	Groundwater from the site is likely to discharge to New Town Bay, located approximately 20 m to the north and 100 m to the west of the site.
Groundwater contact with subsurface building structures	Y (sulfate, chloride)	Proposed installation of piles as part of STP upgrade.	Piles installed as part of design would intersect shallow groundwater beneath the site with corrosion potential if sufficiently high concentrations of sulfate and chloride.

Based on likely groundwater uses at the site and on the objectives of this investigation, the criteria used to assess the groundwater results are those provided in **Table 10** below and in **Appendix B, Table B1**.

Table 11: Groundwater assessment criteria

Reference	Sub Reference	Reason for Use
ASC-NEPM 1999 (amended 2013)	Groundwater Health Screening Levels for Vapour Intrusion, Commercial/Industrial Use (HSL-D) and Intrusive Maintenance Workers – SAND	Assessment of risk to site users and excavation workers from hydrocarbon vapours in groundwater
Australian Water Quality Guidelines (ANZG 2018); HEPA 2020	Aquatic Ecosystem Protection – Slightly to Moderately Disturbed (95%-99% values) – Marine waters	Assessment of ecological risk to receiving River Derwent system (estuary)
Tasmanian EPA UPSS Regulations (2020)	Inferred LNAPL trigger values	Assessment of the presence of inferred LNAPL
Recreational Water	Recreational guideline values calculated based on 10 x	Assessment of risks to on and

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Reference	Sub Reference	Reason for Use
Quality Guidelines (NHMRC, 2008)	Australian Drinking Water Guidelines (NHMRC 2011, updated 2018)	off site users and construction workers from exposure to contaminants in groundwater through ingestion or contact
AS2159-2009 Piling Design and Installation	Exposure Classification Guidelines	Assess corrosion potential of groundwater for piling.
PFAS National Environmental Management Plan Version 2.0 (2020)	Human health recreational water criteria	Assessment of risk from PFAS to human health associated with recreational use
	Freshwater 95% species protection (the WQG guidelines recommend a 99% species protection for slightly to moderately disturbed systems for bioaccumulative and biomagnifying chemicals; however, given the degraded nature of the receiving environment, a 95% protection level was adopted for the assessment of PFAS concentrations)	Assessment of risk from PFAS to aquatic ecosystems

5.2.2 Groundwater levels and field parameters

The groundwater standing water levels (SWL) and water chemistry parameters measured at the depth of sampling have been provided in **Appendix B, Table B1**. Based on these results, the groundwater at the site could be described as slightly oxygenated, brackish (except MW5d which is saline), near neutral, reducing, with a high turbidity.

Reduced standing water levels were calculated based on the top of casing (TOC) and well riser details provided in EM&C (2016 -Table 3a), and SWLs collected at the time of this assessment, and have been mapped on attached **Figure A4**. Based on these calculations, groundwater at the site is relatively shallow (between 0.21 and 1.25 mAHD on 12 Sells Point Road and between 1.24 and 1.56 mAHD within the wetlands at 10 Sells Point Road) and is inferred to flow towards the north.

Based on these results, the groundwater table, at the time of this assessment, was likely to lie within the lower portion of the landfill waste material in the wetlands at 10 Sells Point Road and within the upper fill material present on the STP at 12 Sells Point Road.

5.2.3 Visual and olfactory indications of contamination

The following observations were noted during the groundwater assessment:

- A strong hydrocarbon odour and grey turbid water was identified in MW5s.
- A light sheen, slight hydrocarbon odour and moderate turbidity was identified in MW6.
- NAPL was not identified in any of the wells sampled.

5.2.4 Groundwater analytical results

Tabulated water results have been provided in **Appendix B, Table B2**. Historical groundwater results are provided in **Appendix B, Table B3**. The laboratory certificates of analysis are included in **Appendix E**.

Table 12 below shows notable groundwater results, including those exceeding the adopted human health and/or ecological assessment criteria.

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Table 12 Notable groundwater results including those exceeding adopted assessment criteria

Contaminants	Concentrations	Criteria exceeded (µg/L)	Relevant PEV/Comments
Nickel	20 µg/L (MW1) 11 µg/L (MW2) 7 µg/L (MW4) 12 µg/L (MW5d) 98 µg/L (MW5s) 18 µg/L (MW6)	7	Marine ecosystem protection
Zinc	40 µg/L (MW2) 15 µg/L (MW5d) 25 µg/L (MW6)	15	Marine ecosystem protection
PFOS	0.19 µg/L (MW1) 0.01 µg/L (MW2) 0.03 µg/L (MW4)	0.00023	Marine ecosystem protection
Phenanthrene	3.6 µg/L (MW5s)	0.6	Marine ecosystem protection
Anthracene	1.4 µg/L (MW5s)	0.01	Marine ecosystem protection
Fluoranthene	9.2 µg/L (MW5s)	1.0	Marine ecosystem protection
Benzo(a)pyrene (BaP)	4.7 µg/L (MW5s)	0.1	Marine ecosystem protection Recreational Water Quality
Chloride	6230 mg/L (MW5d) 1890 mg/L (MW5s)	1000 mg/L 6000 mg/L	'Non-aggressive' exposure conditions for steel or concrete piles.
Dissolved methane	7690 µg/L (MW2) 3800 µg/L (MW4) 393 µg/L (MW5d) 7870 µg/L (MW5s) 11900 µg/L (MW6)	Not available	Dissolved methane in shallow bores ranged 3800-11,900 µg/L and indicate potential presence of methane gas in the subsurface. Lower concentration reported in deep bore MW5d.
Total carbon dioxide	1560 mg/L (MW1) 426 mg/L (MW5d) 2170 mg/L (MW5s) 2230 mg/L (MW6)	Not available	Total carbon dioxide in shallow bores ranged 1560-2230 mg/L and indicate potential presence of carbon dioxide gas in the subsurface. Lower concentration reported in deep bore MW5d.

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The findings of the groundwater assessment were as follows:

- The majority of contaminants were reported below the adopted human health criteria for recreational water use. The only exception was benzo(a)pyrene in groundwater at MW5s.
- Dissolved nickel and zinc exceeded the groundwater investigation levels (GILs) for marine ecosystem protection (95% protection level) in bores MW1, MW4, MW5s, MW5d, MW6 (nickel) and MW2, MW5 and MW6 (zinc). All other metals were below the limit of reporting (LOR) with the exception of arsenic and one detection of chromium which were detected above the LOR.
- Concentrations of PFOS exceeded the GILs (95% marine) in MW1 and exceeded the HEPA (2018) 95% marine guideline in MW2 and MW4. Traces of PFOA were also detected in MW1, MW2, MW4 and MW5s, however these concentrations were below adopted ecological and human health criteria.
- Total Recoverable Hydrocarbons (TRH) were measured in bores MW1, MW2, MW5s and MW6, predominantly in the >C₁₆-C₃₄ fraction. The measured TRH concentrations were below the adopted assessment criteria for LNAPL presence and vapour intrusion for both a commercial/industrial land use and for intrusive maintenance workers.
- Concentrations of PAHs (phenanthrene, anthracene, fluoranthene and BaP) exceeded the GILs for marine ecosystem protection in MW5s.
- BTEXN, phenols, PAHs (except MW5s), tributyltin and *E. coli* were all below the limit of reporting.
- Counts of total coliforms were detected in MW1, MW4 and MW5d.
- Concentrations of dissolved methane and total carbon dioxide in groundwater were reported in all wells, with highest concentrations reported in shallow bores and indicate the potential for landfill gas to be present in the subsurface. The highest dissolved methane levels were identified in MW5s, MW6 and at MW2. Wells MW5s and MW6 are located on the wetlands. Well MW2 is located near the laboratory on the STP site.
- The corrosion classification results for piling installation indicate non-aggressive or mildly corrosive groundwater. The chloride:sulfate ratio does not indicate the presence of ASS at any monitored locations.

A review of these results against relevant historic results from 2016 identified:

- Concentrations of nickel and zinc were relatively consistent across the two time periods. The concentrations of these metals is likely a combination of land reclamation, landfilling and historic industrial land use on the site and in the surrounding area.
- Concentrations of TRH (>C₁₆-C₃₄ and >C₃₄-C₄₀ fractions) in MW5s were greater in 2016, where results exceeded the inferred LNAPL criteria (Tasmanian EPA, 2020). A silica gel clean up was undertaken on the sample from MW5s, with only minor changes to the concentrations of these fractions, indicating a possible petroleum source rather than natural organic material.
- Concentrations of naphthalene and BaP were greater in 2016, with the 2016 results being above the GIL (95% marine).
- The concentrations of TRH and PAH may fluctuate in response to groundwater SWLs. In 2016, SWLs were shallower than during the most recent round of monitoring, resulting in COC being liberated from the soil / landfill profile at these depths. Historic SWLs are presented in **Appendix B, Table B2**. The presence of these analytes at MW5s may require further delineation.
- Concentrations of *E. coli* and total coliforms were significantly higher in 2016. It is understood that the STP no longer irrigates the site with effluent and there was a change to full chlorine disinfection

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post 2016 (pers comm S.Lucas TasWater), which likely the explain the decrease observed between 2016 and 2022.

- Concentrations of dissolved methane were detected in all groundwater wells in 2016, with the most recent 2022 results generally more elevated.

The results and findings of the groundwater investigation works indicate that elevated concentrations of zinc, nickel, PFOS, dissolved gases, PAHs and historic TRH are likely a result of historical land reclamation, uncontrolled landfilling and industrial use on the site and in the area.

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5.3 Preliminary Assessment of Landfill Gas to Address Data Gap 2b.

5.3.1 LFG assessment criteria

The criteria used to assess the LFG results are those provided in **Table 13** below and in **Appendix B, Table B0**.

Table 13: LFG assessment criteria

Reference	Sub Reference	Reason for Use
DPIPWE, 2004 / EPA Vic, 2015	Methane action level for gas in subsurface services on and adjacent the landfill (1% v/v or 10,000 ppm). Methane action level subsurface geology at the landfill boundary (1.25% v/v). Carbon dioxide action level (1.5% above background level).	Assessment of risks to on and off site users, construction workers and future land use from exposure to methane and carbon dioxide gases.
Safe Work Australia, 2011	Lower and upper explosive limit for methane in air (5% v/v LEL and 15% v/v UEL).	Assessment of explosive risks to construction workers and future land use.

5.3.2 LFG Screening Locations

Screening for LFG in the subsurface was undertaken on seven groundwater monitoring bores. For the purposes of informing this preliminary assessment, the existing groundwater monitoring wells were retrofitted with gas caps to allow sampling of landfill gas that may enter the bore via the screened section across the unsaturated zone between the water table and ground level. Whilst not a substitution for dedicated landfill gas bores, the existing groundwater bores were assessed to be suitable for this screening exercise following a review of the construction logs and camera inspections of the bores. Screen across the unsaturated zone was confirmed at MW1 (0.66m), MW2 (1.18m), MW5s (1.3m) and MW6 (1.11m) (**Attached Table B1**). However, to properly assess for landfill gas in the subsurface, dedicated landfill gas wells would need to be installed and screened across a greater length of the unsaturated zone (i.e. above the groundwater table) to properly inform the risks associated with landfill gas beneath the site.

Screening for methane in accessible utility pits, service alignments, and escaping the ground surface was undertaken in and around the wetlands area, particularly the car park and open spaces to the west and north west.

The locations of the monitoring bores and screening area are shown on **Figure 5**.

5.3.3 Monitoring Conditions

The weather and atmospheric pressure conditions in Hobart during the monitoring events are summarised in **Table 14** below.

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Table 14 Weather and Atmospheric Conditions During Monitoring

Date	Weather Condition	Field Atmospheric Pressure (GA5000)	BOM Mean Sea Level Pressure (12 pm to 3 pm)	Increasing / Decreasing During Sampling
4 th May 2022	Cloudy, very light rain, cool temperature (13°C), very slight breeze	1008-1009 mbar	1008.2 to 1009 mbar	Increasing following barometric low at 3:00am of 1005.7.
31 st May 2022	Fine, low wind	982 mbar	983.9 to 983.4 mbar	Decreasing immediately prior to arriving onsite at 14:00 pm.

Monitoring during a period of falling atmospheric pressure is considered to represent the scenario where LFG migration is more likely to occur. Monitoring events on the 4th and 31st May 2022 were conducted immediately (in the hours) after a period of dropping atmospheric pressure.

Weather observations from the Bureau of Meteorology (BOM) are attached in **Appendix D**.

5.3.4 Preliminary LFG screening results

Tabulated LFG results have been provided in **Appendix B, Table B0.1 and B0.2** and are also shown on **Figure 5**.

The results of the preliminary LFG monitoring are summarised in **Table 15** below, which presents LFG results exceeding adopted action levels.

Table 15 Preliminary LFG results exceeding the adopted action levels

Gas	Concentrations (% v/v)	Criteria exceeded (% v/v)
Methane in sub-surface (2 sampling events)	53.9 & 54.7 (MW5s) 46.9 & 50.8 (MW6)	1.25 % (LSG Action Level) 5% LEL (Worksafe Lower Explosive Limit) 15% UEL (Worksafe Upper Explosive Limit)
Carbon Dioxide in sub-surface (2 sampling events)	23.6 & 24 (MW5s) 27.5 & 29.1 (MW6)	^7.6 % (EPA Vic BEPM Action Level)
Methane in utility services on and adjacent landfill	99,000 ppm, or 9.9% v/v	10,000 ppm (EPA Vic BEPM Action Level) 5% LEL (Worksafe Lower Explosive Limit) 15% UEL (Worksafe Upper Explosive Limit)

^Interim Carbon Dioxide trigger adopted as 1.5% above background levels in suitable bore.

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The findings of the preliminary LFG assessment were as follows:

- Concentrations of methane and carbon dioxide in the subsurface exceeded the action levels at MW5s and MW6 (on the former landfill at the wetlands). This included:
 - Exceedance of both the lower and upper explosive limits for methane of 5% and 15% respectively. The concentrations of methane detected during this assessment at MW5s and MW6 were in excess of these results, indicating that explosive risks may be present, should concentrations fall to within these ranges.
 - Exceedance of the methane action level of 1.25% v/v in Landfill Sustainability Guide.
 - Exceedance of the carbon dioxide preliminary action level of 7.6% v/v (based on limited background data).
- The concentrations of methane and carbon dioxide at all other wells (MW1, MW2, MW4 and MW5d), were below the adopted action levels. However, it is noted that two wells, MW4 and MW5d, had recorded SWLs that were above the slotted screens, and there is no suitable pathway for LFG into these bores.
- The landfill gas flow rate is an important factor for assessing the potential for landfill gas migration. Flow rates observed during sampling ranged between -2.9 L/h to 0.1 L/h, however most were closer to 0 L/h. A negative flow rate can indicate the presence of a vacuum (higher pressure outside the bore than inside). The higher the positive flow rate the higher the potential for migration of landfill gas. The highest rate was identified in MW5s (0.1 L/h) (**Appendix B, Table B0.1**) which is considered very low.
- Methane sweeps were undertaken away from the inferred methane source identified in the wetlands. This included utility pits and service alignments to the west of the wetlands on adjacent land, which includes car parking and recreational buildings, including rowing sheds and the Bridge Club. Utility pits and service alignments can accumulate and migrate fugitive gas emissions, acting as preferential pathways to distribute LFG to areas where it is not expected.
 - Sweep results in utility pits reported methane gas concentrations between 2.9 ppm and 3,542 ppm on the 4th May 2022 (below the action level of 10,000ppm).
 - Follow up utility sweeps on the 31st May 2022 of areas in and around the rowing sheds, car parks, and Bridge Club identified methane levels between 1.0 ppm and 99,000 ppm, or 9.9% v/v methane. This upper reading exceeded the action level of 10,000 ppm for landfill gas in a service alignment by a factor of 10 and was within the 5-15% v/v explosive range.
 - The highest concentration of methane was located in vicinity of the tarmac adjacent to the Bridge Club building. At a minimum, the results indicate that further investigation and risk assessment is required, in particular on the parcel of land where the rowing sheds and Bridge Club are located.
- Evidence of vegetation die back was not observed during the event.
- The elevated concentrations of methane and carbon dioxide detected at the wetlands in the subsurface at MW5s, MW6, and detection of methane in service alignments away from the wetlands in the recreational land to the west is considered to trigger the Notification of a Contaminated Site under Section 74B of EMPCA which would require the owner or occupier of that land to promptly inform the Director, EPA, when they become aware of the contamination. It is not known if EPA is already aware of the presence of landfill gas in the subsurface at the wetlands portion of the site.

6 CONCEPTUAL SITE MODEL

6.1 Conceptual Site Model

A CSM has been developed based on the information gathered to date and on the site settings. The assessment is based on potential source-pathway-receptor linkages with regards to human health and the environment.

6.1.1 Contamination Sources

Soil assessment was undertaken as part of previous investigations at 10 and 12 Selfs Point Road carried out by other parties; only limited investigations were undertaken in the wetlands. No soil assessment was undertaken as part of this investigation. The groundwater and preliminary LFG assessment undertaken in April-May 2022 have found the following contaminants at concentrations exceeding human health or ecological assessment criteria:

- Some metals (nickel and zinc) exceeded the GILs (95% protection level) for marine waters. Concentrations of nickel and zinc were also detected above the GILs in 2016 and were found to be relatively consistent across the two time periods.
- Concentrations of PFOS exceeded the GILs (95% marine) in MW1 and exceeded the HEPA (2018) 95% protection marine guideline in MW2 and MW4.
- Concentrations of PAHs (phenanthrene, anthracene, fluoranthene and BaP exceeded AWQG for 95% protection of marine ecosystems in MW5s. Detections of naphthalene and BaP were greater at MW5s in 2016 (including presence of TRH in concentrations consistent with inferred LNAPL), with the 2016 results being above the GIL (95% marine).
- Concentrations of dissolved carbon dioxide and methane in groundwater were detected in all of the wells analysed. The highest dissolved methane levels were identified in MW5s, MW6 and at MW2.
- Concentrations of landfill gas (methane and carbon dioxide) in the subsurface exceeded the action levels at MW5s and MW6.

While previous investigations did not identify impacted soil at the site above human health investigation levels (with the exception of soil in the northern portion at around 4.5 mbgl in depth), screening of soil data against the IB105 criteria identified exceedances for metals and PAH above Level 1 and 2 criteria in the fill material across the site. Also, the underlying landfill waste material at the site has not been fully characterised and the existing stockpiles on the site have not been assessed. Previous investigations and the groundwater assessment undertaken for this report did not find any evidence of ASS onsite; however this would need to be confirmed if extensive soil excavation was proposed.

6.1.2 Human and Ecological Receptors

The following human receptors have been identified for the proposed STP upgrade:

- Workers involved in excavations and construction;
- Current site users;
- Neighbouring property users; and
- Future site users (commercial/industrial use as STP).

The following ecological receptors have been identified for the proposed works:

- New Town Bay and River Derwent, adjacent to the site;
- Site vegetation; and

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- Aquatic and terrestrial organisms.

6.1.3 Potential Exposure and Migration Pathways

The potential routes by which the identified human and ecological receptors may be exposed to contamination present onsite would be:

- Dermal contact or ingestion of contaminated groundwater or soil (construction workers);
- Inhalation of gas / vapours from groundwater during excavation or dewatering (construction workers);
- Inhalation and explosive risks of gas / vapours from landfill gas (future and current commercial site users);
- Vapour intrusion of landfill gas or hydrocarbon vapours into current and future buildings and underground structures (future and current commercial site users and off-site human receptors).
- Exposure to contaminated dust during construction (off-site human receptors).
- Exposure to contaminants in soils (ecological).
- Run-off of impacted surface and groundwater into the River Derwent during excavation and dewatering (ecological receptors).
- Uptake of groundwater by terrestrial and aquatic flora and fauna.

6.2 Qualitative Risk Assessment

Based on the results of this investigation, a qualitative assessment of risk has been undertaken for each of the identified potential receptors, which is presented in **Table 16**.

Table 16 Qualitative Risk Assessment

Potential Receptor	Potential Exposure Pathway(s)	Contaminant Screening	Risk Evaluation
Construction workers	Dermal contact or ingestion of contaminated groundwater. Inhalation of hydrocarbon vapours from groundwater.	Concentrations measured in groundwater during this assessment were well below the adopted health screening criteria. The 2022 monitoring results for hydrocarbon contamination at well MW5s were lower than 2016 and also below criteria for vapour intrusion. .	No unacceptable risks were identified from dermal contact, ingestion or vapour intrusion from contaminated groundwater. Managing contaminated groundwater if intersected, including potential contact, should be included in a Construction Environmental Management Plan (CEMP) during site works.
Construction workers	Inhalation and explosive risks of landfill gas.	Preliminary screening indicated that landfill gas (methane and carbon dioxide) exceeded the adopted trigger levels and the lower and upper explosive limits (for methane).	The presence of potentially elevated concentrations of landfill gas may pose human health and explosive risks during excavation and construction works. A Landfill Gas Risk Assessment is required to assess the actual risk and the need for risk controls.
Construction workers	Dermal contact, inhalation or ingestion with contaminated fill, soil or fibres.	While previous investigations did not identify impacted soil at the site above human health investigation levels (with the exception of soil in the northern portion at around 4.5 mbgl in depth), screening of soil data against the IB105	No unacceptable risks have been identified based on the current data set; however, data gaps exist. Additional investigation of soil/fill and existing site stockpiles should be undertaken before and during site works.

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Potential Receptor	Potential Exposure Pathway(s)	Contaminant Screening	Risk Evaluation
Future and current commercial site users		criteria identified exceedances for metals and PAH above Level 1 and 2 criteria in the fill material across the site. Also, the underlying landfill waste material at the site has not been fully characterised and the stockpiles on the site have not been assessed.	Managing soil, including excess that may require offsite disposal, should be included in CEMP during site works. No unacceptable risks currently identified; however, data gaps exist that require investigation. Current access to the site is limited to on-site workers, with the exception of the access point to the wetlands off Marine Esp, which may allow uninhibited access.
Future and current commercial site users	Intrusion of landfill gas into current and future buildings and underground structures.	Based on the preliminary LFG results, there may be a risk to future and current land users if the site is developed and landfill gas migrates into buildings or structures, posing human health and explosive gas risks.	The presence of potentially elevated concentrations of landfill gas may pose human health and explosive risks for future and current users of the site. A Landfill Gas Risk Assessment is required to assess the actual risk and the need for landfill gas control measures in the STP upgrade design and/or other risk controls.
Future and current commercial site users	Hydrocarbon vapour intrusion into current and future buildings and underground structures.	The 2022 monitoring results for hydrocarbon contamination at well MW5s were lower than 2016 and also below criteria for vapour intrusion. The concentrations of TRH and PAH may fluctuate in response to groundwater SWLs.	Based on the 2022 results at MW5s, the risk of vapour intrusion is low. There is additional groundwater data pending for MW5s and downgradient from GHD due diligence assessment, with this risk to be rechecked upon receipt of this data.
Offsite human receptors (rowing shed, Cat Centre, Tasmanian Bridge Association and possible sport and recreation building on Rugby Park)	Intrusion of landfill gas into buildings or subsurface structures.	Based on the preliminary landfill gas results, there may be a risk to offsite receptors if landfill gas has potential to migrate into offsite buildings or structures, posing human health and explosive gas risks.	The presence of potentially elevated concentrations of landfill gas may pose human health and explosive risks for offsite receptors. A Landfill Gas Risk Assessment is required to assess the actual risk to offsite receptors
Offsite human receptors	Exposure to contaminated dust during construction.	While previous investigations did not identify impacted soil at the site above human health investigation levels (with the exception of soil in the northern portion at around 4.5 mbgl in depth), screening of soil data against IB105 criteria identified exceedances for metals and PAH above Level 1 and 2 criteria in the fill material across the site sufficient to trigger dust management measures.	Low risk but should be mitigated under dust reduction measures in a CEMP.

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Potential Receptor	Potential Exposure Pathway(s)	Contaminant Screening	Risk Evaluation
Ecological Receptors on or offsite	Exposure to contaminants in soils. Run-off or leaching of contaminated soils	No investigations into soil or fill was undertaken during this investigation. Previous investigations did not identify exceedances of ecological criteria at the site (with the exception of soil in the northern portion at around 1.6 mbgl in depth), however, no assessment of metals against ecological investigation levels were undertaken in 2016. Screening of soil data against the IB105 criteria identified exceedances for metals and PAH above Level 1 and 2 criteria in the fill material across the site, which may indicate ecological exposure risks. ASS have not been identified at the site, however, limited investigations have been undertaken of the soil on-site.	No unacceptable risks were identified and data gaps exist, however, also considering: - Only low-value flora is present within the area of investigation; and - The measures to be implemented in the CEMP for the management of stockpiles, such as fencing and dust and runoff reduction, would reduce exposure to fauna on and offsite. Additional investigations into the presence of ASS should be undertaken once excavation volumes are understood and appropriate management undertaken if required.
River Derwent and aquatic organisms;	Contaminated groundwater discharge to river.	Groundwater monitoring data for 2022 identified concentrations of nickel, zinc, PFOS and PAHs above marine ecosystem protection guidelines in groundwater beneath site.	Potential risk to river shoreline and its aquatic organisms adjacent to site if contaminants at discharge point are reported at similar concentrations to that beneath site. There are additional groundwater bores pending installation by GHD downgradient of site and near adjacent shoreline, with this risk to be rechecked upon receipt of this data.

6.3 Recommendations and Management Measures

Based on the CSM outlined above (**Table 16**), there may be unacceptable human health and ecological risks associated with the proposed works. Further works and management measures to mitigate these risks are presented in **Table 17**.

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Table 17 Recommendations and Management Measures Before, During and Post Construction

Media	Location	Recommendations for Further Investigation	Management Measures
Before Construction			
General	Northern portion of 12 Sells Point Road - UST	NIL - completed as per Section 5 (Data Gap 1a)	UST is located within existing infrastructure on the site and not within the area of proposed STP upgrades. However, the UST does contain a residual volume of diesel and removal of this primary source would eliminate the risk of potential future leakage and groundwater contamination. - Residual diesel be educted from tank by vacuum truck and disposed in accordance with EPA regulations. - UST be decommissioned in-situ, such as by foam fill (i.e. Benefil biodegradable foam)
Soil	Northern portion of 12 Sells Point Road, Council depot, 10 Sells Point Road	Data Gap 1b. Assessment of existing soil stockpiles, by an appropriately qualified environmental consultant and classification for waste disposal or on-site re-use. Stockpile sampling would be based on the number and size of stockpiles, in accordance with IB105. Analytes would include contaminants identified during previous investigations (including the contaminants listed in Table 2 of IB105) and presence/absence for asbestos should suspected ACM be identified.	To be undertaken prior to construction works with appropriate management measures implemented in the CEMP based on the findings. General soil management protocols for CEMP include: - Use of appropriate personal protective equipment (PPE) by all personnel on site when required, to prevent direct contact with soil and dust inhalation - Excavated soil to be treated as potentially contaminated, placed in a designated area and contained within an earth bund - Excavated soil to be inspected and tested by an appropriately qualified person for waste classification purposes - Soils to be classified in accordance with IB105 and managed and disposed according to the classification level. Remove contaminated material to an approved disposal facility (pending results and EPA approval). If suspected ACM is identified during works, the following implemented: - Stop work and secure the area with tape or temporary fencing - Notify the person in charge (main contractor or site owner)

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Media	Location	Recommendations for Further Investigation	Management Measures
			Site owner to arrange for an appropriately qualified contaminated land consultant to inspect the area and determine the appropriate course of action.
Groundwater	Wetlands, 10 Sells Point Road	Data Gap 2a. Assessment of groundwater in existing groundwater wells has been completed by Elgin as part of this investigation. No additional investigations required (subject to any additional findings by GHD as part of due diligence investigations).	Review of GHD groundwater assessment findings and refine management measures if required.
Landfill Gas	Wetlands, 10 Sells Point Road	Data Gap 2b, 2c and 2d. Preliminary assessment of landfill gas has been completed, with the potential for elevated risks to exist. A Rapid Screening Risk Assessment (RSRA) for the Wetland area, and a Landfill Gas Risk Assessment (LGRA) are required to assess actual risks for the development and surrounding areas.	Further assessment of landfill gas risks is required immediately to inform the EIS via a RSRA. Measures would include: - More accurate measurement of landfill gas in subsurface and its potential lateral extent by dedicated landfill gas bores, particularly at the perimeter to inform migration of LFG away from the Wetlands source. - Assessing the risks from the STP expansion design in and near the wetlands area, including installation (if any) of new subsurface pits and/or service lines. For example, where the design includes laying of concrete slab(s), these may present impermeable barrier(s) that could result in LFG present in the unsaturated geology to migrate laterally, increasing the risk to onsite and off-site buildings and utility lines. - Preliminary assessment of whether landfill gas control measures could be required for the construction of the STP expansion. - Provide the RSRA for consideration as part of the land acquisition due diligence for the wetlands portion of the site - currently underway by GHD for TasWater - so that potential liabilities associated with landfill gas that may be inherited through such an acquisition are understood. A more detailed and comprehensive LGRA would investigate landfill gas beyond the Wetland area and should follow the RSRA, with considerations that include:

CONCEPTUAL SITE MODEL

Media	Location	Recommendations for Further Investigation	Management Measures
			- Defining the boundary of the landfilling area to determine the potential extent of the LFG source, from existing information, or test pitting. - Use of Service Locators and detailed plans to establish the exact alignment of services and utilities such as water, sewage, stormwater, and communications. - Reviewing the construction details of buildings to understand the likelihood of preferential pathways to be present that may allow LFG inside the building envelope. - Installation and monitoring of dedicated landfill gas bores adjacent to buildings that already exist, and/or monitoring of the internal air quality to understand risk to occupants. - Screening for fugitive landfill gas emissions in service alignments, utility pits, nearby buildings, and from passive surface emissions (hotspots) from the known landfill area using methane detection equipment. - Inform onsite workers and utility service providers of the potential for LFG at the site.
During Construction			
Soil	Northern portion of 12 Sells Point Road – anecdotal AST and drainage line area	NIL – to be managed during construction should works extend into this area under an expected finds protocol and measures to protect workers against elevated faecal coliforms levels.	The material in this vicinity is not proposed to be disturbed. Should works extend into this area the following shall be implemented. Signs of contaminated material associated with an AST include (but not limited to): - Odours - Discolouration or staining - Presence of underground tanks or infrastructure - NAPL In the event that any unusual soil conditions are encountered, or any of the above: - Stop work and secure the area with tape or temporary fencing

CONCEPTUAL SITE MODEL

Media	Location	Recommendations for Further Investigation	Management Measures
			• Notify the person in charge (main contractor or site owner) • Site owner to arrange for an appropriately qualified contaminated land consultant to inspect the area and determine the appropriate course of action. • Contact with any soil on site may encounter elevated concentrations of contaminants, faecal coliforms and nutrients. Direct contact with these soils should be managed with appropriate hygiene procedures and PPE.
Soil	Northern portion of 12 Sels Point Road	Data Gap 3a. Assess excavated soils on-site during earthworks. All soils should be classified for waste disposal or on-site re-use. Analytes would include the contaminants identified during previous investigations, with selected samples tested for PFAS (sum of PFOS & PFHxS and PFOA), leachable contaminants and presence/absence for asbestos should suspected ACM be identified.	Soils to be excavated during works should be stockpiled in a designated holding area, under the guidance of an appropriately qualified environmental consultant, with any identified landfill/waste material separated from other soils. To be undertaken prior to construction works with appropriate management measures implemented in the CEMP based on the findings. General soil management protocols for CEMP would include: • Use of appropriate PPE by all personnel on site when required, to prevent direct contact with soil and dust inhalation • Excavated soil to be treated as potentially contaminated, placed in a designated area and contained within an earth bund • Dust suppression measures • Excavated soil to be inspected and tested by an appropriately qualified person for waste classification purposes • Soils to be classified in accordance with IB105 and managed and disposed according to the classification level. Remove contaminated material to an approved disposal facility (pending results and EPA approval).
Soil	Wetlands, 10 Sels Point Road	Data Gap 3b. As above. It is proposed that the upper 2 m of dredged fill/clay capping/topsoil material is removed and stockpiled separately from any underlying waste/landfill material. Tributyltin should be included in the analytical suite. Sampling and testing for ASS should be undertaken if disturbance of over 100 T of soil was proposed in the wetlands area, to confirm the absence of ASS.	If suspected ACM is identified during works, or any unusual soil conditions are encountered, the following should implemented (as part of an unexpected finds procedure): • Stop work and secure the area with tape or temporary fencing

CONCEPTUAL SITE MODEL

Media	Location	Recommendations for Further Investigation	Management Measures
			- Notify the person in charge (main contractor or site owner) - Site owner to arrange for an appropriately qualified contaminated land consultant to inspect the area and determine the appropriate course of action.
Groundwater	Wetlands, 10 Sells Point Road Northern portion of 12 Sells Point Road	Data Gap 2a. Assessment of groundwater in existing groundwater wells has been completed by Elgin as part of this investigation. No additional investigations required (subject to any additional findings by GHD as part of due diligence investigations). Groundwater is shallow across the site and may be intercepted during any excavation works (Between 2-6 mbgl).	Following review of the GHD groundwater report, if groundwater has potential to be intersected during works management measures may include: - Appropriate erosion and sediment control measures - Silt mesh barriers if sediments/soils are saturated - Diversion bunds if trenches are to remain open for extended periods - Use of appropriate PPE by all personnel on site when required, to prevent direct contact with groundwater - If excavation and dewatering are required, ensure capture and management measures. Should further contamination in groundwater be identified as part of the GHD due diligence investigations, additional measures for control and remediation may be required, particularly if a vapour risk is identified.
Landfill Gas	Northern portion of 12 Sells Point Road Wetlands, 10 Sells Point Road	Preliminary assessment of landfill gas has been completed, with the potential for elevated risks to exist. LGRA required to assess actual risks.	Further assessment of landfill risks is required immediately as a RSRA to inform a more detailed LGRA. Risk control measures required for construction would be an output of both the RSRA and LGRA.
Post Construction			
Soil and groundwater	Northern portion of 12 Sells Point Road Wetlands, 10 Sells Point Road	Based on the outcomes of the soil data collected pre and during construction works, and the groundwater assessment works conducted by GHD, further management protocols may be required.	Should residual contamination of site soils and groundwater be identified, the soil and groundwater on site should be managed under the guidance of an ongoing Environmental Management Plan (EMP).

CONCEPTUAL SITE MODEL

Media	Location	Recommendations for Further Investigation	Management Measures
Landfill Gas	Northern portion of 12 Selfs Point Road Wetlands, 10 Selfs Point Road Off-site risks	Based on the outcomes of a detailed Landfill Gas Risk Assessment, further management protocols may be required.	Landfill Gas may require on-going management at the site and would be managed under the guidance of an ongoing EMP.

CONCLUSIONS AND RECOMMENDATIONS

7 CONCLUSIONS AND RECOMMENDATIONS

This report presents the findings of a contaminated site assessment undertaken for the Selfs Point STP expansion project. The site was historically used for reclamation purposes and extensive municipal and trade waste landfilling.

A gap analysis of previous investigations was completed previously in March 2022 by Elgin. Based on this report, a number of investigations were recommended for the second stage of assessment, including soil, groundwater and a preliminary landfill gas assessment. This report has presented a review of previous investigations (soil and groundwater) the findings of the groundwater assessment and a preliminary landfill gas screen, a CSM and recommendations and control measures to be implemented at the site for the STP expansion project.

The data gaps identified and recommendations for further sampling are presented below. The recommendations in grey have been completed as part of this report:

Timing	Location	Media	Recommendations for Further Works
Before construction	Northern portion of 12 Selfs Point Road	General	1a. Confirm the location of the UST in the context of proposed earthworks and gather existing information (such as decommissioning information). Recommend UST is decommissioned in-situ, with eduction of residual diesel and foam filling of tank.
	Northern portion of 12 Selfs Point Road, Council depot, 10 Selfs Point Road	Soil	1b. Assessment of soil stockpiles by an appropriately qualified environmental consultant and classification for waste disposal or on-site re-use. Stockpile sampling would be based on the number and size of stockpiles, in accordance with IB105. Analytes would include contaminants identified during previous investigations (including the contaminants listed in Table 2 of IB105) and presence/absence for asbestos should suspected ACM be identified.
	Wetlands, 10 Selfs Point Road	Groundwater	2a. Assessment of groundwater for hydrocarbons, including LNAPL, tributyltin, PFAS and dissolved methane and CO ₂ (additional investigations to be undertaken by GHD as part of due diligence assessment). The GHD report should be reviewed by Elgin when available and these recommendations updated.
	Wetlands, 10 Selfs Point Road	Landfill Gas	2b. Preliminary assessment of landfill gas in subsurface and in nearby existing underground asset locations (stormwater drains, service pits and groundwater monitoring wells) on and surrounding the site.
	Wetlands, 10 Selfs Point Road	Landfill Gas	2c. Rapid Screening Risk Assessment (RSRA) of landfill gas of the site, in the context of the Selfs Point STP project, in order to identify risks and management and mitigation strategies for final design and construction. Works would include the installation of landfill gas bores around the perimeter of the Wetland parcel to assess presence of landfill gas in the subsurface at the boundary. This data would also inform the scoping of a broader Landfill Gas Risk Assessment (LGRA).
	Wetlands, 10 Selfs Point Road	Landfill Gas	2d. Completion of a LGRA. A more thorough assessment that considers the broader environment beyond the immediate implications of the STP project. Noting it is not yet clear how this parcel of work will be commissioned or the areas it would cover.

CONCLUSIONS AND RECOMMENDATIONS

Timing	Location	Media	Recommendations for Further Works
During construction	Northern portion of 12 Sels Point Road	Soil	3a. Assess excavated soils on-site during earthworks. Soils should be stockpiled in a designated holding area, under the guidance of an appropriately qualified environmental consultant, with any identified landfill/waste material separated from other soils. All soils should be classified for waste disposal or on-site re-use. Analytes would include the contaminants identified during previous investigations, with selected samples tested for PFAS (sum of PFOS & PFHxS and PFOA), leachable contaminants and presence/absence for asbestos should suspected ACM be identified.
	Wetlands, 10 Sels Point Road	Soil	3b. As above. It is proposed that the upper 2 m of dredged fill/clay capping/topsoil material is removed and stockpiled separately from any underlying waste/landfill material. TBT should be included in the analytical suite. Sampling and testing for ASS should be undertaken if disturbance of over 100 T of soil was proposed in the wetlands area, to confirm the absence of ASS.

The main findings of the assessment were as follows:

1. The UST on the site was identified and has been marked on Figure A2. The UST contains approximately 2,700 L of diesel fuel and does not appear to be used or decommissioned. The UST is not located in an area of proposed expansion works. It is recommended that the UST is decommissioned in-situ, with education and disposal of the residual diesel fuel and foam filling of the tank.
2. An anecdotal 1,000 L AST was noted to have been present in the past, near a historic truck wash bay. The AST was not present during the inspection. It was also noted that effluent was historically discharged into a drainage line that was located in the vicinity of groundwater wells MW1 and MW2. These areas are not expected to be within the vicinity of the proposed expansion works (in the northern section), but there may be some historic impacted soils present, should these areas be disturbed.
3. Soil assessment was undertaken as part of previous investigations at 10 and 12 Sels Point Road carried out by other parties; only limited investigations were undertaken in the wetlands. No soil assessment was undertaken as part of this investigation. While previous investigations did not identify impacted soil at the site above human health investigation levels (with the exception of soil in the northern portion at around 4.5 mbgl in depth), screening of soil data against the IB105 (IB105) criteria identified exceedances for metals and PAH above Level 1 and 2 criteria in the fill material across the site. Also, the underlying landfill waste material at the site has not been fully characterised and the existing stockpiles on the site have not been assessed. Previous investigations and the groundwater assessment undertaken for this report did not find any evidence of ASS onsite; however this would need to be confirmed if extensive soil excavation was proposed.
4. Groundwater at the site was relatively shallow (between 0.21 and 1.25 mAHD on 12 Sels Point Road and between 1.24 and 1.56 mAHD within the wetlands at 10 Sels Point Road) and was inferred to flow towards the north (towards New Town Bay). The groundwater table was likely to lie within the lower portion of the landfill waste material in the wetlands at 10 Sels Point Road and within the upper fill material present on the STP at 12 Sels Point Road.

CONCLUSIONS AND RECOMMENDATIONS

5. Contaminants detected in groundwater beneath the site included nickel, zinc, PFOS, hydrocarbons, PAHs, dissolved methane and carbon dioxide:
 - The majority of contaminants were reported below the adopted human health criteria for recreational water use or contact during construction works. The only exception was benzo(a)pyrene in groundwater at MW5s.
 - Nickel, zinc, PFOS and PAH contaminants were reported in groundwater beneath the site that were at concentrations above marine ecosystem protection guidelines. These results indicate a potential risk to the river and aquatic receptors along the shoreline to the north of the site if these contaminants are present at similar concentrations at the point of discharge. Data from new bores to be installed by GHD adjacent to this shoreline will assist in assessing this actual risk.
 - Hydrocarbon contamination in groundwater previously identified at bore MW5s was at lower concentrations in 2022 when compared to 2016. The results did not indicate the presence of LNAPL and indicated that there is a low risk of hydrocarbon vapour intrusion into structures built in vicinity of MW5s as part of the STP expansion works.
 - Dissolved methane and total carbon dioxide was reported in groundwater in all seven bores, with highest concentrations reported in shallow bores and are a line of evidence for the presence of landfill gas in the subsurface of the site.
 - The corrosion classification results for piling installation indicate non-aggressive or mildly corrosive groundwater. The chloride:sulfate ratio does not indicate the presence of ASS at any monitored locations.
6. The historical use of the wetlands portion of the site identified the potential for the presence of landfill gas beneath the site, which was confirmed from the results of a preliminary landfill gas screening that was undertaken as part of this assessment, with key findings that included:
 - Methane was detected in the subsurface at bores MW5s (53.9% v/v) and MW6 (45.9% v/v) on the former landfill at the wetlands at elevated levels that exceeded both the action level (1.25% v/v) under the Landfill Sustainability Guide (2004), and methane's lower (5% v/v) and upper (15% v/v) explosive limits. These results indicate that methane explosive risks may be present should subsurface concentrations fall to within the explosive limit range or fugitive emissions reach the ground surface. Carbon dioxide was also elevated in MW5s and MW6.
 - Methane sweeps of nearby utility pits on two occasions reported the presence of methane between 1.0 ppm and 99,000 ppm (9.9% v/v), and exceeded the action level of 10,000ppm. This upper reading exceeded the action level of 10,000 ppm for landfill gas in a service alignment by a factor of 10 and was within the 5-15% v/v explosive range. The highest concentration of methane was located in vicinity of the tarmac adjacent to the Bridge Club building.
7. The preliminary landfill gas screening indicates potential human health and explosive risks from elevated methane and carbon dioxide measured in the subsurface of the wetlands, and that there are also potential migration pathways to nearby utility pits and service alignments (such as stormwater). At a minimum, the results indicate that further investigation and risk assessment is required, in particular on the parcel of land where the rowing sheds and Bridge Club are located.
8. The level of risk posed by the landfill gas should be assessed by a two-stage process: (Stage 1) a Rapid Screening Risk Assessment, then (Stage 2) a more detailed Landfill Gas Risk Assessment (LGRA).

CONCLUSIONS AND RECOMMENDATIONS

Stage 1: The Rapid Screening Risk Assessment (RSRA) would cover risks to the expansion of the STP onto the Wetlands area, including:

- More accurate measurement of landfill gas in subsurface and its potential lateral extent by dedicated landfill gas bores, particularly at the perimeter to inform migration of LFG away from the Wetlands source.
- Assessing the risks from the STP expansion design in and near the wetlands area, including installation (if any) of new subsurface pits and/or service lines. For example, where the design includes laying of concrete slab(s), these may present impermeable barrier(s) that could result in LFG present in the unsaturated geology to migrate laterally, increasing the risk to onsite and off-site buildings and utility lines.
- Preliminary assessment of whether landfill gas control measures could be required for the construction of the STP expansion.
- Provide the RSRA for consideration as part of the land acquisition due diligence for the wetlands portion of the site - currently underway by GHD for TasWater - so that potential liabilities associated with landfill gas that may be inherited through such an acquisition are understood.

Stage 2: A more detailed and comprehensive LGRA would investigate landfill gas beyond the Wetland area, with considerations that include:

- Defining the boundary of the landfilling area to determine the potential extent of the LFG source.
 - Use of Service Locators and detailed plans to establish the exact alignment of services and utilities such as water, sewage, stormwater, and communications.
 - Reviewing the construction details of buildings to understand the likelihood of preferential pathways to be present that may allow LFG inside the building envelope.
 - Installation and monitoring of dedicated landfill gas bores adjacent to buildings that already exist, and/or monitoring of the internal air quality to understand risk to occupants.
 - Screening for fugitive landfill gas emissions in service alignments, utility pits, nearby buildings, and from passive surface emissions (hotspots) from the known landfill area using methane detection equipment.
9. The elevated concentrations of methane and carbon dioxide detected at the wetlands in the subsurface at MW5s, MW6, and detection of methane in service alignments away from the wetlands in the recreational land to the west is considered to trigger the Notification of a Contaminated Site under Section 74B of EMPCA which would require the owner or occupier of that land to promptly inform the Director, EPA, when they become aware of the contamination. It is not known if EPA is already aware of the presence of landfill gas in the subsurface at the wetlands portion of the site.
10. A CSM was developed as a basis for a qualitative assessment of human health and ecological risks from soil, groundwater and landfill gas for the STP expansion. A number of environmental management measures were identified for the STP expansion works to manage potential risks identified in the CSM. The majority of these can be included as part of a CEMP for the works, including soil and groundwater management. Other measures include the RSRA and LGRA as recommended above, with an outcome of these assessments including gas mitigation measures (if any) that may need to be included in the design for the STP expansion.

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LIMITATIONS

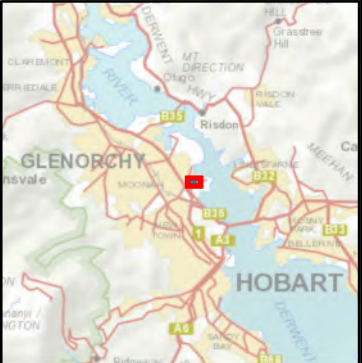
8 LIMITATIONS

Elgin Associates Pty Ltd has prepared this report for the sole use of the TasWater Capital Delivery Office in accordance with the usual care and thoroughness of the consulting profession. It is based on 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. 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.

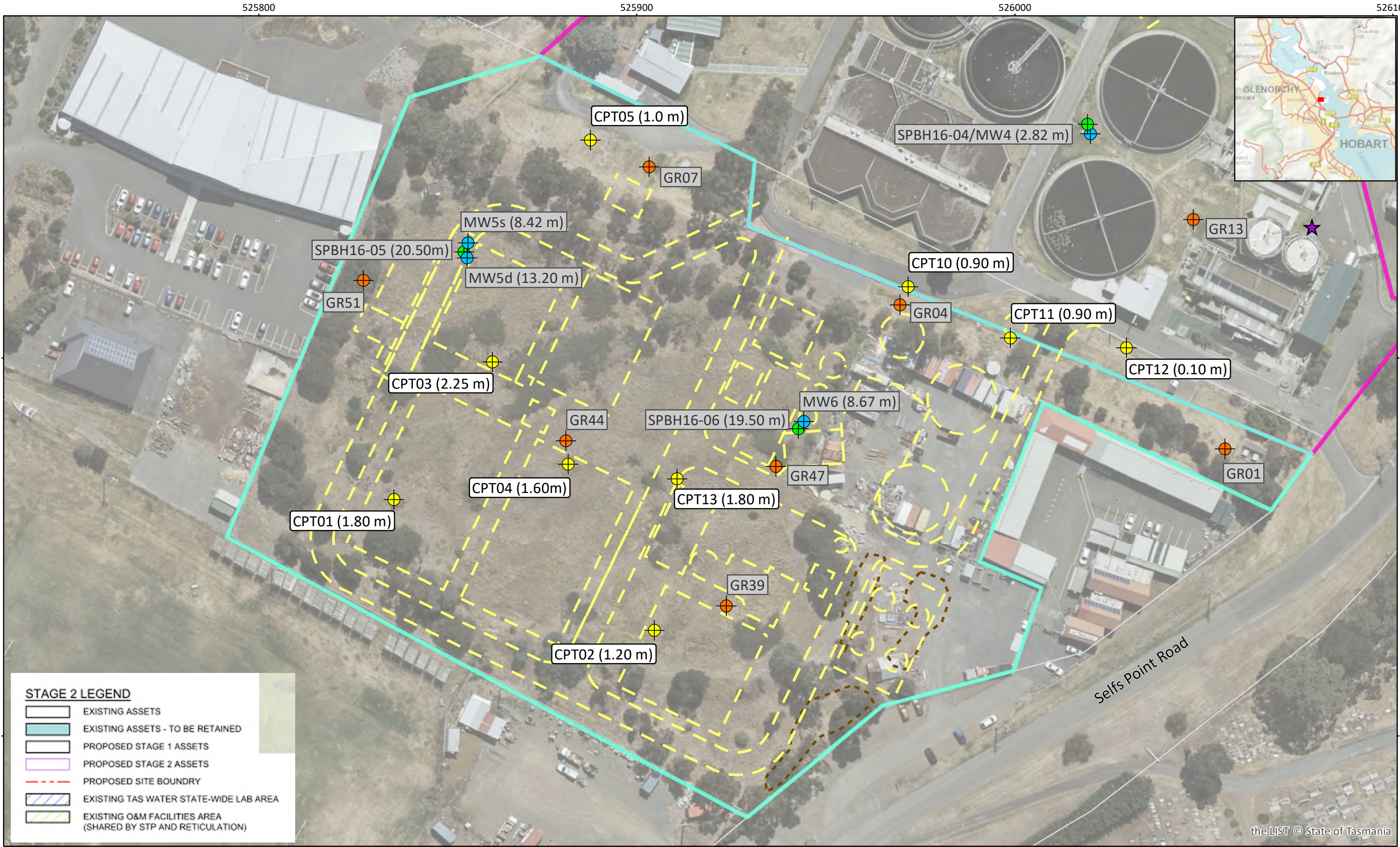
This report was prepared in April-June 2022 and is based on the conditions encountered and information reviewed during that period up to the time of preparation. Elgin Associates disclaims responsibility for any changes that may have occurred after this time. Opinions and recommendations contained in 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.

Figures



Legend Proposed Stages 1&2 Assets Cadastral parcels Site Boundaries New Town Bay Wetlands Existing STP site	N Scale = 1:1,500 04080 Meters	Site: Selfs Point STP Concept Design 10-12 Selfs Point Road, New Town, TAS (JN22377) Date: 04 May 2022 Size: A3 Version: A	Client: ERA Planning for TasWater Drawn: MU Approved: EH/LF	Title: 75% Concept Design Stage 2 Site Layout Plan Drawing # 0089-DWG-SELST01-GA-C-001	Figure 1 Coordinate System: GDA2020 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 2020 Scale Factor: 0.9996 Units: Meter
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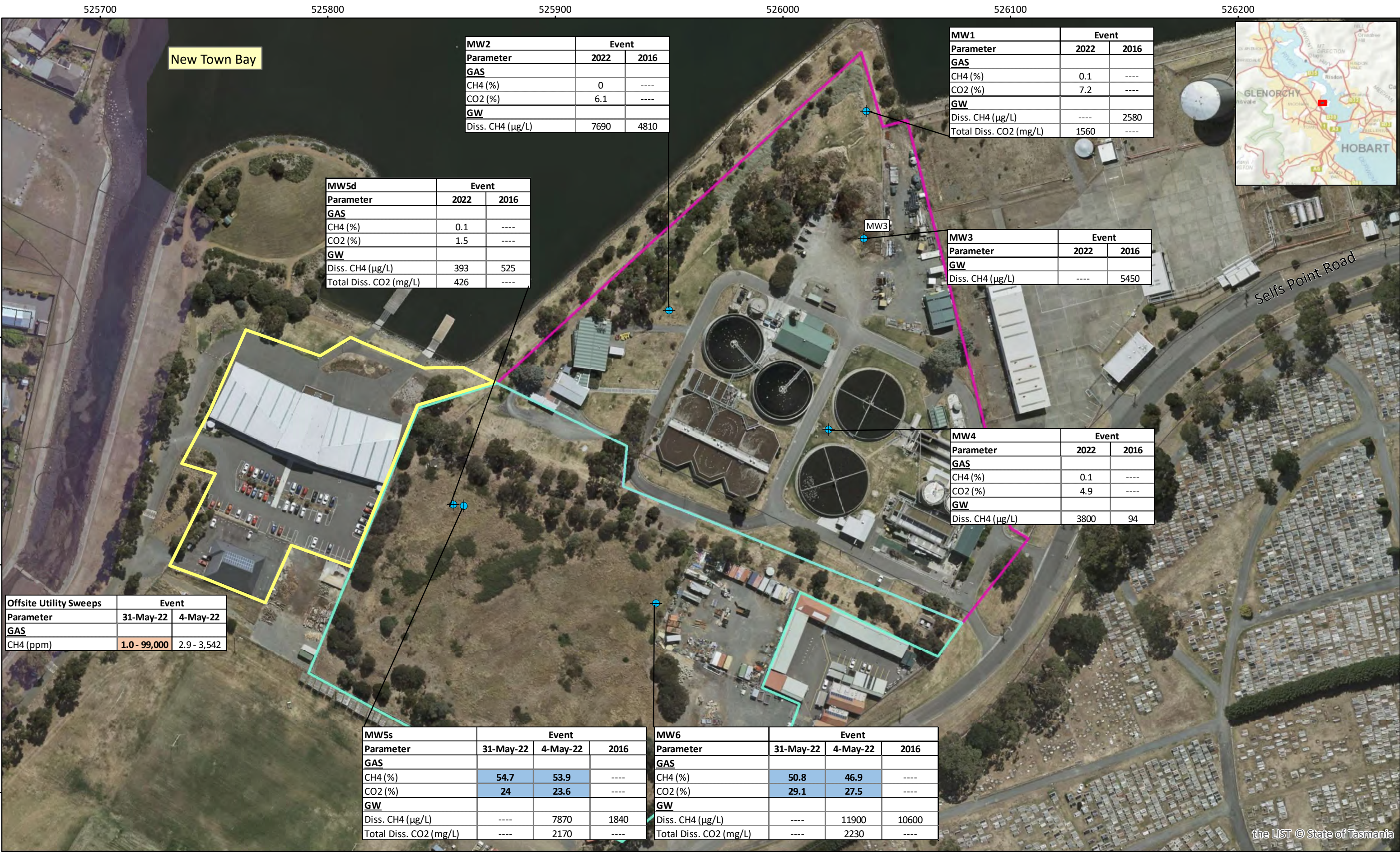
Legend GHD 2021 ★ UST location ⬮ Test pit/bore EM&C 2016 ⬮ Surface soil NATA analysed ⬮ Soil bore ⬮ Groundwater well	 Scale = 1:900 	Site: Selfs Point STP Concept Design 10 Selfs Point Road, New Town, TAS (JN22377)	Client: ERA Planning for TasWater	Title: 75% Concept Design Stage 2 and Previous Investigations (Southern) Drawing # 0089-DWG-SELST01-GA-C-001	
		Date: 10 May 2022 Size: A3 Version: B	Drawn: MU Approved: EH/LF		



GHD 2021 Test pit/bore Surface soil NATA analysed Soil bore Groundwater well Approx. location anecdotal AST EM&C 2016 Stockpiles Drainage line Proposed Stages 1&2 Assets Cadastral parcels Site Boundaries New Town Bay Wetlands Existing STP site	N Scale = 1:900 0 25 50 Meters	Site: Sels Point STP Concept Design 12 Sels Point Road, New Town, TAS (JN22377) Date: 10 May 2022 Size: A3 Version: B	Client: ERA Planning for TasWater Drawn: MU Approved: EH/LF	Title: 75% Concept Design Stage 2 and Previous Investigations (Southern) Drawing # 0089-DWG-SELST01-GA-C-001 elgin associates	Figure 3 Coordinate System: GDA2020 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 2020 Scale Factor: 0.9996 Units: Meter
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Legend GW well ID (reduced water level mAHd) GW well ID (not sampled) Inferred GW flow direction Inferred GW contour mAHd New Town Bay Wetlands Existing STP site *Contours are limited on number of data points	N 0 25 50 Meters Scale = 1:1,200	Site: Selfs Point STP Concept Design 10-12 Selfs Point Road, New Town, TAS (JN22377)	Client: ERA Planning for TasWater	Title: Groundwater Reduced Levels (RL) - Inferred Contours and Flow	Figure 4 Coordinate System: GDA2020 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 2020 Scale Factor: 0.9996 Units: Meter
		Date: 10 May 2022 Size: A3 Version: B	Drawn: MU Approved: EH/LF		



Legend - Groundwater well - Offsite Sweeps Area Site Boundaries - New Town Bay Wetlands - Existing STP site - Cadastral parcels	Landfill Gas Exceedances (BPBM 2015) - Subsurface Geology Action level = 1.25% - Utility Sweep Action Level = 10,000ppm CH4 = Methane CO2 = Carbon Dioxide	N Scale = 1:1,500 0 25 50 Meters	Site: Selfs Point STP Concept Design 10-12 Selfs Point Road, New Town, TAS (JN22377) Date: 7 June 2022 Size: A3 Version: B	Client: ERA Planning for TasWater Drawn: MU Approved: LF	Title: Landfill Gas Screening and Dissolved Gases in Groundwater 	Figure 5 Coordinate System: GDA2020 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 2020 Scale Factor: 0.9996 Units: Meter
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Analytical Results

		Lower and Upper Explosive Limit (LEL / UEL) for methane in air (SWA, 2011)	Action Level utility services on and adjacent landfill (Vic BPEM 2015)	Action Level subsurface geology (LSG 2004 and Vic BPEM 2015)	Sample ID	MW1	MW2	MW4	MW5d	MW5s		MW6	
					Sampling Date	4/05/2022	4/05/2022	4/05/2022	4/05/2022	4/05/2022	31/05/2022	4/05/2022	31/05/2022
Equipment	Analyte Name				Units								
Gauging	Depth to Water (DTW)				mBTOC	2.186	1.902	1.858	6.76	6.802	6.55	6.701	6.46
	Total Well Depth (TD)				mBTOC	3.92	4.21	2.75	13.15	8.26	8.26	8.574	8.574
	Well Screen Interval as measured 4th May 2022				mBTOC	1.50 - 3.92	0.70 - 4.21	1.95 - 2.75	~10.5	5.60 - 8.26	5.60 - 8.26	5.75 - 8.57	5.75 - 8.57
GA5000	Atmospheric Pressure				mb	1008	1008	1009	1009	1009	982	1009	982
	Relative Pressure (Well)				mb	0.03	-0.03	-5.91	15.54	0.1	-0.04	0.07	0.07
	Internal flow				L/h	0	0	-2.9	6.9	0.1	0	-0.1	0
	Methane (CH ₄)	5% / 15%		1.25%	% v/v	0.1	0	0.1	0.1	53.9	54.7	46.9	50.8
	Carbon Dioxide (CO ₂)			7.6 % (1.5% above b'ground*	% v/v	7.2	6.1	4.9	1.5	23.6	24.3	27.5	29.1
	Oxygen (O ₂)				% v/v	14.1	16.1	13	20.1	0	0	0.2	0.9
	Carbon Monoxide (CO)				ppm	0	0	0	0	1	1	0	1
	Hydrogen Sulfide (H ₂ S)				ppm	0	0	0	0	3	0	0	0
	Nitrogen Balance (N)				% v/v	78.5	77.8	82	78.3	22.6	21	25.4	19.3
	Peak Methane (CH ₄)				% v/v	0.1	0	0.1	2.5	54	54.8	47	50.9
	Peak Carbon Dioxide (CO ₂)				% v/v	7.2	6.1	5	1.6	23.6	24.3	27.5	29.1
	Min O ₂				% v/v	14.1	16.1	13	20.1	0	0	0.2	0.9
	Aspiration Time				sec	180	180	180	180	180	180	180	180

Notes

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Best practice environmental management; Siting, design, operation and rehabilitation of landfills. Publication 788.3.
Landfill Sustainability Guide; Landfill gas

* Preliminary value based on MW1-MW3 average + 1.5%

1.81 SWL above screened interval

Attached Table B0.2 - Landfill Gas Preliminary Screening Results - Utilities / Service Alignments
JN22377: Selfs Point CSA

				Date	Methane (CH ₄)	Methane (CH ₄)
Sweep location	Type	Easting	Northing	Unit	ppm	%
Action Level utility services on and adjacent landfill (Vic BPEM 2015)					10,000	1.0%
Lower and Upper Explosive Limit (LEL / UEL) for methane in air (SWA, 2011)						5% / 15%
	Sewer	525772	5256017	4/05/2022	3,542	0.35%
Grated pit adjacent rowing shed and car park (GP1)	Stormwater	525805	5256036	4/05/2022	6.4	--
Grated pit with Ag pipe (3 pipes) central car park (GP2)	Stormwater	525782	5256031	4/05/2022	32.6	--
Grated pit central garden bed car park (GP3)	Stormwater	525763	5256040	4/05/2022	5.5 - 28.9	--
Grated pit near Marine Pde (GP4)	Stormwater	525752	5256059	4/05/2022	2.9	--
Utility Screening Event 2 - 31 May 2022						
Ag Outlet - open space - NE rowing shed	Stormwater	525838	5256076	31/05/2022	1.3	--
Stop Valve - open space - NE rowing shed	Water	525844	5256082	31/05/2022	1.0	--
Fire Point - open space - NE rowing shed	Fire Valve	525845	5256081	31/05/2022	1.3	--
Crack near Rowing shed	Tarmac	525778	5256059	31/05/2022	89.6	--
Water Valve (WV1) adjacent Rowing shed	Water	525791	5256044	31/05/2022	1.4	--
Water Valve (WV2) adjacent Rowing shed	Water	525794	5256072	31/05/2022	1.3	--
Water Point (WP1) - NE Rowing shed	Water	525835	5256060	31/05/2022	1.0	--
Sewer valve cover - southern side car park (Sewer1)	Sewer	525773	5256017	31/05/2022	2.0	--
Grated pit adjacent rowing shed and car park (GP1)	Stormwater	525805	5256037	31/05/2022	3.6	--
Grated pit with Ag pipe (3 pipes) central car park (GP2)	Stormwater	525782	5256031	31/05/2022	790	--
Grated pit central garden bed car park (GP3)	Stormwater	525763	5256038	31/05/2022	2.4	--
Grated pit near Marine Pde (GP4)	Stormwater	525751	5256060	31/05/2022	2.0	--
Grated pit Bridge Club car park (GP5)	Stormwater	525775	5256007	31/05/2022	7.3	--
Grated Pit Bridge Club car park (GP6)	Stormwater	525747	5256016	31/05/2022	1.4	--
Grated pit Bridge Club car park (GP7)	Stormwater	525732	5256000	31/05/2022	1.0	--
Crack in Tarmac Bridge Club car park	Tarmac	525758	5256008	31/05/2022	29.9	--
Green Lid - in tarmac adjacent to Bridge Club (unknown utility type)	Water	525772	5256001	31/05/2022	6,700	0.67%
Stormwater Trap - in tarmac adjacent to Bridge Club	Stormwater	525773	5256004	31/05/2022	339	--
Wall Vent 1 - outer brickwork Bridge Club	Structure	525749	5255993	31/05/2022	48.9	--
Wall Vent 2 - outer brickwork Bridge Club	Structure	525752	5255992	31/05/2022	51.9	--
Wall Vent 3 - outer brickwork Bridge Club	Structure	525755	5255990	31/05/2022	83.9	--
Tarmac adjacent to Bridge Club	Tarmac	525771	5256004	31/05/2022	99,000	9.9%

Notes

EPA Victoria BEPM (2015). Best practice environmental management; Siting, design, operation and rehabilitation of landfills. Publication 788.3.

TAS DPIWE (2004). Landfill Sustainability Guide; Landfill gas

Safe Work Australia (2011). Confined Spaces - Code of Practice

Attached Table B1 - Groundwater Gauging Results
JN22377: Selfs Point CSA

Well ID	Round Measured	Easting	Northing	Casing (m)	Bore Depth (mBTOC)	Bore Depth (mBGL)	Depth to Groundwater (mBTOC)	(A) Depth to Groundwater (mBGL)	(B) Elevation surveyed (mAHD)	RL mAHD (B - A)
MW1	April 2022	526036.61	5256199.32		3.920	3.920	2.155	2.155	2.365	0.210
MW2	April 2022	525949.96	5256111.78		4.205	4.205	1.880	1.880	2.334	0.454
MW3	EM&C - May 2016	526035.58	5256143.32					1.620	2.306	0.686
MW4	April 2022	526020.04	5256059.36		2.750	2.750	1.810	1.810	3.065	1.255
MW5d (deep)	April 2022	525855.12	5256026.52	0.700	13.150	12.450	6.962	6.262	7.503	1.241
MW5s (shallow)	April 2022	525855.28	5256030.47	0.755	8.264	7.509	6.895	6.140	7.538	1.398
MW6	April 2022	525944.20	5255983.18	0.750	8.574	7.824	6.855	6.105	7.663	1.558

m: meters

GL: ground level

mBTOC: meters below to of casing

mBGL: meters below ground level

mAHD: meters above Australian Height Datum

Attached Table B2 - Groundwater Results
JN22377: Selfs Point CSA



		Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2- <4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Intrusive Maintenance Workers (shallow trench) 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10)	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines	AS2159-2009 Piling Installation and Design Exposure Classification Guidelines		Sample ID	MW1	MW2	MW4	MW5d	MW5s	MW6
Parameter Suite	Analyte Name							Units	LOR						
Gauging	Depth to Water (DTW)							mBTOC		2.16	1.88	1.81	6.96	6.90	6.86
	Total Well Depth (TD)							mBTOC		3.92	4.21	2.75	13.15	8.26	8.574
	Well Screen Interval as measured 4th May 2022							mBTOC		1.50 - 3.92	0.70 - 4.21	1.95 - 2.75	~10.5 -13.15	5.60 - 8.26	5.75 - 8.57
Field Parameters	pH (field)	5.9-7.7					<5.5 (concrete), <5	pH Unit	0.1	7.0	7.1	7.2	6.6	6.7	6.5
	pH (lab)	5.9-7.7						pH Unit	0.01	7.5	----	----	7.7	7.3	6.9
	Dissolved Oxygen	7.5-12.9						mg/L	0.1	0.51	0.31	2.4	1.9	0.66	0.33
	Electrical Conductivity	66.9-178.3						µs/cm	1	4006	2363	1867	18230	8849	4862
	Redox Potential							mV	1	-170	-167	-113	-56	-115	-146
	Turbidity	1.6-7.8						NTU	0.1	13	66	20	2.8	169	46
	Temperature	4.0-17.2						°C	0.1	16.6	17.6	20.6	17.0	16.9	17.2
	Water Observations									Light brown, slightly turbid, no odour, no sheen	Slightly turbid, no odour, no sheen	Very slightly turbid, no odour, no sheen	Clear, no odour, no sheen	Grey, turbid, strong HC odour, slow recharge	Light sheen, light to moderate turbidity, no odour
Corrosion Classification	Exposure Classification - Steel Piles									Non Aggressive	----	----	Mild	Mild	Non Aggressive
	Exposure Classification - Concrete Piles									Mild	----	----	Mild	Mild	Mild
Physico-Chemical	Sulfate						1000 (concrete)	mg/L	1	96	----	----	785	<1	<1
	Chloride						<6000 (concrete), <1000 (steel)	mg/L	1	470	----	----	6230	1890	657
Dissolved Metals	Arsenic				100			µg/L	1	22	37	2	1	10	4
	Cadmium	0.7**			20			µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium	27/4.4 (CrIII/CrVI)			500 (CrVI)			µg/L	1	1	<1	<1	<1	3	1
	Copper	1.3			20000			µg/L	1	<1	<1	<1	<1	<1	<1
	Lead	4.4			100			µg/L	1	<1	<1	<1	<1	<1	<1
	Nickel	7**			200			µg/L	1	20	11	7	12	98	18
	Zinc	8			3000			µg/L	5	8	40	14	15	8	25
	Mercury				10			µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
CO2 - Free and Total	Free Carbon Dioxide							mg/L	1	96	----	----	20	241	496
	Total Carbon Dioxide							mg/L	1	1560	----	----	426	2170	2230
C1-C4 Hydrocarbon Gases	Methane							µg/L	10	----	7690	3800	393	7870	11900
	Ethene							µg/L	10	----	<10	<10	<10	<10	<10
	Ethane							µg/L	10	----	<10	<10	<10	<10	<10
	Propene							µg/L	10	----	<10	<10	<10	<10	<10
	Propane							µg/L	10	----	<10	<10	<10	<10	<10
	Butene							µg/L	10	----	<10	<10	<10	<10	<10
	Butane							µg/L	10	----	<10	<10	<10	<10	<10
Perfluoroalkyl Sulfonic Acids	Perfluorobutane sulfonic acid (PFBS)							µg/L	0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluoropentane sulfonic acid (PFPeS)							µg/L	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorohexane sulfonic acid (PFHxS)					2	2	µg/L	0.01	0.18	<0.01	<0.01	<0.01	<0.01	<0.01
	Perfluoroheptane sulfonic acid (PFHpS)							µg/L	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorooctane sulfonic acid (PFOS)	0.00023*				2	2	µg/L	0.01	0.19	0.01	0.03	<0.01	<0.01	<0.01
	Perfluorodecane sulfonic acid (PFDS)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroalkyl Carboxylic Acids	Perfluorobutanoic acid (PFBA)							µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Perfluoropentanoic acid (PFPeA)							µg/L	0.02	0.34	<0.02	<0.02	<0.02	0.04	<0.02
	Perfluorohexanoic acid (PFHxA)							µg/L	0.02	0.28	<0.02	<0.02	<0.02	0.04	<0.02
	Perfluoroheptanoic acid (PFHpA)							µg/L	0.02	0.19	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorooctanoic acid (PFOA)	19*				10^	10^	µg/L	0.01	0.49	0.02	0.02	<0.01	0.02	<0.01
	Perfluorononanoic acid (PFNA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorodecanoic acid (PFDA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluoroundecanoic acid (PFUnDA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorododecanoic acid (PFDoDA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorotridecanoic acid (PFTTrDA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorotetradecanoic acid (PFTeDA)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Attached Table B2 - Groundwater Results
JN22377: Selfs Point CSA



		Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2-<4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Intrusive Maintenance Workers (shallow trench) 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10)	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines	AS2159-2009 Piling Installation and Design Exposure Classification Guidelines		Sample ID	MW1	MW2	MW4	MW5d	MW5s	MW6
Parameter Suite	Analyte Name							Units	LOR						
Perfluoroalkyl Sulfonamides	Perfluorooctane sulfonamide (FOSA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	N-Methyl perfluorooctane sulfonamide (MeFOSA)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(n:2) Fluorotelomer Sulfonic Acids	4:2 Fluorotelomer sulfonic acid (4:2 FTS)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	8:2 Fluorotelomer sulfonic acid (8:2 FTS)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFAS Sums	Sum of PFAS							µg/L	0.01	1.79	0.03	0.05	<0.01	0.1	<0.01
	Sum of PFHxS and PFOS					2^	2^	µg/L	0.01	0.37	0.01	0.03	<0.01	<0.01	<0.01
	Sum of PFAS (WA DER List)							µg/L	0.01	1.73	0.03	0.05	<0.01	0.1	<0.01
Total Petroleum Hydrocarbons	C6 - C9 Fraction	30000^^						µg/L	20	<20	<20	<20	<20	<20	<20
	C10 - C14 Fraction	30000^^						µg/L	50	<50	<50	<50	<50	220	140
	C15 - C28 Fraction	5000^^						µg/L	100	180	110	<100	<100	840	670
	C29 - C36 Fraction	5000^^						µg/L	50	<50	<50	<50	<50	280	70
	C10 - C36 Fraction (sum)							µg/L	50	180	110	<50	<50	1340	880
Total Recoverable Hydrocarbons - NEPM 2013 Fractions	C6 - C10 Fraction							µg/L	20	<20	<20	<20	<20	<20	<20
	C6 - C10 Fraction minus BTEX (F1)	30000^^	6000	NL				µg/L	20	<20	<20	<20	<20	<20	<20
	>C10 - C16 Fraction	30000^^						µg/L	100	<100	<100	<100	<100	320	230
	>C16 - C34 Fraction	5000^^						µg/L	100	180	100	<100	<100	940	620
	>C34 - C40 Fraction	5000^^						µg/L	100	<100	<100	<100	<100	160	<100
	>C10 - C40 Fraction (sum)							µg/L	100	180	100	<100	<100	1420	850
	>C10 - C16 Fraction minus Naphthalene (F2)	30000^^	NL	NL				µg/L	100	<100	<100	<100	<100	320	230
BTEXN	Benzene	500**/3000^^	5000	NL	10			µg/L	1	<1	<1	<1	<1	<1	<1
	Toluene	180	NL	NL	8000			µg/L	2	<2	<2	<2	<2	<2	<2
	Ethylbenzene	80	NL	NL	3000			µg/L	2	<2	<2	<2	<2	<2	<2
	meta- & para-Xylene	75	NL	NL				µg/L	2	<2	<2	<2	<2	<2	<2
	ortho-Xylene		NL	NL				µg/L	2	<2	<2	<2	<2	<2	<2
	Total Xylenes		NL	NL	6000			µg/L	2	<2	<2	<2	<2	<2	<2
	Sum of BTEX	20000^^						µg/L	1	<1	<1	<1	<1	<1	<1
	Naphthalene	50**	NL	NL				µg/L	5	<5	<5	<5	<5	<5	<5
Phenolic Compounds	Phenol	400						µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2-Chlorophenol				3000			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2-Methylphenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3- & 4-Methylphenol							µg/L	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	2-Nitrophenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2,4-Dimethylphenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2,4-Dichlorophenol				2000			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2,6-Dichlorophenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4-Chloro-3-methylphenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2,4,6-Trichlorophenol				200			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2,4,5-Trichlorophenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Pentachlorophenol	11**			100			µg/L	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0

Attached Table B2 - Groundwater Results
JN22377: Selfs Point CSA

		Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2-<4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Intrusive Maintenance Workers (shallow trench) 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10)	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines	AS2159-2009 Piling Installation and Design Exposure Classification Guidelines		Sample ID	MW1	MW2	MW4	MW5d	MW5s	MW6
Parameter Suite	Analyte Name							Units	LOR						
Polynuclear Aromatic Hydrocarbons	Naphthalene	50**						µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Acenaphthylene							µg/L	1	<1.0	<1.0	<1.0	<1.0	1.6	<1.0
	Acenaphthene							µg/L	1	<1.0	<1.0	<1.0	<1.0	1.6	<1.0
	Fluorene							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Phenanthrene	0.6**						µg/L	1	<1.0	<1.0	<1.0	<1.0	3.6	<1.0
	Anthracene	0.01**						µg/L	1	<1.0	<1.0	<1.0	<1.0	1.4	<1.0
	Fluoranthene	1.0**						µg/L	1	<1.0	<1.0	<1.0	<1.0	9.2	<1.0
	Pyrene							µg/L	1	<1.0	<1.0	<1.0	<1.0	9.3	<1.0
	Benz(a)anthracene							µg/L	1	<1.0	<1.0	<1.0	<1.0	3.4	<1.0
	Chrysene							µg/L	1	<1.0	<1.0	<1.0	<1.0	3.5	<1.0
	Benzo(b+j)fluoranthene							µg/L	1	<1.0	<1.0	<1.0	<1.0	3.7	<1.0
	Benzo(k)fluoranthene							µg/L	1	<1.0	<1.0	<1.0	<1.0	3.3	<1.0
	Benzo(a)pyrene	0.1**			0.1			µg/L	0.5	<0.5	<0.5	<0.5	<0.5	4.7	<0.5
	Indeno(1.2.3.cd)pyrene							µg/L	1	<1.0	<1.0	<1.0	<1.0	3.1	<1.0
	Dibenz(a.h)anthracene							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Benzo(g.h.i)perylene							µg/L	1	<1.0	<1.0	<1.0	<1.0	4	<1.0
Bacteriological	Sum of polycyclic aromatic hydrocarbons							µg/L	0.5	<0.5	<0.5	<0.5	<0.5	52.4	<0.5
	Benzo(a)pyrene TEQ (zero)							µg/L	0.5	<0.5	<0.5	<0.5	<0.5	6.1	<0.5
Bacteriological	Escherichia coli (Colilert)							orgs/100m	1	0	<10	0	1	<10	<10
	Total Coliforms (Colilert)							orgs/100m	1	3	<10	15	14	<10	<10
Organotin Compounds (Soluble)	Tributyltin	0.006						µgSn/L	0.002	<0.002	----	----	<0.002	<0.002	<0.002

Abbreviation Notes	
EPA 2021	Tasmanian EPA DGVs for Aquatic Ecosystems of the Derwent Estuary-Bruny Catchment
EPA 2020	Tasmanian EPA UPSS Regulations (2020)
PFAS	Per and Poly Fluoroalkylated Substances
HEPA 2020	Heads of EPA Australia and NZ
PFAS NEMP/HEPA	PFAS National Environmental Management Plan (HEPA, 2018)
TV	Trigger Value
HMTV	Hardness Modified Trigger Value derived per ANZECC (2000)
GV	Guideline Value
SPWQM	State Policy on Water Quality Management (1997)
WQG	Water Quality Guideline
ANZG 2018	Australian Water Quality Guidelines https://www.waterquality.gov.au/anz-guidelines
NHMRC 2018	Australian Drinking Water Guidelines, NHMRC 2018
NHMRC 2019	Guidance on PFAS in Recreational Water (NHMRC 2019)
**	HEPA 2018 and ANZG 2018, 99% guideline value for bioaccumulative contaminants
*	HEPA, 2018, 95% guideline value
^	Some recreational water resources may be used less frequently than the assumed guidelines (150 days/year), and (in rare cases) some may be used more frequently.
^^	Tasmanian EPA UPSS Regulations (2020) inferred LNAPL; petrol TPH means the total concentration of TPH between C6 and C14 or TRH between C6 and C16
1.81	SWL above screened interval

Attached Table B3 - Historical Groundwater Results
JN22377: Selfs Point SCA

Parameter Suite	Analyte Name	Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2-<4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Maintenance Intrusive Workers HSL-D 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines	Units	Sample ID	MW1		MW2		MW3	MW4		MW5d		MW5s		MW6	
								Sampling Date	9/05/2016	7/04/2022	9/05/2016	7/04/2022	9/05/2016	11/05/2016	7/04/2022	10/05/2016	7/04/2022	10/05/2016	7/04/2022	11/05/2016	7/04/2022
									LOR												
Gauging	Depth to Water (DTW)						mBTOC	0.1	1.550	2.155	1.635	1.880	1.620	1.312	1.810	6.782	6.962	6.505	6.895	6.739	6.855
	Total Well Depth (TD)						mBTOC	0.1	4.000	3.920	4.500	4.205	4.500	3.500	2.750	13.20	13.150	8.000	8.264	8.670	8.574
	Well Screen Interval						mBTOC	0.1	0.98-3.98	1.50 - 3.92	1.26-4.26	0.70 - 4.21	1.28-4.28	1.82-2.82	1.95 - 2.75	10.2-13.2	~10.5 -13.15	5.42-8.42	5.60 - 8.26	5.67 - 8.67	5.75 - 8.57
Physico-Chemical	Ammonia						mg/L	0.01	2.76	----	3.11	----	10.6	0.96	----	9.26	----	101	----	85.5	----
	Sulfate						mg/L	1	138	96	22	----	92	341	----	874	785	<10	<1	20	<1
	Chloride						mg/L	1	263	470	421	----	5660	343	----	7870	6230	3040	1890	1180	657
Dissolved Metals	Arsenic				100		µg/L	1	8	22	22	37	19	5	2	3	1	23	10	2	4
	Cadmium	0.7**			20		µg/L	0.1	<0.1	<0.1	0.7	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium	7/4.4 (CrIII/CrVI)			500 (CrVI)		µg/L	1	3	1	<1	<1	<1	<1	<1	<1	<1	2	3	1	1
	Copper	1.3			20000		µg/L	1	2	<1	1	<1	<1	5	<1	<1	<1	<1	<1	<1	<1
	Lead	4.4			100		µg/L	1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1
	Nickel	7**			200		µg/L	1	39	20	12	11	13	50	7	7	12	19	98	24	18
	Zinc	8			3000		µg/L	5	24	8	67	40	85	121	14	18	15	11	8	10	25
	Mercury				10		µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
C1-C4 Hydrocarbon Gases	Methane						µg/L	10	2580	----	4810	7690	5450	94	3800	525	393	1840	7870	10600	11900
Perfluoroalkyl Sulfonic Acids	Perfluorobutane sulfonic acid (PFBS)						µg/L	0.02	----	0.06	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluoropentane sulfonic acid (PFPeS)						µg/L	0.02	----	0.04	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorohexane sulfonic acid (PFHxS)					2	µg/L	0.01	----	0.18	----	<0.01	----	----	<0.01	----	<0.01	----	<0.01	----	<0.01
	Perfluoroheptane sulfonic acid (PFHpS)						µg/L	0.02	----	0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorooctane sulfonic acid (PFOS)	0.00023*				2	µg/L	0.01	----	0.19	----	0.01	----	----	0.03	----	<0.01	----	<0.01	----	<0.01
	Perfluorodecane sulfonic acid (PFDS)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
Perfluoroalkyl Carboxylic Acids	Perfluorobutanoic acid (PFBA)						µg/L	0.1	----	<0.1	----	<0.1	----	----	<0.1	----	<0.1	----	<0.1	----	<0.1
	Perfluoropentanoic acid (PFPeA)						µg/L	0.02	----	0.34	----	<0.02	----	----	<0.02	----	<0.02	----	0.04	----	<0.02
	Perfluorohexanoic acid (PFHxA)						µg/L	0.02	----	0.28	----	<0.02	----	----	<0.02	----	<0.02	----	0.04	----	<0.02
	Perfluoroheptanoic acid (PFHpA)						µg/L	0.02	----	0.19	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorooctanoic acid (PFOA)	19*				10^	µg/L	0.01	----	0.49	----	0.02	----	----	0.02	----	<0.01	----	0.02	----	<0.01
	Perfluorononanoic acid (PFNA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorodecanoic acid (PFDA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluoroundecanoic acid (PFUnDA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorododecanoic acid (PFDoDA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorotridecanoic acid (PFTriDA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorotetradecanoic acid (PFTeDA)						µg/L	0.05	----	<0.05	----	<0.05	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05

Attached Table B3 - Historical Groundwater Results
JN22377: Selfs Point SCA

		Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2- <4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Maintenance Workers HSL-D 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines			Sample ID	MW1		MW2		MW3	MW4		MW5d		MW5s		MW6	
									Sampling Date	9/05/2016	7/04/2022	9/05/2016	7/04/2022	9/05/2016	11/05/2016	7/04/2022	10/05/2016	7/04/2022	10/05/2016	7/04/2022	11/05/2016	7/04/2022
Parameter Suite	Analyte Name						Units	LOR														
Perfluoroalkyl Sulfonamides	Perfluorooctane sulfonamide (FOSA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	N-Methyl perfluorooctane sulfonamide (MeFOSA)						µg/L	0.05	----	<0.05	----	<0.05	----	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)						µg/L	0.05	----	<0.05	----	<0.05	----	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)						µg/L	0.05	----	<0.05	----	<0.05	----	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)						µg/L	0.05	----	<0.05	----	<0.05	----	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
(n:2) Fluorotelomer Sulfonic Acids	4:2 Fluorotelomer sulfonic acid (4:2 FTS)						µg/L	0.05	----	<0.05	----	<0.05	----	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)						µg/L	0.05	----	<0.05	----	<0.05	----	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	8:2 Fluorotelomer sulfonic acid (8:2 FTS)						µg/L	0.05	----	<0.05	----	<0.05	----	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)						µg/L	0.05	----	<0.05	----	<0.05	----	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
PFAS Sums	Sum of PFAS						µg/L	0.01	----	1.79	----	0.03	----	----	----	0.05	----	<0.01	----	0.1	----	<0.01
	Sum of PFHxS and PFOS					2^	µg/L	0.01	----	0.37	----	0.01	----	----	----	0.03	----	<0.01	----	<0.01	----	<0.01
	Sum of PFAS (WA DER List)						µg/L	0.01	----	1.73	----	0.03	----	----	----	0.05	----	<0.01	----	0.1	----	<0.01
Total Recoverable Hydrocarbons - NEPM 2013 Fractions	C6 - C10 Fraction						µg/L	20	----	<20	----	<20	----	----	----	<20	----	<20	----	<20	----	<20
	C6 - C10 Fraction minus BTEX (F1)	30000^^	6000	NL			µg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	>C10 - C16 Fraction	30000^^					µg/L	100	----	<100	----	<100	----	----	----	<100	----	<100	----	320	----	230
	>C16 - C34 Fraction	5000^^					µg/L	100	200	180	<100	100	<100	<100	<100	<100	<100	69900	940	270	620	
	>C34 - C40 Fraction	5000^^					µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	17800	160	<100	<100	
	>C10 - C40 Fraction (sum)						µg/L	100	----	180	----	100	----	----	----	<100	----	<100	----	1420	----	850
	>C10 - C16 Fraction minus Naphthalene (F2)	30000^^	NL	NL			µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	5210	320	160	230	
BTEXN	Benzene	500**/3000^^	5000	NL	10		µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Toluene	180	NL	NL	8000		µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Ethylbenzene	80	NL	NL	3000		µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	meta- & para-Xylene	75	NL	NL			µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	ortho-Xylene		NL	NL			µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Total Xylenes		NL	NL	6000		µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Sum of BTEX	20000^^					µg/L	1	----	<1	----	<1	----	----	----	<1	----	<1	----	<1	----	<1
	Naphthalene	50**	NL	NL			µg/L	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	12	<5	6	<5

Attached Table B3 - Historical Groundwater Results
JN22377: Sels Point SCA

Parameter Suite	Analyte Name	Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2- <4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Maintenance Intrusive Workers HSL-D 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines	Units	Sample ID	MW1		MW2		MW3	MW4		MW5d		MW5s		MW6	
								Sampling Date	9/05/2016	7/04/2022	9/05/2016	7/04/2022	9/05/2016	11/05/2016	7/04/2022	10/05/2016	7/04/2022	10/05/2016	7/04/2022	11/05/2016	7/04/2022
									LOR												
Polynuclear Hydrocarbons	Naphthalene	50**					µg/L	1	<2	<1.0	<2	<1.0	<2	<2	<1.0	<2	<1.0	54	<1.0	4	<1.0
	Acenaphthylene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	1.6	----	<1.0
	Acenaphthene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	1.6	----	<1.0
	Fluorene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	<1.0	----	<1.0
	Phenanthrene	0.6**					µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.6	----	<1.0
	Anthracene	0.01**					µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	1.4	----	<1.0
	Fluoranthene	1.0**					µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	9.2	----	<1.0
	Pyrene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	9.3	----	<1.0
	Benz(a)anthracene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.4	----	<1.0
	Chrysene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.5	----	<1.0
	Benzo(b+j)fluoranthene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.7	----	<1.0
	Benzo(k)fluoranthene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.3	----	<1.0
	Benzo(a)pyrene	0.1**			0.1		µg/L	0.5	<2	<0.5	<2	<0.5	<2	<2	<0.5	<2	<0.5	498	4.7	<2	<0.5
	Indeno(1.2.3.cd)pyrene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.1	----	<1.0
	Dibenz(a.h)anthracene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	<1.0	----	<1.0
	Benzo(g,h,i)perylene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	4	----	<1.0
	Sum of polycyclic aromatic hydrocarbons						µg/L	0.5	5	<0.5	<2	<0.5	<2	<2	<0.5	<2	<0.5	6410	52.4	8	<0.5
	Benzo(a)pyrene TEQ (zero)						µg/L	0.5	----	<0.5	----	<0.5	----	----	<0.5	----	<0.5	----	6.1	----	<0.5
Bacteriological	Escherichia coli (Colilert)						orgs/100m	1	<10	0	97	<10	<10	220	0	9	1	610	<10	20	<10
	Total Coliforms (Colilert)						orgs/100m	1	590	3	>24000	<10	11000	6900	15	>2000	14	>24000	<10	9800	<10

Abbreviation Notes

EPA 2021 Tasmanian EPA DGVs for Aquatic Ecosystems of the Derwent Estuary-Bruny Catchment

EPA 2020 Tasmanian EPA UPSS Regulations (2020)

PFAS Per and Poly Fluoroalkylated Substances

HEPA Heads of EPA Australia and NZ

PFAS NEMP/HEPA PFAS National Environmental Management Plan (HEPA, 2018)

TV Trigger Value

HMTV Hardness Modified Trigger Value derived per ANZECC (2000)

GV Guideline Value

SPWQM State Policy on Water Quality Management (1997)

WQG Water Quality Guideline

ANZG 2018 Australian Water Quality Guidelines <https://www.waterquality.gov.au/anz-guidelines>

NHMRC 2018 Australian Drinking Water Guidelines, NHMRC 2018

NHMRC 2019 Guidance on PFAS in Recreational Water (NHMRC 2019)

* HEPA 2018 and ANZG 2018, 99% guideline value for bioaccumulative contaminants

** HEPA, 2018, 95% guideline value

^ Some recreational water resources may be used less frequently than the assumed guidelines (150 days/year), and (in rare cases) some may be used more frequently.

^^ Tasmanian EPA UPSS Regulations (2020) inferred LNAPL; petrol TPH means the total concentration of TPH between C6 and C14 or TRH between C6 and C16

WorkSafe Record

GDA 94 POSITION MANIFEST LOCATION

EASTING-528514mE
NORTHING-5253030mN
(APPROX. ONLY)

PROPERTY IDENTITY NUMBER
5527258

EVACUATION & ASSEMBLY POINTS

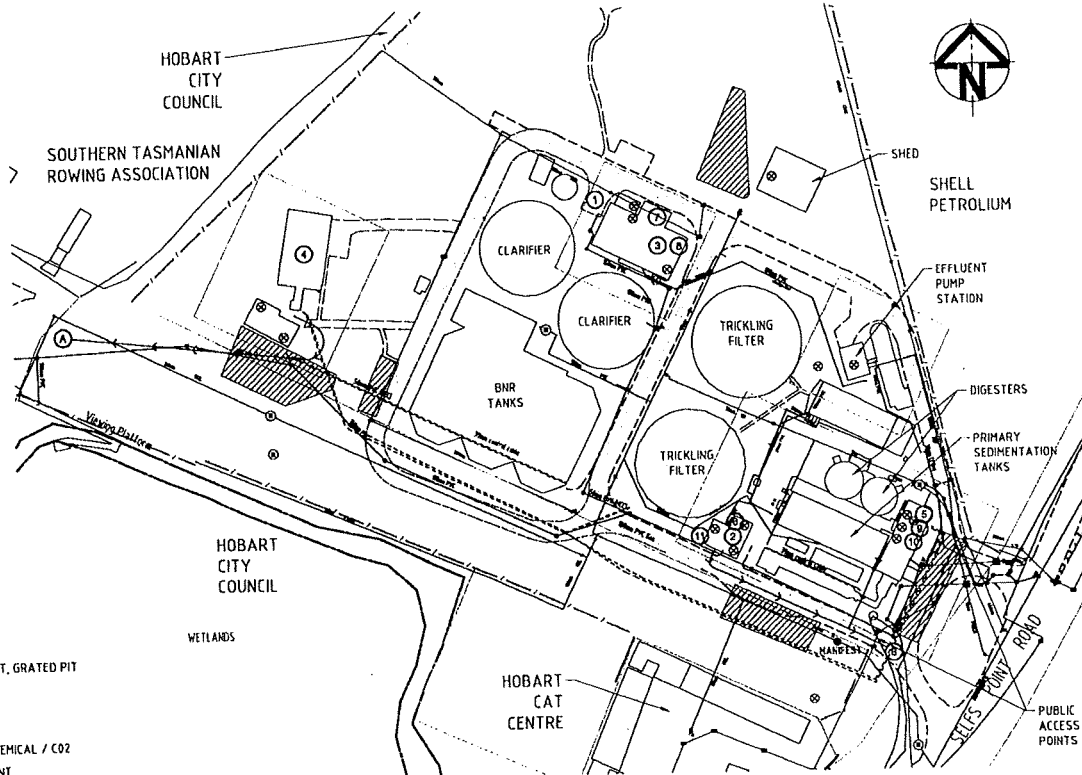
EVACUATION ROUTE
LAB ASSEMBLY
PLANT ASSEMBLY

BUILDING LEGEND

- 1 BULK STORAGE
- 2 CHLORINE BUILDING
- 3 DEWATERING STORAGE
- 4 LABORATORY
- 5 LOWER PUMP HOUSE (LEVEL 2)
- 6 OIL STORE
- 7 SAMPLING ROOM
- 8 SLUDGE ROOM
- 9 STORE ROOM (LEVEL 3)
- 10 WATERING CONTROL ROOM (LEVEL 3)
- 11 WORKSHOP

LEGEND

- BOUNDARY FENCE
- STORMWATER, JUNCTION PIT, GRATED PIT
- SEWER, MANHOLE
- WATER STOP VALVE
- FIRE HYDRANT
- FIRE PLUG
- FIRE EXTINGUISHER DRY CHEMICAL / CO2
- ELECTRICAL ISOLATION POINT
- INTERNAL ROADWAY
- CAR PARKING



SITE PLAN
SCALE 1:1000 @ A3

PRELIMINARY ONLY	DRAWING CHECK DATE: 10/10/10 BY: [Signature]	COORDINATION CHECK DATE: 10/10/10 BY: [Signature]	southern water	SEWER ENGINEER MANAGER & FACILITATOR	HAZARDOUS SUBSTANCES NOTIFICATION ASSESSMENT	SEWERS POINT WWTW EMERGENCY PLANS SITE LOCATION & PLAN	PRELIMINARY ONLY 3338.002-SP02
	3338.002-SP02						

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EASTING-528514mE
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EVACUATION & ASSEMBLY POINTS

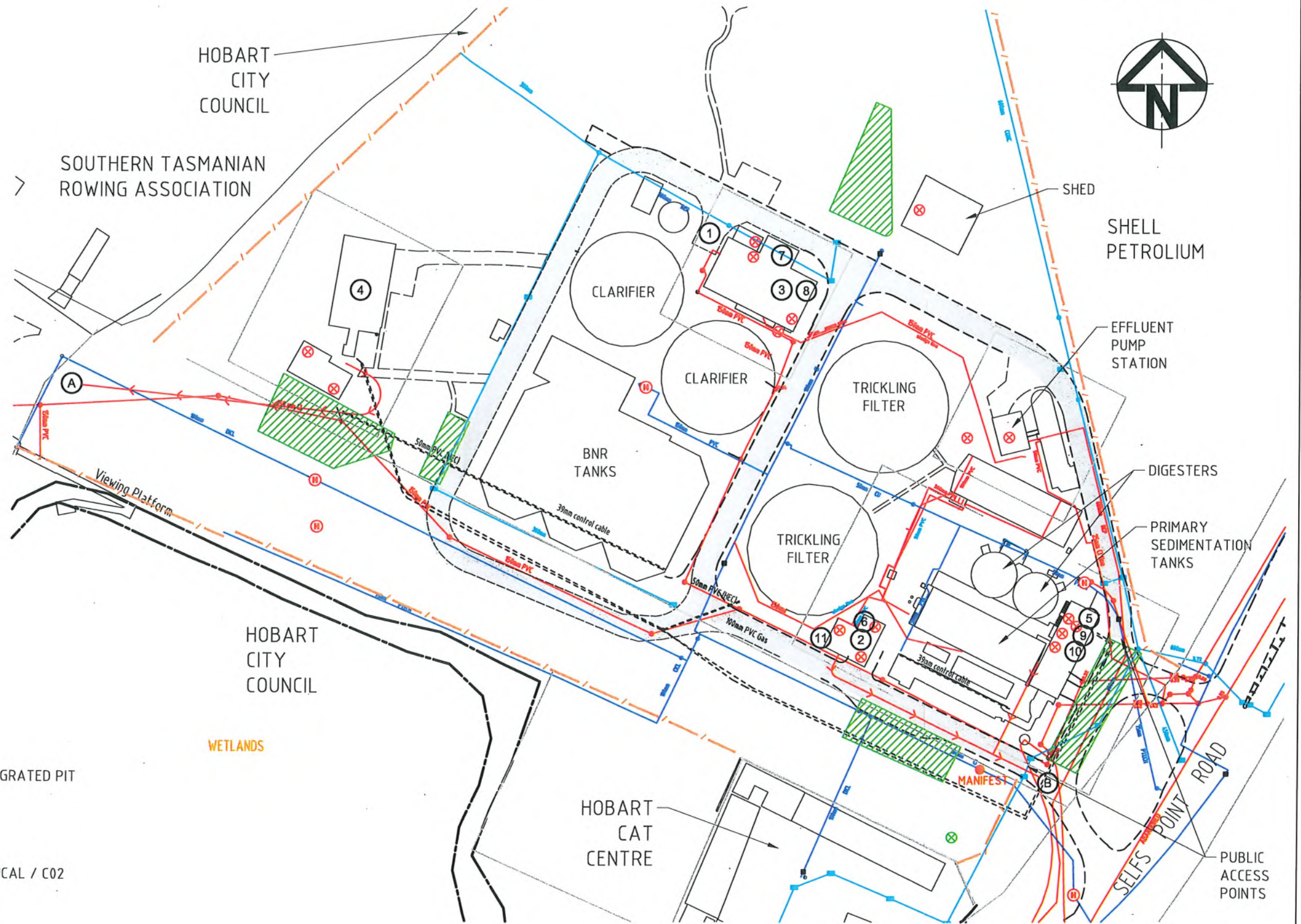
- ← EVACUATION ROUTE
- (A) LAB ASSEMBLY
- (B) PLANT ASSEMBLY

BUILDING LEGEND

- 1 BULK STORAGE
- 2 CHLORINE BUILDING
- 3 DEWATERING STORAGE
- 4 LABORATORY
- 5 LOWER PUMP HOUSE (LEVEL 2)
- 6 OIL STORE
- 7 SAMPLING ROOM
- 8 SLUDGE ROOM
- 9 STORE ROOM (LEVEL 3)
- 10 WATERING CONTROL ROOM (LEVEL 3)
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LEGEND

- / — BOUNDARY FENCE
- STORMWATER, JUNCTION PIT, GRATED PIT
- SEWER, MANHOLE
- WATER, STOP VALVE
- ⊕ FIRE HYDRANT
- ⊕ FIRE PLUG
- ⊕ FIRE EXTINGUISHER DRY CHEMICAL / CO2
- ⊕ ELECTRICAL ISOLATION POINT
- INTERNAL ROADWAY
- ▨ CAR PARKING



SITE PLAN
SCALE 1:1000 @ A3

DO NOT SCALE THIS DRAWING. Use only dimensions shown. All dimensions should be checked on site. Drawing to be read in conjunction with the associated notes and specifications. Drawing to be read in conjunction with all other services, architectural and structural. These designs, drawings and specifications are copyright and must not be altered, reproduced or copied wholly or in any part without the written permission of SEMF Pty Ltd. All rights reserved.



DRAWING CHECK SIGNATURE: [] DATE: 18.3.10 DESIGNED: CWG CHECKED: [] CLIENT: []		CO-ORDINATION CHECK SIGNATURE: [] DATE: [] STRUCT: [] MECH: [] ELEC: [] HYDRAUL: [] PREP: []		CLIENT 	ENGINEERS 	PROJECT DANGEROUS SUBSTANCES NOTIFICATION ASSESSMENT	TITLE SELFS POINT WWTW EMERGENCY PLANS SITE LOCATION & PLAN	SCALE 1:1000 DRAWING NO: 3338.002-SP02	STATUS PRELIMINARY ONLY NOT TO BE USED FOR CONSTRUCTION	REVISIONS REV. 1 DATE: 18.3.10 DESCRIPTION: []
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Dangerous Goods Storage Details for Selfs Point, Hobart City Council

Site Number: 3037

Item No.	Correct Technical Name of Goods	UN No.	Class	Sub-Risk	Packaging Group	HAZCHEM Code	Amount (kilolitre/tonnes)	Nature of Storage	Australian Standard	DG Reg.
1	Chlorine	1071	2.3	8	N/A	2XE	1.840 kl	2 x 920kg drums	2927	53(3)
2	Calcium Hypochlorite	2880	5.1	---	II or III	2W	0.160 t	2 x 80 kg drums	3780	53(8)
3	Methane (Natural Gas)	1971	2.1	---	N/A	2[S]E		By product		
4	Diesel	N/A	3	---	---	---	4500 l	Underground tank	1940	53(4)
5	Ferric Sulphate (4% Sulfuric Acid)	1760	8	---	II	2R	3 kl	Aboveground tank	3780	53(8)

R E LEESON
INSPECTOR/MANAGEMENT SPECIALIST

Date: 30 September 1998

Field Sheets

Daily Running Sheet

Sampling Event:

Date: 07 / 04 / 2022	Project Name: Selfs Point GMW
Job Number: JN22377	Client: Dan Elson - ERA Planning
Location Details: 12 Selfs Point Rd, New Town	Personnel: EH & MU

Weather: Sunny, clear

[illegible]

Groundwater Sampling Sheet

Well-ID:

MW1

Date:	07/04/22	Sampled By:	EH/MU	Photo	☒
Job Number:	JN 22377	Stickup/Flush:	Flush	Stabilised	☒
Project Name:	Self Point	Locked/Key Type:	-	Obs Complete	☒
Client:	San Elson - EPA Planning	Height TOC (m):	-		

Location Details:

MW1 near point opp Derwent

Well Condition / Maintenance:

Good, Landfill gas cap, Left tubing in well

Gauging

Gauging Date/Time:	0819 - 07/04/22	Well Diameter (D) (mm):	50mm
Depth to Water (DTW) (mTOC):	2.155	Screen Interval (m) - From:	To:
Total Well Depth (TD) (mTOC):	3.920	Bore Volume:	2.55

Bore Volume
Calcs:

Bore Volume =

(3.9 - 2.16) x 1.9625

TD (m) - DTW (m)

CO2 = 7380 ppm over
 PID = 2.1 ppm
 VOC = 0.0 ppm

Well Purging

Purging Date/Time:	07/04/22 0935	Purging Method:	Low Flow
Purge Depth:	3.30m	DTW 2.13m	Total Purge Volume: 3.5L

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
9:35	2.10	0.5	16.5	0.74	4339	7.00	-163.2	46.82	3
948	2.27	1.0	16.6	0.80	4186	7.00	-162.8	38.79	3
9:55	2.30	1.5	16.7	0.67	4123	7.01	-167.1	45.02	3
956	2.30	2.0	16.7	0.64	4063	7.01	-168.4	44.02	3
957	2.305	2.5	16.7	0.58	4018	7.01	-169.1	36.83	3
1000	2.295	3.0	16.6	0.55	4017	7.01	-169.4	22.05	2
1004	2.320	3.5	16.6	0.51	4006	7.00	-169.6	13.04	2

Observations during purging (odour, colour, turbidity)

No odour or sheen, light brown, slightly turbid

Pump: 15psi

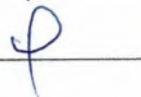
Sampling Not-sampled

Sampling Date/Time:	07/04/22	Start:	1005	Finish:	10:20
Sampling Method:	Low Flow	Sampling Depth (m):	2.32		

Lab Analysis

Time on Bottles/COC:	1005	2AG	Metals Field Filtered?	☒ YES	NO
Sample Bottles Number:	2F4 0.22	Type: 5P + 1AG + 2V + 2PFA	DOC Field Filtered?	YES	NO
Analysis:	AG per work order	Lab QA/QC			
QAQC Information:	Daily RB, FB				

Signoff:



* Lab QA/QC

2AG + 2PFAS

* samples

5P + 2V + 1AG

Groundwater Sampling Sheet

Well-ID:

MW2

Date:	07/04/22	Sampled By:	EH/MO	Photo	☒
Job Number:	JN 22377	Stickup/Flush:	Flush	Stabilised	☒
Project Name:	Self Point	Locked/Key Type:	-	Obs Complete	☒
Client:	Don Elson - EPA Planning	Height TOC (m):	-		

Location Details: MW2 west side

Well Condition / Maintenance: Good. Landfill gas cap. Left tubing in well

Gauging

Gauging Date/Time:	07/04/20 0830	Well Diameter (D) (mm):	50mm
Depth to Water (DTW) (mTOC):	1.880	Screen Interval (m) - From:	To:
Total Well Depth (TD) (mTOC):	4.205	Bore Volume:	4.55

Bore Volume
Calcs:

Bore Volume =

4.2188

x 1.9625

TD (m) - DTW (m)

CO2 = 7720ppm aer
 PID = 0.0ppm
 VOC = 0.0

Well Purging

Purging Date/Time:	07/04/22 1040	Purging Method:	Low Flow
Purge Depth:	2.9m	DTW = 1.785	Total Purge Volume: 3.5L

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
10:56	2.09	0.5	18.1	0.53	2328	7.05	-164.6	65.0	2
11:00	2.185	1.0	18.3	0.53	2349	7.04	-162	53.6	2
11:02	2.202	1.5	18.3	0.48	2363	7.04	-162	39.0	2
11:07	2.210	2.0	19.0	0.45	2375	7.04	-162.9	36.5	1
11:15	2.14	2.5	18.5	0.37	2404	7.05	-166.7	65.0	1
11:24	2.190	3.0	18.0	0.32	2374	7.05	-167.3	65.9	1
11:30	2.25	3.5	17.6	0.31	2363	7.05	-167.0	66.2	1

Observations during purging (odour, colour, turbidity)

no odour, no sheen, slightly turbid.

Pump = 15psi

Sampling

Not sampled

Sampling Date/Time:	07/04/22	Start:	1130	Finish:	1145
Sampling Method:	Low Flow	Sampling Depth (m):	2.9		

Lab Analysis

Time on Bottles/COC:	1130	Metals Field Filtered?	☒ YES	NO		
Sample Bottles Number:	7	Type:	4P+1AG+2V	DOC Field Filtered?	☒ YES	NO
Analysis:	As per work order					
QA/QC Information:	Daily RB/FB					

Signoff:



* RBOI 2V+3P+1AG
 * FBOI 2V+3P+1AG

4P + 2V + 1AG

Groundwater Sampling Sheet

Well-ID:

MW4

Date:	07/04/22	Sampled By:	EH/MU	Photo	☒
Job Number:	JN 22377	Stickup/Flush:	Flush	Stabilised	☒
Project Name:	Self Point	Locked/Key Type:	-	Obs Complete	☒
Client:	Don Elson - ERA Planning	Height TOC (m):	-		

Location Details:

MW4 near tanks

Well Condition / Maintenance:

Good. Landfill gas cap - left tubing in well

Gauging

Gauging Date/Time:	07/04/22 0838	Well Diameter (D) (mm):	50mm
Depth to Water (DTW) (mTOC):	1.81	Screen Interval (m) - From:	To:
Total Well Depth (TD) (mTOC):	2.75	Bore Volume:	1.85

Bore Volume
Calcs:

Bore Volume = 2.75×1.81 x 1.9625
 TD (m) - DTW (m)

CO₂ = 3980 ppm over
 AD = 0.0 ppm

Well Purging

Purging Date/Time:	07/04/22 1156	Purging Method:	Low Flow
Purge Depth:	2.2m DTW 1.81m	Total Purge Volume:	2.5L

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
1207	1.81	0.5	21.1	1.99	1882	7.24	-105.7	78.8	2
1212	1.81	1.0	20.1	2.44	1872	7.22	-113.0	35.0	2
1216	1.82	1.5	20.1	2.48	1872	7.22	-112.7	24.0	2
1219	1.81	2.0	20.4	2.59	1868	7.22	-111.9	20.4	2
1223	1.81	2.5	20.6	2.42	1867	7.21	-113.3	20.0	2

Observations during purging (odour, colour, turbidity)

No odour, no sheen, very slightly turbid.

* Pump: 15psi

Sampling

~~Not sampled~~

Sampling Date/Time:	07/04/22	Start:	1223	Finish:	1239
Sampling Method:	Low Flow	Sampling Depth (m):	2.75		

Lab Analysis

Time on Bottles/COC:	1223	Metals Field Filtered?	☒ YES NO
Sample Bottles Number:	7 + 3	Type:	4P + 2V + 1AG - 2P + 1AG
Analysis:	As per work order	DOC Field Filtered?	☒ YES NO
QA/QC Information:	Daily RB/FB		

* Lab QA/QC
 2PFA's + 1AG

Signoff:



4P + 2V + 1AG

Groundwater Sampling Sheet

Well-ID:

MWS-Deep

Date:	07/04/22	Sampled By:	EH/MU	Photo	☒
Job Number:	JN 22377	Stickup/Flush:	stickup	Stabilised	☒
Project Name:	Self Point	Locked/Key Type:	-	Obs Complete	☒
Client:	Dan Elson - EFA Planning	Height TOC (m):	-		

Location Details: MWS - Deep near rowing shed.

Well Condition / Maintenance: Good condition, landfill gas cap

'left tubing in well'

Gauging

Gauging Date/Time: 07/04/22 0900 Well Diameter (D) (mm): 50mm Casing = 0.70m
 Depth to Water (DTW) (mTOC): 6.962 Screen Interval (m) - From: To:
 Total Well Depth (TD) (mTOC): 13.150 Bore Volume:

Bore Volume
 Calcs: Bore Volume = () x 1.9625
 TD (m) - DTW (m)

CO₂ = 1560ppm CH₄ = 4 % LEL
 VOC = 1.8ppm
 NO 00002

Well Purging

Purging Date/Time: 7/4/22 14:38 Purging Method: low flow
 Purge Depth: 11.00 DTW 6.96 Total Purge Volume: 4.0 L

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
14:43	6.998	0.5	18.8	1.09	8499	6.76	-106.7	5.16	2
14:46	7.01	1.0	17.9	0.93	11058	6.75	-118.2	4.89	2
14:48	7.02	1.5	17.6	1.13	14694	6.69	-112.1	6.28	2
14:51	7.025	2.0	17.4	1.35	16846	6.63	-95.4	4.40	2
14:54	7.03	2.5	17.1	1.57	17574	6.60	-76.7	3.49	2
14:57	7.025	3.0	17.0	1.69	17930	6.59	-68.0	3.44	2
14:59	7.01	3.5	17.0	1.81	18172	6.59	-61.5	3.13	2
15:03	7.025	4.0	17.0	1.92	18230	6.59	-56.4	2.81	2

Observations during purging (odour, colour, turbidity)

Clear, no odour, no sheen

pump 26 psi

Sampling Not sampled

Sampling Date/Time: 7/4/22 Start: 1503 Finish: 1515
 Sampling Method: low flow Sampling Depth (m): 11.0 m

Lab Analysis

Time on Bottles/CO₂: 1503 Metals Field Filtered? ☒ YES NO
 Sample Bottles Number: 11 Type: SP + 4V + 2 AG DOC Field Filtered? ☒ YES NO
 Analysis: As per work order
 QA/QC Information: Daily FB/RB

Signoff:

①

Main Sample: SP + 4V + 1 AG
 Lab QA/QC: 1 AG

2 AG
 4 V
 5 P

Groundwater Sampling Sheet

Well-ID:

MWS - Shallow

Date:	07/04/22	Sampled By:	EH/MU	Photo	✓
Job Number:	JN 22377	Stickup/Flush:	stickup	Stabilised	✓
Project Name:	Self Point	Locked/Key Type:	-	Obs Complete	✓
Client:	Don Elson - EPA Planning	Height TOC (m):	-		

Location Details: MWS - near ring ditch.

Well Condition / Maintenance: Good

Gauging

Gauging Date/Time: 07/04/22 0905 Well Diameter (D) (mm): 50mm Casing = 0.755m
 Depth to Water (DTW) (mTOC): 6.895 Screen Interval (m) - From: To:
 Total Well Depth (TD) (mTOC): 8.264 Bore Volume: 1.37L

Bore Volume Calcs: Bore Volume = $8.26 \times 6.89 \times 1.9625$ CO₂ = over CH₄ = over
 TD (m) - DTW (m) VOC = 1.8ppm
 Strong HC odour

Well Purging

Purging Date/Time: 07/04/22 1523 Purging Method: Low Flow
 Purge Depth: 7.8m DTW: 6.70 Total Purge Volume:

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
15:58	6.97	0.5	18.5	0.86	8804	6.77	-113.0	40.17	1
16:03	7.08	1.0	17.6	1.13	8870	6.75	-107.0	123.56	1
16:08	7.235	1.5	16.9	0.66	8849	6.72	-115.4	168.95	1

Observations during purging (odour, colour, turbidity)

Sampled before stabilisation due to lack of water recharge
 Strong HC odour, grey, turbid * Pump: 25psi

Sampling

Not sampled
 Sampling Date/Time: 07/04/22 Start: 1610 Finish: 1650
 Sampling Method: Low Flow Sampling Depth (m): 7.80

Lab Analysis

Time on Bottles/COC: 1610 Metals Field Filtered? YES NO
 Sample Bottles Number: 10+2+6 Type: DOC Field Filtered? YES NO
 Analysis: As per work order
 QA/QC Information: Daily RB/FB

Signoff:



Main Sample: SP + 4V + 1AG
 FD: 1AG + 2V + 3P
 Lab QA/QC: 2AG

Groundwater Sampling Sheet

Date: 07/04/22		Sampled By: EH/MU		Well-ID: MW6	
Job Number: JN 22371		Stickup/Flush: Stickup		Photo: ☒	
Project Name: Self Pmt		Locked/Key Type: -		Stabilised: ☒	
Client: Dan Elson - EPA Planning		Height TOC (m): -		Obs Complete: ☒	

Location Details:

Well Condition / Maintenance:

Gauging

Gauging Date/Time: 07/04/22 0852 Well Diameter (D) (mm): 50mm Casing = 0.75m
 Depth to Water (DTW) (mTOC): 6.855 Screen Interval (m) - From: To:
 Total Well Depth (TD) (mTOC): 8.574 Bore Volume:

Bore Volume = 2.576.86 x 1.9625 CO2 = over CH4 = over
 Calcs: TD (m) - DTW (m) VOC = 0.0 ppm

Well Purging

Purging Date/Time: 7/04/22 1340 Purging Method: Low Flow
 Purge Depth: 7.9m DTW = 6.82m Total Purge Volume: 2.5L

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
13:45	6.88	0.5	18.2	0.44	4861	6.53	-138.3	50.16	2
13:49	6.918	1.0	17.3	0.45	4848	6.50	-138.5	57.71	2
13:51	6.93	1.5	17.4	0.38	4857	6.50	-141.3	56.98	2
13:55	6.835	2.0	17.3	0.35	4856	6.50	-143.2	54.03	2
14:00	6.95	2.5	17.2	0.33	4862	6.50	-145.5	45.55	2-

Observations during purging (odour, colour, turbidity)

Light sheen, light to moderate turbidity, no odour

Sampling ~~Not sampled~~

Sampling Date/Time: 07/04/22 Start: 1400 Finish: 1415
 Sampling Method: Low Flow Sampling Depth (m): 7.4m

Lab Analysis

Time on Bottles/COC: 1400 Metals Field Filtered? ☒ YES NO
 Sample Bottles Number: 12 Type: SP+3AG+4V DOC Field Filtered? YES NO
 Analysis: AS per work order
 QA/QC Information: Daily RB/RB

Signoff: 

Main Sample: SP+4V+2AG
 Lab QA/QC: 2AG

+ extra QC sample.
 3 AG
 4 V
 5 P.



Site:	SELS Point	GA5000 Number:	
Date:	4/5/22	Calibration Cert Photo?	☒ Y ☐ N
Monitoring Personnel:	EF + LC	Fresh Air Check Done?	☒ Y ☐ N
Nearest BOM station:			
Start Time:	12:02	End Time:	
Atmospheric Pressure at START (BOM):	1008.7	Atmospheric Pressure at END (BOM):	
Atmospheric Pressure at START (GA5000):	1008	Atmospheric Pressure at END (GA5000):	

Enter shaded data in the master data sheet																				
	Well/Bore ID	Start Time	Atmospheric Pressure	Relative Pressure	Flow	Stabilised (% v/v)		O ₂	CO	H ₂ S	Nitrogen Balance	Peak (% v/v)		Min O ₂ (% v/v)	Aspiration Time	Depth to Water	Site Photo taken?	Photo of Gas Meter Taken?	End Time	Comments
						CH ₄	CO ₂					CH ₄	CO ₂							
MW1	12:08	1008	0.005	0	0.1	7.2	14.1	0	0	0	78.5	0.1	7.2	14.1	18.5	2.196	✓	✓	12:03	
MW2	12:35	1002	-0.03	0	0.0	6.1	16.1	0	0	0	77.8	0	6.1	16.1	18.0	1.902	✓	✓	12:35	
MW4	12:37	1009	-5.91	-2.9	0.1	4.9	13.1	0	0	0	82.0	0.1	4.0	13.1	18.0	1.858	✓	✓	12:38	
MWB	1:00	1009	0.07	-0.1	46.9	27.5	0.2	0	0	0	25.4	47.0	27.6	0.2	18.0	6.701	✓	✓	1:09	
MWSD	1:25	1009	15.54	6.9	0.1	1.5	20.1	0	0	0	78.3	2.5	1.6	20.1	18.0	6.758	✓	✓	1:28	
MWSS	1:33	1009	~~53.9~~ 0.10	0.1	53.9	23.6	6.0	1	3	0	22.6	54.0	23.6	0	18.0	6.802	✓	✓	1:36	

6.842-1 rhr
DIN
revised

Table 4a
Groundwater Results

Total Recoverable Hydrocarbons, Benzene, Toluene, Ethylbenzene, Xylenes, Polycyclic Aromatic Hydrocarbons										
Sample ID	Sample Date	Depth To Water (m)	Confining Geology	Total Recoverable Hydrocarbons (mg/L) with Silica Gel Cleanup				Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)
				F1 C6 - C10 less BTEX	F2 >C10 - C16 less Naphthalene	F3 >C16 - C34	F4 >C34 - C40			
MM1	09-May-16	1.550	CLAY	<0.02	<0.1	<0.1	<0.1	<0.001	<0.002	<0.002
MM2	09-May-16	1.635	CLAY	<0.02	<0.1	<0.1	<0.1	<0.001	<0.002	<0.002
MM3	09-May-16	1.620	CLAY	<0.02	<0.1	<0.1	<0.1	<0.001	<0.002	<0.002
MM4	11-May-16	1.312	CLAY	<0.02	<0.1	<0.1	<0.1	<0.001	<0.002	<0.002
MM5-5	10-May-16	6.505	SILT	<0.02	<0.10	<0.10	<0.10	<0.001	<0.002	<0.002
MM5-D	10-May-16	6.782	SILT	<0.02	4.15	63.7	15.5	<0.001	<0.002	<0.002
MM6	11-May-15	6.739	SILT	<0.02	<0.1	<0.1	<0.1	<0.001	<0.002	<0.002
Limit of Reporting water ALS Laboratory				0.02	0.1	0.1	0.1	0.001	0.002	0.002

NOMINATED INVESTIGATION CRITERIA

(b) NEPM GW HSL 'C' for Vapour intrusion	SILT: 4 - 8 m	NL	NL	-	-	NL	NL	NL	-	-	NL
(b) NEPM GW HSL 'D' for Vapour intrusion	SILT: 4 - 8 m	NL	NL	-	-	30	NL	NL	-	-	NL
(b) NEPM GW HSL 'D' for Vapour intrusion	CLAY: 2 - 4 m	NL	NL	-	-	30	NL	NL	-	-	NL
(b) CRC CARE HSL 'MMV' for Vapour intrusion	ALL	NL	NL	-	-	NL	NL	NL	-	-	NL
(b) ANZECC Trigger Values for Marine ecosystem (95% species protection)	-	-	-	-	-	-	-	-	-	-	-
(b) NEPM GIL for Marine water ecosystem protection	-	-	-	-	-	0.500	-	-	-	-	-
(b) Solubility limit SAND, SILT and CLAY	9	3	-	-	-	59	61	3.9	-	-	21

Table Notes

- (c) Australian and new Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy, Australian and New Zealand Environment and Conservation Council, 200
- 1) Assessment criteria for a commercial site ('D') are obtained from National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (NEPC, 1999)
- 2) Laboratory analysis of naphthalene is conducted using two separate methods, EPO80: extracting sample from the vial preserved for volatiles and EPO75(SIM)B: extracting sample from the uprease naphthalene concentration from EPO80 is used for F2 calculation.
- , " " denotes analyte not tested by laboratory, or no criteria available.
- Highlighted values exceed nominated investigation criteria

Table Abbreviations

NEPM: National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013
 CRC CARE: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment
 HSL: Health Screening Level
 GIL: Groundwater Investigation Level
 MMV: Intrusive Maintenance Worker
 mBS: metre below ground surface

Actual
 Screen 1.5m
 Screen 0.7m
 Screen 2.1.95m
 5.600 mBS
 Screen 5.75-8.55
 5.75-8.55
 3.55 - 9.0m
 Estimated
 1.2 - 4.0m
 1.5 - 4.5m
 1.5 - 4.5m
 2.0 - 4.5m
 4.5 - 8.0m
 10.6 - 13.95m



Latest Weather Observations for Hobart

IDT60901

Issued at 9:11 pm EST Wednesday 4 May 2022 (issued every 10 minutes, with the page automatically refreshed every 10 minutes)

Station Details ID: 094029 Name: HOBART (ELLERSLIE ROAD) Lat: -42.89 Lon: 147.33 Height: 50.5 m

Data from the previous 72 hours. | See also: [Recent months at Hobart](#)

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
04/09:00pm	9.6	7.7	6.5	81	1.4	W	6	15	3	8	1012.6	1012.6	0.8
04/08:30pm	9.9	7.4	6.6	80	1.5	W	9	11	5	6	1012.4	1012.4	0.8
04/08:00pm	10.6	8.9	5.8	72	2.2	SSE	4	9	2	5	1012.2	1012.2	0.8
04/07:30pm	10.8	9.0	7.1	78	1.8	S	6	9	3	5	1012.1	1012.1	0.8
04/07:00pm	10.9	9.0	6.8	76	1.9	WSW	6	9	3	5	1011.5	1011.5	0.8
04/06:30pm	11.0	7.8	6.7	75	2.0	WNW	13	20	7	11	1011.1	1011.1	0.8
04/06:00pm	11.6	7.9	6.5	71	2.4	NW	15	20	8	11	1010.7	1010.7	0.8
04/05:30pm	11.5	9.0	6.4	71	2.4	W	9	15	5	8	1010.4	1010.4	0.8
04/05:00pm	11.8	8.9	6.7	71	2.4	WNW	11	19	6	10	1009.7	1009.8	0.8
04/04:30pm	12.4	9.6	6.9	69	2.6	NW	11	19	6	10	1009.3	1009.4	0.8
04/04:00pm	12.7	10.6	6.7	67	2.9	NNE	7	15	4	8	1009.2	1009.3	0.8
04/03:30pm	12.9	11.3	8.0	72	2.4	NNE	6	9	3	5	1009.3	1009.4	0.8
04/03:00pm	12.6	10.4	7.9	73	2.3	SSE	9	13	5	7	1008.9	1009.0	0.8
04/02:30pm	12.9	10.4	8.2	73	2.3	WNW	11	19	6	10	1008.7	1008.8	0.8
04/02:00pm	14.4	11.8	7.9	65	3.2	NNW	11	15	6	8	1008.6	1008.7	0.4
04/01:30pm	14.2	10.9	8.2	67	3.0	NNW	15	22	8	12	1008.7	1008.8	0.4
04/01:00pm	14.1	11.1	9.1	72	2.6	NNW	15	24	8	13	1008.4	1008.5	0.4
04/12:30pm	13.6	10.9	8.9	73	2.4	NW	13	20	7	11	1008.5	1008.6	0.4
04/12:00pm	13.3	11.1	9.2	76	2.1	NNW	11	19	6	10	1008.2	1008.3	0.4
04/11:30am	12.9	10.1	9.9	82	1.5	N	15	24	8	13	1008.6	1008.7	0.4
04/11:00am	13.3	10.1	9.9	80	1.8	N	17	24	9	13	1009.0	1009.1	0.2
04/10:30am	13.2	10.3	9.6	79	1.8	N	15	22	8	12	1009.0	1009.1	0.2
04/10:00am	13.0	8.6	8.9	76	2.1	NNW	22	30	12	16	1008.8	1008.9	0.2
04/09:30am	13.3	10.4	9.5	78	1.9	NNW	15	20	8	11	1008.4	1008.5	0.0
04/09:00am	13.0	10.9	9.8	81	1.6	N	11	15	6	8	1008.3	1008.4	3.2
04/08:30am	13.3	12.4	11.2	87	1.1	N	7	11	4	6	1008.6	1008.7	2.6
04/08:00am	13.2	11.9	11.4	89	1.0	NE	9	11	5	6	1008.0	1008.1	2.4
04/07:30am	12.9	12.8	10.8	87	1.1	WSW	2	7	1	4	1007.8	1007.9	2.4
04/07:00am	13.3	13.3	11.2	87	1.1	SE	2	6	1	3	1007.5	1007.6	2.0
04/06:30am	13.5	12.1	11.0	85	1.3	NW	9	17	5	9	1006.9	1007.0	1.8
04/06:00am	13.6	11.1	11.0	84	1.4	NW	15	19	8	10	1006.7	1006.8	1.8
04/05:30am	13.6	11.9	11.3	86	1.2	NW	11	17	6	9	1006.5	1006.6	1.6
04/05:00am	13.7	11.7	11.4	86	1.2	NNW	13	17	7	9	1006.2	1006.3	1.6
04/04:30am	13.7	12.1	11.4	86	1.2	NW	11	17	6	9	1006.0	1006.1	1.6
04/04:00am	13.6	11.5	11.3	86	1.2	NW	13	20	7	11	1005.9	1006.0	1.2
04/03:30am	13.8	11.3	11.1	84	1.4	NNW	15	24	8	13	1005.6	1005.7	1.2
04/03:00am	14.0	10.6	10.6	80	1.8	NNW	19	26	10	14	1006.0	1006.1	1.2
04/02:30am	14.7	10.1	9.7	72	2.6	NW	24	39	13	21	1006.5	1006.6	0.8
04/02:00am	15.9	13.2	10.4	70	2.9	WNW	15	22	8	12	1006.6	1006.7	0.0
04/01:30am	16.7	12.8	9.4	62	3.8	NNW	20	28	11	15	1005.8	1005.9	0.0
04/01:00am	16.7	12.0	9.4	62	3.8	N	24	35	13	19	1005.6	1005.7	0.0
04/12:30am	17.1	11.9	9.0	59	4.2	NNW	26	41	14	22	1005.8	1005.9	0.0
04/12:00am	17.2	13.1	8.6	57	4.4	N	20	35	11	19	1005.9	1006.0	0.0

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
03/11:30pm	17.4	13.3	8.8	57	4.4	N	20	35	11	19	1006.3	1006.4	0.0
03/11:00pm	17.3	13.7	8.4	56	4.6	N	17	28	9	15	1006.8	1006.9	0.0
03/10:30pm	17.2	14.3	8.1	55	4.6	NNE	13	19	7	10	1007.1	1007.2	0.0
03/10:00pm	17.3	13.7	8.2	55	4.7	NNE	17	30	9	16	1007.3	1007.4	0.0
03/09:30pm	17.6	14.3	7.9	53	4.9	NNE	15	22	8	12	1007.5	1007.6	0.0
03/09:00pm	17.6	13.4	7.6	52	5.1	NNE	19	30	10	16	1007.6	1007.7	0.0
03/08:30pm	17.9	13.7	7.6	51	5.2	NNE	19	30	10	16	1007.7	1007.8	0.0
03/08:00pm	18.1	13.7	7.5	50	5.4	N	20	35	11	19	1007.8	1007.9	0.0
03/07:30pm	18.3	14.1	7.4	49	5.5	N	19	32	10	17	1007.9	1008.0	0.0
03/07:00pm	18.6	13.8	7.4	48	5.7	N	22	33	12	18	1008.0	1008.1	0.0
03/06:30pm	18.8	14.1	7.6	48	5.7	N	22	35	12	19	1007.8	1007.9	0.0
03/06:00pm	19.1	14.0	7.5	47	5.9	N	24	44	13	24	1007.9	1008.0	0.0
03/05:30pm	19.4	15.0	7.2	45	6.2	N	20	32	11	17	1007.7	1007.8	0.0
03/05:00pm	19.8	14.6	7.2	44	6.4	N	24	44	13	24	1007.5	1007.6	0.0

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
03/04:30pm	19.9	15.5	7.3	44	6.4	N	20	32	11	17	1007.7	1007.8	0.0
03/04:00pm	20.1	15.7	7.5	44	6.5	N	20	30	11	16	1007.8	1007.9	0.0
03/03:35pm	20.4	13.9	6.7	41	6.9	NNW	30	48	16	26	1008.1	1008.2	0.0
03/03:30pm	20.5	13.6	6.5	40	7.1	NNW	32	48	17	26	1008.2	1008.3	0.0
03/03:26pm	20.5	14.4	6.5	40	7.1	NNW	28	48	15	26	1008.2	1008.3	0.0
03/03:00pm	20.7	15.4	7.0	41	7.0	NNW	24	37	13	20	1008.3	1008.4	0.0
03/02:30pm	20.8	14.8	7.1	41	7.0	NNW	28	46	15	25	1008.3	1008.4	0.0
03/02:29pm	20.8	14.8	7.1	41	7.0	NNW	28	46	15	25	1008.3	1008.4	0.0
03/02:00pm	21.0	14.6	6.9	40	7.2	NW	30	41	16	22	1008.3	1008.4	0.0
03/01:30pm	20.9	14.1	7.5	42	6.9	NW	33	52	18	28	1008.3	1008.4	0.0
03/01:22pm	21.0	14.0	6.9	40	7.2	NW	33	52	18	28	1008.3	1008.4	0.0
03/01:00pm	21.1	15.5	7.3	41	7.1	NW	26	46	14	25	1008.5	1008.6	0.0
03/12:34pm	21.2	14.6	7.8	42	7.0	NW	32	50	17	27	1008.8	1008.9	0.0
03/12:30pm	21.1	14.4	8.0	43	6.8	NW	33	50	18	27	1008.9	1009.0	0.0
03/12:03pm	20.3	13.8	8.3	46	6.3	NW	32	50	17	27	1009.3	1009.4	0.0
03/12:00pm	20.4	13.7	8.1	45	6.4	NW	33	50	18	27	1009.4	1009.5	0.0
03/11:36am	20.3	14.7	8.6	47	6.1	NW	28	54	15	29	1009.8	1009.9	0.0
03/11:30am	20.1	14.1	8.8	48	5.9	NW	30	44	16	24	1009.9	1010.0	0.0
03/11:23am	20.0	14.5	9.0	49	5.8	NNW	28	46	15	25	1010.0	1010.1	0.0
03/11:00am	19.6	14.0	8.9	50	5.6	NNW	28	39	15	21	1010.4	1010.4	0.0
03/10:30am	19.0	14.2	8.9	52	5.3	NNW	24	33	13	18	1010.6	1010.6	0.0
03/10:00am	18.5	14.1	9.0	54	5.0	NNW	22	32	12	17	1010.9	1010.9	0.0
03/09:30am	17.9	13.1	9.0	56	4.6	N	24	33	13	18	1011.1	1011.1	0.0
03/09:00am	17.3	14.3	9.2	59	4.2	N	15	22	8	12	1011.5	1011.5	0.0
03/08:30am	16.2	14.4	9.4	64	3.5	NNW	9	15	5	8	1011.8	1011.8	0.0
03/08:00am	15.7	13.9	9.4	66	3.3	NNW	9	13	5	7	1011.7	1011.7	0.0
03/07:30am	15.6	13.7	9.1	65	3.3	NNW	9	13	5	7	1011.7	1011.7	0.0
03/07:00am	15.7	13.8	8.9	64	3.5	NW	9	13	5	7	1011.7	1011.7	0.0
03/06:30am	16.0	13.3	9.0	63	3.6	NW	13	19	7	10	1011.8	1011.8	0.0
03/06:00am	15.7	13.4	8.9	64	3.5	NW	11	17	6	9	1011.8	1011.8	0.0
03/05:30am	16.0	13.3	9.0	63	3.6	NW	13	20	7	11	1011.8	1011.8	0.0
03/05:00am	16.5	12.7	9.0	61	3.9	NNW	19	28	10	15	1011.5	1011.5	0.0
03/04:30am	16.4	12.4	8.9	61	3.9	NNW	20	32	11	17	1011.4	1011.4	0.0
03/04:00am	16.1	12.1	9.1	63	3.6	NNW	20	28	11	15	1011.1	1011.1	0.0
03/03:30am	15.7	12.7	9.4	66	3.3	NNW	15	24	8	13	1011.6	1011.6	0.0
03/03:00am	15.4	12.4	9.3	67	3.2	NNW	15	22	8	12	1011.6	1011.6	0.0
03/02:30am	15.4	13.6	9.3	67	3.1	N	9	15	5	8	1011.8	1011.8	0.0
03/02:00am	14.6	13.1	9.2	70	2.8	NNW	7	13	4	7	1012.0	1012.0	0.0
03/01:30am	14.6	13.1	9.2	70	2.8	NW	7	9	4	5	1012.1	1012.1	0.0
03/01:00am	14.6	12.8	9.4	71	2.7	NW	9	15	5	8	1012.5	1012.5	0.0
03/12:30am	14.3	12.5	9.3	72	2.6	NW	9	13	5	7	1012.6	1012.6	0.0
03/12:00am	14.6	12.1	9.6	72	2.6	NW	13	17	7	9	1012.9	1012.9	0.0

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
02/11:30pm	14.8	12.6	9.4	70	2.8	NW	11	13	6	7	1012.9	1012.9	0.0
02/11:00pm	15.2	13.1	9.6	69	2.9	WNW	11	13	6	7	1013.3	1013.3	0.0
02/10:30pm	15.7	14.3	9.6	67	3.2	NW	7	11	4	6	1013.6	1013.6	0.0
02/10:00pm	16.2	14.9	9.8	66	3.4	NNW	7	11	4	6	1014.0	1014.0	0.0
02/09:30pm	16.5	15.2	10.1	66	3.4	NW	7	11	4	6	1014.2	1014.2	0.0
02/09:00pm	16.5	14.1	10.1	66	3.4	NW	13	20	7	11	1014.0	1014.0	0.0
02/08:30pm	16.5	13.7	10.1	66	3.4	NW	15	22	8	12	1013.9	1013.9	0.0
02/08:00pm	16.7	14.3	10.1	65	3.5	NW	13	22	7	12	1014.0	1014.0	0.0
02/07:30pm	16.6	13.9	10.2	66	3.4	NW	15	26	8	14	1014.0	1014.0	0.0
02/07:00pm	17.1	13.8	10.9	67	3.3	NNW	19	28	10	15	1014.0	1014.0	0.0
02/06:30pm	18.0	13.6	10.4	61	4.1	NNW	24	37	13	20	1013.6	1013.6	0.0
02/06:00pm	18.2	13.4	10.3	60	4.2	NW	26	39	14	21	1013.5	1013.5	0.0
02/05:30pm	18.5	12.9	10.1	58	4.5	NW	30	44	16	24	1013.1	1013.1	0.0
02/05:15pm	18.6	13.3	9.9	57	4.6	NW	28	46	15	25	1013.1	1013.1	0.0
02/05:00pm	18.7	13.0	9.8	56	4.7	WNW	30	44	16	24	1013.0	1013.0	0.0
02/04:35pm	19.2	13.8	9.4	53	5.2	NW	28	46	15	25	1013.1	1013.1	0.0
02/04:30pm	19.2	14.1	9.1	52	5.3	NW	26	41	14	22	1013.1	1013.1	0.0
02/04:00pm	19.5	14.8	9.1	51	5.5	NW	24	37	13	20	1012.6	1012.6	0.0
02/03:30pm	20.0	14.9	9.3	50	5.7	WNW	26	41	14	22	1012.9	1012.9	0.0
02/03:00pm	20.0	15.0	9.6	51	5.6	NW	26	41	14	22	1012.9	1012.9	0.0
02/02:30pm	20.4	15.3	9.3	49	5.9	NW	26	43	14	23	1012.7	1012.7	0.0
02/02:06pm	20.4	14.2	9.3	49	5.9	NW	32	50	17	27	1012.8	1012.8	0.0
02/02:00pm	20.5	14.2	9.1	48	6.0	NW	32	46	17	25	1012.9	1012.9	0.0
02/01:30pm	20.5	14.1	9.4	49	5.9	NW	33	50	18	27	1013.0	1013.0	0.0
02/01:07pm	20.1	14.6	9.1	49	5.8	NW	28	46	15	25	1012.8	1012.8	0.0
02/01:00pm	20.8	15.1	9.7	49	6.0	NW	30	44	16	24	1012.8	1012.8	0.0
02/12:30pm	21.2	16.3	9.8	48	6.1	NW	26	39	14	21	1013.2	1013.2	0.0
02/12:09pm	20.6	15.3	9.8	50	5.8	NNW	28	46	15	25	1013.4	1013.4	0.0
02/12:00pm	20.7	17.2	10.2	51	5.7	NNW	19	37	10	20	1013.6	1013.6	0.0
02/11:30am	19.2	15.6	9.9	55	5.0	NNW	19	30	10	16	1014.2	1014.2	0.0

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
02/11:00am	19.6	15.9	10.0	54	5.1	NNW	20	37	11	20	1014.3	1014.3	0.0
02/10:30am	19.2	15.0	9.9	55	5.0	NNW	22	32	12	17	1014.3	1014.3	0.0
02/10:00am	18.4	15.1	9.7	57	4.6	N	17	30	9	16	1014.3	1014.3	0.0
02/09:30am	17.5	13.4	10.1	62	3.9	N	22	30	12	16	1014.4	1014.4	0.0
02/09:00am	16.4	12.3	10.0	66	3.4	N	22	37	12	20	1014.5	1014.5	0.0
02/08:30am	15.9	12.2	10.2	69	3.0	N	20	28	11	15	1014.4	1014.4	0.0
02/08:00am	14.5	11.7	10.1	75	2.3	NNW	15	24	8	13	1014.5	1014.5	0.0
02/07:30am	14.6	11.0	10.0	74	2.4	NNW	19	26	10	14	1014.2	1014.2	0.0
02/07:00am	14.6	11.0	9.8	73	2.5	NW	19	22	10	12	1013.8	1013.8	0.0
02/06:30am	14.2	11.7	9.6	74	2.4	NW	13	20	7	11	1013.8	1013.8	0.0
02/06:00am	13.6	11.5	9.8	78	2.0	W	11	15	6	8	1013.5	1013.5	0.0
02/05:30am	13.3	11.5	9.5	78	1.9	NW	9	17	5	9	1013.5	1013.5	0.0
02/05:00am	13.6	11.8	9.6	77	2.1	W	9	15	5	8	1013.2	1013.2	0.0
02/04:30am	14.0	12.6	9.4	74	2.4	WNW	7	15	4	8	1012.9	1012.9	0.0
02/04:00am	14.2	11.6	9.4	73	2.5	W	13	22	7	12	1012.7	1012.7	0.0
02/03:30am	14.6	11.4	9.8	73	2.5	WNW	17	20	9	11	1012.7	1012.7	0.0
02/03:00am	14.9	10.3	9.7	71	2.7	WNW	24	33	13	18	1012.5	1012.5	0.0
02/02:30am	14.9	10.0	9.9	72	2.6	NW	26	35	14	19	1012.7	1012.7	0.0
02/02:00am	15.2	10.3	10.0	71	2.7	NW	26	35	14	19	1012.8	1012.8	0.0
02/01:30am	15.1	11.1	10.3	73	2.5	NW	22	32	12	17	1012.9	1012.9	0.0
02/01:00am	14.7	11.3	10.5	76	2.2	NW	19	24	10	13	1013.0	1013.0	0.0
02/12:30am	15.0	12.8	10.8	76	2.2	NW	13	20	7	11	1013.0	1013.0	0.0
02/12:00am	14.9	13.1	10.9	77	2.1	WNW	11	17	6	9	1012.9	1012.9	0.0
Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
01/11:30pm	14.7	12.9	10.7	77	2.1	NNW	11	17	6	9	1012.6	1012.6	0.0
01/11:00pm	15.1	11.8	10.9	76	2.2	NNW	19	39	10	21	1012.1	1012.1	0.0
01/10:30pm	14.8	13.4	10.8	77	2.1	NW	9	24	5	13	1012.5	1012.5	0.0
01/10:00pm	14.9	11.1	11.3	79	1.9	NW	22	35	12	19	1012.3	1012.3	0.0
01/09:30pm	15.8	12.3	10.3	70	2.9	WNW	19	30	10	16	1012.4	1012.4	0.0

Hobart, Tasmania

May 2022 Daily Weather Observations

Most observations from Battery Point, but cloud, evaporation and sunshine from Hobart Airport.

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am					3 pm						
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C					km/h	local	°C	%	g th		km/h	hPa	°C	%	g th		km/h	hPa
1	Su	11.8	18.8	1.0	4.2		WNW	52	16:44	15.4	49	4	NNW	19	1011.9	18.0	64	7	NW	20	1009.9
2	Mo	13.2	21.7	0	2.6		NW	50	13:16	16.4	66	6	N	22	1014.5	20.0	51	7	NW	26	1012.9
3	Tu	14.2	21.4	0	4.0		NNW	54	11:36	17.3	59	7	N	15	1011.5	20.7	41	7	NNW	24	1008.4
4	We	12.8	14.4	3.2	2.8		NNW	43	00:17	13.0	81	7	N	11	1008.4	12.6	73	7	SSE	9	1009.0
5	Th	4.7	14.4	0.8	1.8		S	54	22:25	6.4	88	2	NNW	15	1017.5	12.5	72	8	SSW	26	1016.8
6	Fr	6.4	13.5	85.2			S	87	02:52	9.4	91	7	SSW	17	1009.1	13.3	63	7	NNW	24	1005.5
7	Sa	9.4	12.2	5.0	1.8		SSW	63	14:56	11.1	82	7	SW	19	999.6	11.0	85	8	SSW	33	1003.4
8	Su	9.6	16.6	19.8			SW	54	00:17	12.1	75	3	N	4	1019.7	14.9	52	2	SSW	17	1021.3
9	Mo	4.6	16.1	0.2	1.8		NNW	26	10:36	7.6	79	1	NNW	15	1029.1	15.8	47	1	N	9	1027.3
10	Tu	5.8	18.0	0	1.2		NW	35	04:46	8.4	81	1	N	13	1031.0	16.4	51	1	NE	9	1029.4
11	We	6.1	15.1	0	2.0		NW	33	04:57	9.3	73	3	N	15	1031.2	14.1	62	7	NNW	15	1028.2
12	Th	9.3	14.3	0	0.4		NW	35	10:32	10.7	82	7	N	15	1024.9	14.2	72	8	NNW	7	1020.4
13	Fr	7.4	16.7	0	0.4		NNW	26	04:31	9.8	90	3	NNW	13	1017.9	15.5	69	7	ESE	13	1016.7
14	Sa	9.8	17.7	3.2	0.6		NW	46	21:52	12.4	94	7	N	7	1009.3	16.8	79	3	NW	7	1002.5
15	Su	12.3	19.9	0.2	1.2		NW	50	11:48	16.0	63	5	NNW	15	1004.2	18.3	51	7	WNW	17	998.2
16	Mo	7.3	12.5	8.4	2.2		WNW	72	00:46	9.7	72	2	NNW	20	1001.1	9.9	64	2	NNW	28	1001.6
17	Tu	6.1	14.2	5.8	1.8		W	59	12:22	9.7	68	6	N	20	1005.4	13.2	50	7	NNW	28	1004.1
18	We	7.1	12.5	1.0	1.8		W	67	12:40	9.0	72	7	NNW	22	1002.9	11.4	55	4	SW	30	1007.2
19	Th	9.0	13.6	0.8	1.2		WSW	57	09:26	11.0	65	4	SW	37	1019.6	12.0	50	2	SW	22	1024.3
20	Fr	5.0	13.1	0	2.0		WSW	50	00:17	7.7	78	7	WNW	11	1034.1	12.0	66	6	E	9	1033.8
21	Sa	4.1	13.0	0	0.8		NNW	28	10:25	6.2	88	7	NNW	9	1036.9	12.6	59	2	N	7	1034.0
22	Su	4.0	11.5	0	1.2		NNW	33	07:42	6.7	83	7	NW	17	1032.9	11.2	65	7	NNW	15	1031.0
23	Mo	6.1	15.3	0	0.8		NNW	28	01:58	7.1	86	1	NNW	15	1032.0	15.0	56	1	NNW	9	1029.6
24	Tu	6.8	14.8	0	1.6		NNW	26	10:42	7.5	84	6	NNW	19	1031.4	12.7	62	2	ESE	11	1028.8
25	We	3.0	15.4	0	0.8		NNW	43	09:53	4.2	93	1	NW	26	1026.6	13.9	62	1	NE	11	1023.2
26	Th	3.7	14.8	0	1.0		NNW	31	01:50	4.8	95	3	NNW	20	1019.4	12.8	70	7	N	15	1014.6
27	Fr	4.7	16.0	0	0.6		NNW	33	04:41	12.4	69	7	WNW	9	1014.5	14.6	46	7	NW	20	1014.6
28	Sa	4.6	15.6	0	1.4		NW	37	07:29	5.6	82	6	NNW	17	1011.8	14.6	55	3	N	2	1009.0
29	Su	3.5	11.9	0	1.0		NNW	22	09:48	5.3	91	7	NNW	7	1010.3	10.6	76	3	Calm		1006.1
30	Mo	4.2	13.4	0	0.6		NNW	28	09:32	7.4	87	1	NNW	13	996.0	11.9	61	5	NE	9	989.9
31	Tu	4.0	10.2	0	0.8		NNW	28	05:31	5.1	87	7	NNW	9	983.9	10.1	64	7	NNW	17	983.4
Statistics for May 2022																					
Mean		7.1	15.1		1.5					9.5	79	4		15	1016.1	14.0	61	4		15	1014.4
Lowest		3.0	10.2	0	0.4					4.2	49	1	N	4	983.9	9.9	41	1	Calm		983.4
Highest		14.2	21.7	85.2	4.2		S	87		17.3	95	7	SW	37	1036.9	20.7	85	8	SSW	33	1034.0
Total				134.6	44.4																

IDCJDW7021.202205 Prepared at 13:03 UTC on Tuesday 7 June 2022

Source of data

Temperature, humidity, wind, pressure and rainfall observations are from Hobart (Ellerslie Road) (station 094029). Cloud, evaporation and sunshine observations are from Hobart Airport (station 094008).

Conditions at Hobart Airport may be markedly different to those in the city on some days. Some cloud observations are from automated equipment; these are somewhat different to those made by a human observer and may not appear every day.

You should read the **important information** in [these notes](#).

Other formats

To **print** this page, get the [PDF version](#) (one page, 45 kb).

To use this page in a **spreadsheet**, get the [plain text version](#) (4 kb).

Other times and other places

The **last 14 months** of Daily Weather Observations for Hobart, Tasmania are also here on this web site:

[Jun 22](#) [May 22](#) [Apr 22](#) [Mar 22](#) [Feb 22](#) [Jan 22](#) [Dec 21](#) [Nov 21](#)
[Oct 21](#) [Sep 21](#) [Aug 21](#) [Jul 21](#) [Jun 21](#) [May 21](#)

Daily Weather Observations are also routinely prepared for hundreds of **other locations** in [Tasmania](#) and [across Australia](#). To get other months or places not on this web site, [contact us](#).

Climate statistics

If you are after **long-term averages** relevant to Hobart, Tasmania, look at the tables for [Hobart \(Ellerslie Road\)](#) or [Hobart Airport](#).

Maps and tables of average conditions for [locations across Australia](#) are also available.

More information

If you are using these pages, you are deemed to have understood the **important information** in [these notes](#). They cover how the data are obtained, how they are processed, and what each column means.

If you have **any questions** about this product, or you want any other weather or climate information, please [contact us](#).

Laboratory Certificates of Analysis

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2206432**

Amendment : **1**

Client : **ELGIN ASSOCIATES PTY LTD**
Contact : **SOPHIE LE ROUX**
Address : **258 Argyle St**
NORTH HOBART TAS 7000

Laboratory : **Environmental Division Melbourne**
Contact : **Peter Ravlic**
Address : **4 Westall Rd Springvale VIC Australia**
3171

E-mail : **sophie.leroux@elgin.com.au**
Telephone : **----**
Facsimile : **----**

E-mail : **peter.ravlic@alsglobal.com**
Telephone : **+6138549 9645**
Facsimile : **+61-3-8549 9626**

Project : **Selfs Point CSA**
Order number : **JN22377**
C-O-C number : **----**
Site : **----**
Sampler : **EH, MU**

Page : **1 of 3**
Quote number : **EM2017ELGASS0003 (EN/222)**
QC Level : **NEPM 2013 B3 & ALS QC Standard**

Dates

Date Samples Received : **08-Apr-2022 11:55**
Client Requested Due : **05-May-2022**
Date

Issue Date : **03-May-2022**
Scheduled Reporting Date : **05-May-2022**

Delivery Details

Mode of Delivery : **Carrier**
No. of coolers/boxes : **2**
Receipt Detail :

Security Seal : **Intact.**
Temperature : **5.4°C - Ice Bricks present**
No. of samples received / analysed : **9 / 8**

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
- **The scheduled reporting date has been extended due to analytical testing conducted by ALS interstate laboratories.**
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale, ALS Scoresby, ALS Brisbane 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 laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Preliminary results will be available on 19/4/22. However the final report with hydrocarbon gases, tributyltin, E.coli and total coliforms analysis will be complete on 22/4/22.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

Method Sample ID	Sample Container Received	Preferred Sample Container for Analysis
Dissolved Mercury by FIMS : EG035F		
RB01	- Clear Plastic Bottle - Unfiltered; Lab-acidified	- Clear Plastic Bottle - Nitric Acid; Filtered
Dissolved Metals by ICP-MS - Suite A : EG020A-F		
RB01	- Clear Plastic Bottle - Unfiltered; Lab-acidified	- Clear Plastic Bottle - Nitric Acid; Filtered

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	Sampling date / time	Sample ID	WATER - Corr. Schedule 1 Water on Steel & Concrete Piles (AS2159-2009)	WATER - EA165-PH CO2 - Free and Total (Default)	WATER - EP033 C1 - C4 Gases in Water	WATER - EP090S Organotins (TBT) Brisbane	WATER - EP231X PFAS - Full Suite (28 analytes)	WATER - MM514 E.coli & Total Coliforms by MPN Colliert	WATER - W-27 TRHIBTEXN/PAH/Phenols/8 Metals
EM2206432-001	07-Apr-2022 00:00	MW1	✓	✓		✓	✓	✓	✓
EM2206432-002	07-Apr-2022 00:00	MW2			✓		✓	✓	✓
EM2206432-003	07-Apr-2022 00:00	MW4			✓		✓	✓	✓
EM2206432-004	07-Apr-2022 00:00	MW5s	✓	✓	✓	✓	✓	✓	✓
EM2206432-005	07-Apr-2022 00:00	MW5d	✓	✓	✓	✓	✓	✓	✓
EM2206432-006	07-Apr-2022 00:00	MW6	✓	✓	✓	✓	✓	✓	✓
EM2206432-007	07-Apr-2022 00:00	FD01					✓		✓
EM2206432-008	07-Apr-2022 00:00	RB01					✓		✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	(On Hold) WATER No analysis requested
EM2206432-009	07-Apr-2022 00:00	FB01	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

CERTIFICATE OF ANALYSIS

Work Order	: EM2206432	Page	: 1 of 13
Amendment	: 1		
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: SOPHIE LE ROUX	Contact	: Peter Ravlic
Address	: 258 Argyle St NORTH HOBART TAS 7000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Selfs Point CSA	Date Samples Received	: 08-Apr-2022 11:55
Order number	: JN22377	Date Analysis Commenced	: 08-Apr-2022
C-O-C number	: ----	Issue Date	: 09-May-2022 09:42
Sampler	: EH, MU		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 9		
No. of samples analysed	: 8		



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

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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>
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Gaston Allende	R&D Chemist	Sydney Organics, Smithfield, NSW
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Samantha Smith	Assistant Laboratory Manager	WRG Subcontracting, Springvale, VIC
Sarah Ashworth	Laboratory Manager - Brisbane	Brisbane Organics, Stafford, QLD
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- EP090S-Organotin: Sample 'MW5s' shows poor surrogate recovery due to matrix interference. Confirmed by re-extraction and re-analysis.
- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) 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.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- Corrosion assessment for Concrete and Steel piles in water per Australian Standard AS2159-2009 is based on the specific exposure condition. In the absence of exposure condition information being supplied, assessment is made according to Tables 6.4.2 C & 6.5.2 C for groundwater, selecting the most severe classification. Refer to AS2159-2009 section 6.4 for further interpretation of corrosion assessment. ALS is not NATA accredited for Corrosion Assessment comments.
- EP075(SIM): EM2206432_007 Particular samples required dilution prior to analysis due to matrix interferences. LOR values have been adjusted accordingly.
- Amendment (3/5/22): This report has been amended to report dissolved gases (EP033) on samples 2, 3 and CO2 (EP165-P) on sample1 (MW1)
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- E.coli & Total Coliforms by MPN (MM514) is conducted by ALS Scoresby NATA accreditation no. 992, site no. 989.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

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

Sample ID

				MW1	MW2	MW4	MW5s	MW5d
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00
Compound	CAS Number	LOR	Unit	EM2206432-001	EM2206432-002	EM2206432-003	EM2206432-004	EM2206432-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.54	----	----	7.26	7.67
EA165: CO2 - Free and Total								
Free Carbon Dioxide as CO2	85540-96-1	1	mg/L	96	----	----	241	20
Total Carbon Dioxide as CO2	85540-96-1	1	mg/L	1560	----	----	2170	426
EA167: Corrosion Classification (per AS2159-2009)								
Ø Exposure Classification - Concrete Piles	----	-	-	Mild	----	----	Mild	Mild
Ø Exposure Classification - Steel Piles	----	-	-	Non Aggressive	----	----	Mild	Mild
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	96	----	----	<1	785
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	470	----	----	1890	6230
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	0.022	0.037	0.002	0.010	0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	0.003	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	0.020	0.011	0.007	0.098	0.012
Zinc	7440-66-6	0.005	mg/L	0.008	0.040	0.014	0.008	0.015
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	----	7690	3800	7870	393
Ethene	74-85-1	10	µg/L	----	<10	<10	<10	<10
Ethane	74-84-0	10	µg/L	----	<10	<10	<10	<10
Propene	115-07-1	10	µg/L	----	<10	<10	<10	<10
Propane	74-98-6	10	µg/L	----	<10	<10	<10	<10
Butene	25167-67-3	10	µg/L	----	<10	<10	<10	<10
Butane	106-97-8	10	µg/L	----	<10	<10	<10	<10
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW1	MW2	MW4	MW5s	MW5d
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	
Compound	CAS Number	LOR	Unit	EM2206432-001	EM2206432-002	EM2206432-003	EM2206432-004	EM2206432-005	
				Result	Result	Result	Result	Result	
EP075(SIM)A: Phenolic Compounds - Continued									
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	<1.0	1.6	<1.0	
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	<1.0	1.6	<1.0	
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	<1.0	3.6	<1.0	
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	<1.0	1.4	<1.0	
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	<1.0	9.2	<1.0	
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	<1.0	9.3	<1.0	
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	<1.0	3.4	<1.0	
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	<1.0	3.5	<1.0	
Benzo(b+j)fluoranthene	205-99-2	205-82-3	1.0	µg/L	<1.0	<1.0	3.7	<1.0	
Benzo(k)fluoranthene	207-08-9		1.0	µg/L	<1.0	<1.0	3.3	<1.0	
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	4.7	<0.5	
Indeno(1,2,3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	<1.0	3.1	<1.0	
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	<1.0	4.0	<1.0	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	52.4	<0.5	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	6.1	<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	220	<50	
C15 - C28 Fraction	----	100	µg/L	180	110	<100	840	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	280	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	180	110	<50	1340	<50	
EP080/071: Total Recoverable Hvdrocarbons - NEPM 2013 Fractions									



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW1	MW2	MW4	MW5s	MW5d
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00
Compound	CAS Number	LOR	Unit	EM2206432-001	EM2206432-002	EM2206432-003	EM2206432-004	EM2206432-005
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
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	320	<100
>C16 - C34 Fraction	----	100	µg/L	180	100	<100	940	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	160	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	180	100	<100	1420	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	320	<100
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	----	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
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.06	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.18	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.19	0.01	0.03	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW1	MW2	MW4	MW5s	MW5d
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00
Compound	CAS Number	LOR	Unit	EM2206432-001	EM2206432-002	EM2206432-003	EM2206432-004	EM2206432-005
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.34	<0.02	<0.02	0.04	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.28	<0.02	<0.02	0.04	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.19	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.49	0.02	0.02	0.02	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW1	MW2	MW4	MW5s	MW5d
Sampling date / time					07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00
Compound	CAS Number	LOR	Unit		EM2206432-001	EM2206432-002	EM2206432-003	EM2206432-004	EM2206432-005
					Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		1.79	0.03	0.05	0.10	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		0.37	0.01	0.03	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		1.73	0.03	0.05	0.10	<0.01
MM514: E.coli & Total Coliforms MPN by Colilert									
Escherichia coli (Colilert)	----	1	orgs/100mL		0	<10	0	<10	1
Total Coliforms (Colilert)	----	1	orgs/100mL		3	<10	15	<10	14
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		29.5	29.7	26.6	28.9	30.5
2-Chlorophenol-D4	93951-73-6	1.0	%		75.0	74.7	67.3	71.4	71.9
2,4,6-Tribromophenol	118-79-6	1.0	%		81.9	80.1	70.6	87.9	78.7
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		94.2	90.7	83.8	89.5	85.6
Anthracene-d10	1719-06-8	1.0	%		86.7	83.3	77.1	79.5	78.2
4-Terphenyl-d14	1718-51-0	1.0	%		83.8	79.3	75.3	73.4	78.8
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		109	110	107	103	106
Toluene-D8	2037-26-5	2	%		104	103	103	101	97.4
4-Bromofluorobenzene	460-00-4	2	%		104	101	106	102	101
EP090S: Organotin Surrogate									
Tripropyltin	----	5	%		24.6	----	----	18.4	41.4
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		101	91.1	92.3	101	97.3
13C8-PFOA	----	0.02	%		99.1	106	101	96.8	100



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW6	FD01	RB01	----	----
Sampling date / time					07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit		EM2206432-006	EM2206432-007	EM2206432-008	-----	-----
					Result	Result	Result	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		6.90	----	----	----	----
EA165: CO2 - Free and Total									
Free Carbon Dioxide as CO2	85540-96-1	1	mg/L		496	----	----	----	----
Total Carbon Dioxide as CO2	85540-96-1	1	mg/L		2230	----	----	----	----
EA167: Corrosion Classification (per AS2159-2009)									
Ø Exposure Classification - Concrete Piles	----	-	-		Mild	----	----	----	----
Ø Exposure Classification - Steel Piles	----	-	-		Non Aggressive	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<1	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		657	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		0.004	0.012	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		0.001	0.004	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		0.018	0.100	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L		0.025	0.016	<0.005	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		11900	----	----	----	----
Ethene	74-85-1	10	µg/L		<10	----	----	----	----
Ethane	74-84-0	10	µg/L		<10	----	----	----	----
Propene	115-07-1	10	µg/L		<10	----	----	----	----
Propane	74-98-6	10	µg/L		<10	----	----	----	----
Butene	25167-67-3	10	µg/L		<10	----	----	----	----
Butane	106-97-8	10	µg/L		<10	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	<1.2	<1.0	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.2	<1.0	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	<1.2	<1.0	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	<2.4	<2.0	----	----



Analytical Results

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

Sample ID

				MW6	FD01	RB01	----	----
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2206432-006	EM2206432-007	EM2206432-008	-----	-----
				Result	Result	Result	----	----

EP075(SIM)A: Phenolic Compounds - Continued

2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.2	<1.0	----	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.2	<1.0	----	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.2	<1.0	----	----
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.2	<1.0	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.2	<1.0	----	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.2	<1.0	----	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.2	<1.0	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.4	<2.0	----	----

EP075(SIM)B: Polynuclear Aromatic Hydrocarbons

Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	1.4	<1.0	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	1.3	<1.0	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	3.4	<1.0	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	1.4	<1.0	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	8.8	<1.0	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	8.9	<1.0	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	3.1	<1.0	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	3.2	<1.0	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	3.0	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	3.1	<1.0	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	4.1	<0.5	----	----
Indeno(1,2,3-cd)pyrene	193-39-5	1.0	µg/L	<1.0	2.6	<1.0	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	3.4	<1.0	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	47.7	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	5.3	<0.5	----	----

EP080/071: Total Petroleum Hydrocarbons

C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L	140	250	<50	----	----
C15 - C28 Fraction	----	100	µg/L	670	910	<100	----	----
C29 - C36 Fraction	----	50	µg/L	70	320	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	880	1480	<50	----	----

EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions



Analytical Results

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

Sample ID

				MW6	FD01	RB01	----	----
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2206432-006	EM2206432-007	EM2206432-008	-----	-----
Result				Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	230	340	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	620	1030	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	190	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	850	1560	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	230	340	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	<0.01	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW6	FD01	RB01	----	----
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2206432-006	EM2206432-007	EM2206432-008	-----	-----
				Result	Result	Result	----	----
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.05	<0.02	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.06	<0.02	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.02	<0.02	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.02	<0.01	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW6	FD01	RB01	----	----
Sampling date / time					07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit		EM2206432-006	EM2206432-007	EM2206432-008	-----	-----
					Result	Result	Result	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	0.15	<0.01	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	0.15	<0.01	----	----
MM514: E.coli & Total Coliforms MPN by Colilert									
Escherichia coli (Colilert)	----	1	orgs/100mL		<10	----	----	----	----
Total Coliforms (Colilert)	----	1	orgs/100mL		<10	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		30.2	24.4	32.6	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		74.2	57.3	80.7	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%		83.8	66.1	83.8	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		87.9	72.0	99.8	----	----
Anthracene-d10	1719-06-8	1.0	%		79.7	73.9	88.9	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		77.9	65.0	88.9	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		114	109	108	----	----
Toluene-D8	2037-26-5	2	%		108	102	103	----	----
4-Bromofluorobenzene	460-00-4	2	%		103	108	103	----	----
EP090S: Organotin Surrogate									
Tripolytin	----	5	%		33.4	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		92.4	86.0	133	----	----
13C8-PFOA	----	0.02	%		97.6	94.7	101	----	----



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	51
2-Chlorophenol-D4	93951-73-6	30	114
2,4,6-Tribromophenol	118-79-6	26	133
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	35	127
Anthracene-d10	1719-06-8	44	122
4-Terphenyl-d14	1718-51-0	44	124
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
EP090S: Organotin Surrogate			
Tripopyltin	----	24	116
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(WATER) EP090: Organotin Compounds (Soluble)

(WATER) EP090S: Organotin Surrogate

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP033: C1 - C4 Hydrocarbon Gases

QUALITY CONTROL REPORT

Work Order : **EM2206432**

Page : 1 of 15

Amendment : **1**

Client : **ELGIN ASSOCIATES PTY LTD**

Laboratory : Environmental Division Melbourne

Contact : SOPHIE LE ROUX

Contact : Peter Ravlic

Address : 258 Argyle St
NORTH HOBART TAS 7000

Address : 4 Westall Rd Springvale VIC Australia 3171

Telephone : ----

Telephone : +6138549 9645

Project : Selfs Point CSA

Date Samples Received : 08-Apr-2022

Order number : JN22377

Date Analysis Commenced : 08-Apr-2022

C-O-C number : ----

Issue Date : 09-May-2022

Sampler : EH, MU

Site : ----

Quote number : EN/222

No. of samples received : 9

No. of samples analysed : 8



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

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

Signatories	Position	Accreditation Category
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Gaston Allende	R&D Chemist	Sydney Organics, Smithfield, NSW
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Samantha Smith	Assistant Laboratory Manager	WRG Subcontracting, Springvale, VIC
Sarah Ashworth	Laboratory Manager - Brisbane	Brisbane Organics, Stafford, QLD
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA005P: pH by PC Titrator (QC Lot: 4285835)									
EM2206380-003	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.96	7.87	1.1	0% - 20%
EM2206378-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.61	7.61	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4279186)									
EM2206435-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	283	281	0.6	0% - 20%
EM2206265-010	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	9	12	30.7	0% - 50%
ED045G: Chloride by Discrete Analyser (QC Lot: 4279185)									
EM2206265-010	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	111	112	0.0	0% - 20%
EM2206441-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	2460	2490	1.2	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4282617)									
EM2206365-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
EM2206365-010	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4282619)									
EM2206432-002	MW2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.037	0.036	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.011	0.012	0.0	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.040	0.039	3.8	No Limit
EM2206553-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.028	0.006	128	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4282618)									
EM2206432-001	MW1	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EM2206547-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 4283921)									
EM2206365-004	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EM2206432-005	MW5d	EP033: Methane	74-82-8	10	µg/L	393	380	3.5	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 4318699)									
EM2206432-002	MW2	EP033: Methane	74-82-8	10	µg/L	7690	7540	1.9	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 4318699) - continued									
EM2207680-004	Anonymous	EP033: Methane	74-82-8	10	µg/L	4460	4950	10.3	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 4277990)									
EM2206432-001	MW1	EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	<2.0	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4277990)									
EM2206432-001	MW1	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	<1.0	0.0	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4277989)							
EM2206319-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4277989) - continued									
EM2206319-001	Anonymous	EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	0.0	No Limit
EM2206432-004	MW5s	EP071: C15 - C28 Fraction	----	100	µg/L	840	750	11.4	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	220	170	22.7	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	280	250	11.6	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	µg/L	1340	1170	13.5	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4278071)									
EM2206319-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EM2206343-026	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4277989)									
EM2206319-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	0.0	No Limit
EM2206432-004	MW5s	EP071: >C10 - C16 Fraction	----	100	µg/L	320	270	17.5	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	940	840	11.4	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	160	150	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	100	µg/L	1420	1260	11.9	0% - 50%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4278071)									
EM2206319-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EM2206343-026	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4278071)									
EM2206319-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
EM2206343-026	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4294552)									
EM2206432-001	MW1	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.18	0.20	12.1	0% - 50%



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4294552) - continued									
EM2206432-001	MW1	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.19	0.17	6.6	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.06	0.08	28.7	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EM2206603-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.07	0.08	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.14	0.13	11.2	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4294552)									
EM2206432-001	MW1	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.49	0.46	6.3	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.34	0.31	7.3	0% - 50%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.28	0.26	7.8	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.19	0.19	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EM2206603-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4294552)									
EM2206432-001	MW1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4294552) - continued									
EM2206432-001	MW1	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EM2206603-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4294552)							
EM2206432-001	MW1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EM2206603-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4294552)									
EM2206432-001	MW1	EP231X: Sum of PFAS	----	0.01	µg/L	1.79	1.71	4.6	0% - 20%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231P: PFAS Sums (QC Lot: 4294552) - continued									
EM2206432-001	MW1	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.37	0.37	0.0	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	1.73	1.67	3.5	0% - 20%
EM2206603-005	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.21	0.21	0.0	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.21	0.21	0.0	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.21	0.21	0.0	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EA005P: pH by PC Titrator (QCLot: 4285835)								
EA005-P: pH Value	----	----	pH Unit	----	7 pH Unit	101	98.8	101
				----	9 pH Unit	99.9	99.3	101
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4279186)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	115	85.8	117
				<1	500 mg/L	109	80.0	120
ED045G: Chloride by Discrete Analyser (QCLot: 4279185)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	92.8	85.0	115
				<1	1000 mg/L	96.8	85.0	122
EG020F: Dissolved Metals by ICP-MS (QCLot: 4282617)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	89.0	111
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	83.5	111
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	105	83.2	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	101	83.1	107
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.8	84.6	108
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	84.3	110
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	106	86.3	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 4282619)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	89.0	111
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	102	83.5	111
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	83.2	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.4	83.1	107
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.8	84.6	108
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.6	84.3	110
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	110	86.3	112
EG035F: Dissolved Mercury by FIMS (QCLot: 4282618)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	81.1	71.6	116
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 4283921)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	96.6	86.0	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	93.1	87.0	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	95.4	87.0	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	94.8	85.0	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	98.2	84.0	112
EP033: Butene	25167-67-3	10	µg/L	<10	99.61 µg/L	105	83.0	115
EP033: Butane	106-97-8	10	µg/L	<10	102.18 µg/L	108	85.0	115



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 4318699)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	96.2	86.0	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	96.3	87.0	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	95.8	87.0	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	94.0	85.0	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	94.6	84.0	112
EP033: Butene	25167-67-3	10	µg/L	<10	99.61 µg/L	90.8	83.0	115
EP033: Butane	106-97-8	10	µg/L	<10	102.18 µg/L	93.1	85.0	115
EP075(SIM)A: Phenolic Compounds (QCLot: 4277990)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	34.1	17.8	51.1
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	75.6	43.2	107
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	68.9	39.2	98.7
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	64.3	35.5	91.3
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	73.4	34.4	124
EP075(SIM): 2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	74.2	44.4	112
EP075(SIM): 2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	70.1	45.3	115
EP075(SIM): 2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	71.2	44.3	116
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	77.1	46.6	117
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	80.9	38.2	122
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	79.1	43.2	123
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	77.4	48.1	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4277990)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	77.7	42.8	114
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	91.4	48.6	119
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	95.4	47.0	117
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	94.9	49.5	119
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	88.7	49.4	121
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	87.3	48.4	122
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	91.6	50.3	124
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	92.1	50.0	126
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	87.4	49.4	127
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	92.2	48.7	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	85.3	54.5	134
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	85.0	56.1	134
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	86.7	55.6	135
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	81.6	54.4	126
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	81.7	54.5	126
EP075(SIM): Benzo(a,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	80.6	54.4	126



Sub-Matrix: **WATER**

Method: Compound				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
CAS Number	LOR	Unit						
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4277989)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	4000 µg/L	80.9	47.2	122
EP071: C15 - C28 Fraction	----	100	µg/L	<100	16900 µg/L	82.5	52.9	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	8090 µg/L	83.0	50.4	127
EP071: C10 - C36 Fraction (sum)	----	50	µg/L	<50	28990 µg/L	82.3	51.5	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4278071)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	108	66.2	134
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4277989)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	5830 µg/L	78.6	49.1	125
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	21700 µg/L	83.7	51.6	128
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1560 µg/L	86.1	47.2	130
EP071: >C10 - C40 Fraction (sum)	----	100	µg/L	<100	29090 µg/L	82.9	51.2	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4278071)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	114	66.2	132
EP080: BTEXN (QCLot: 4278071)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	115	68.8	127
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	113	72.9	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	113	71.7	130
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	111	72.3	136
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	113	75.9	134
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	117	68.3	131
EP090: Organotin Compounds (Soluble) (QCLot: 4287226)								
EP090S: Tributyltin	56573-85-4	2	ngSn/L	<2	147 ngSn/L	87.4	30.7	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4294552)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	106	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	99.9	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	93.2	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	92.6	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	89.2	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	87.5	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4294552)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	84.3	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	98.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	99.5	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	98.9	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	95.7	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	103	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	104	71.0	129



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4294552) - continued								
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	97.4	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	102	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	90.7	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4294552)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	97.3	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	104	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	97.5	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	89.6	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	100	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	103	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	96.5	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4294552)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	99.5	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 µg/L	102	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	113	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	120	70.0	130
EP231P: PFAS Sums (QCLot: 4294552)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number			Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4279186)							
EM2206432-001	MW1	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	110	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4279185)							
EM2206432-001	MW1	ED045G: Chloride	16887-00-6	400 mg/L	85.3	70.0	142



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4282617)							
EM2206365-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	106	76.6	124
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	98.4	74.6	118
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	93.5	71.0	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	97.2	76.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	89.2	75.0	133
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	98.2	73.0	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	97.8	75.0	131
EG020F: Dissolved Metals by ICP-MS (QCLot: 4282619)							
EM2206432-002	MW2	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	99.0	76.6	124
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	98.6	74.6	118
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	96.5	71.0	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	97.1	76.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	95.9	75.0	133
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	96.6	73.0	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	94.8	75.0	131
EG035F: Dissolved Mercury by FIMS (QCLot: 4282618)							
EM2206432-002	MW2	EG035F: Mercury	7439-97-6	0.01 mg/L	76.9	70.0	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 4283921)							
EM2206365-005	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	99.7	70.0	130
		EP033: Ethene	74-85-1	50.29 µg/L	86.4	70.0	130
		EP033: Ethane	74-84-0	54.43 µg/L	95.9	70.0	130
		EP033: Propene	115-07-1	73.97 µg/L	75.8	70.0	130
		EP033: Propane	74-98-6	78.28 µg/L	98.5	70.0	130
		EP033: Butene	25167-67-3	99.61 µg/L	85.0	70.0	130
		EP033: Butane	106-97-8	102.18 µg/L	108	70.0	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 4318699)							
EM2206432-003	MW4	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70.0	130
		EP033: Ethene	74-85-1	50.29 µg/L	82.7	70.0	130
		EP033: Ethane	74-84-0	54.43 µg/L	90.1	70.0	130
		EP033: Propene	115-07-1	73.97 µg/L	82.3	70.0	130
		EP033: Propane	74-98-6	78.28 µg/L	81.8	70.0	130
		EP033: Butene	25167-67-3	99.61 µg/L	80.3	70.0	130
		EP033: Butane	106-97-8	102.18 µg/L	81.4	70.0	130
EP075(SIM)A: Phenolic Compounds (QCLot: 4277990)							
EM2206432-003	MW4	EP075(SIM): Phenol	108-95-2	5 µg/L	42.6	15.0	61.0
		EP075(SIM): 2-Chlorophenol	95-57-8	5 µg/L	91.3	35.0	131
		EP075(SIM): 2-Nitrophenol	88-75-5	5 µg/L	94.5	39.0	121



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 4277990) - continued							
EM2206432-003	MW4	EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	5 µg/L	97.1	32.0	130
		EP075(SIM): Pentachlorophenol	87-86-5	5 µg/L	124	11.0	147
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4277990)							
EM2206432-003	MW4	EP075(SIM): Acenaphthene	83-32-9	5 µg/L	117	39.3	123
		EP075(SIM): Pyrene	129-00-0	5 µg/L	114	44.0	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4277989)							
EM2206319-004	Anonymous	EP071: C10 - C14 Fraction	----	4000 µg/L	74.6	48.0	126
		EP071: C15 - C28 Fraction	----	16900 µg/L	76.8	51.7	132
		EP071: C29 - C36 Fraction	----	8090 µg/L	77.5	50.5	127
		EP071: C10 - C36 Fraction (sum)	----	28990 µg/L	76.6	50.2	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4278071)							
EM2206319-002	Anonymous	EP080: C6 - C9 Fraction	----	280 µg/L	102	33.9	126
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4277989)							
EM2206319-004	Anonymous	EP071: >C10 - C16 Fraction	----	5830 µg/L	72.5	48.0	128
		EP071: >C16 - C34 Fraction	----	21700 µg/L	78.0	50.4	130
		EP071: >C34 - C40 Fraction	----	1560 µg/L	81.0	47.4	131
		EP071: >C10 - C40 Fraction (sum)	----	29090 µg/L	77.3	50.0	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4278071)							
EM2206319-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	98.8	34.0	122
EP080: BTEXN (QCLot: 4278071)							
EM2206319-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	118	56.3	133
		EP080: Toluene	108-88-3	20 µg/L	117	60.4	132
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4294552)							
EM2206432-003	MW4	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.222 µg/L	108	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	92.1	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.228 µg/L	91.4	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	102	69.0	134
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	84.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4294552)							
EM2206432-003	MW4	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	78.7	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	104	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	106	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	96.5	72.0	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	110	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	106	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	95.9	69.0	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4294552) - continued							
EM2206432-003	MW4	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	92.3	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	76.9	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	101	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4294552)							
EM2206432-003	MW4	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	104	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	104	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	90.7	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	88.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	108	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	99.3	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	104	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4294552)							
EM2206432-003	MW4	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	99.0	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.238 µg/L	105	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	118	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.242 µg/L	80.0	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order : **EM2206432**

Page : 1 of 9

Amendment : **1**

Client : **ELGIN ASSOCIATES PTY LTD**

Laboratory : Environmental Division Melbourne

Contact : SOPHIE LE ROUX

Telephone : +6138549 9645

Project : Selfs Point CSA

Date Samples Received : 08-Apr-2022

Site : ----

Issue Date : 09-May-2022

Sampler : EH, MU

No. of samples received : 9

Order number : JN22377

No. of samples analysed : 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

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 : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP033: C1 - C4 Hydrocarbon Gases	EM2206432--003	MW4	Methane	74-82-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Regular Sample Surrogates

Sub-Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP090S: Organotin Surrogate	EM2206432-004	MW5s	Trippropyltin	----	18.4 %	24.0-116 %	Recovery less than lower data quality objective

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
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
MW1,	MW5s,	----	----	----	14-Apr-2022	07-Apr-2022	7
MW5d,	MW6						
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid							
MW2,	MW4	----	----	----	04-May-2022	21-Apr-2022	13

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	15	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Organotin Compounds (Soluble)	0	15	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	
EA005P: pH by PC Titrator									
Clear Plastic Bottle - Natural (EA005-P)	MW5s, MW5d,	MW6	07-Apr-2022	----	----	----	14-Apr-2022	07-Apr-2022	✖
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Clear Plastic Bottle - Natural (ED041G)	MW5s, MW5d,	MW6	07-Apr-2022	----	----	----	12-Apr-2022	05-May-2022	✔
ED045G: Chloride by Discrete Analyser									
Clear Plastic Bottle - Natural (ED045G)	MW5s, MW5d,	MW6	07-Apr-2022	----	----	----	12-Apr-2022	05-May-2022	✔
EG020F: Dissolved Metals by ICP-MS									
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F)	MW2, MW4, MW5d, FD01		07-Apr-2022	----	----	----	12-Apr-2022	04-Oct-2022	✔
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-F)	RB01		07-Apr-2022	----	----	----	12-Apr-2022	04-Oct-2022	✔
EG035F: Dissolved Mercury by FIMS									
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F)	MW2, MW4, MW5d, FD01		07-Apr-2022	----	----	----	12-Apr-2022	05-May-2022	✔
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035F)	RB01		07-Apr-2022	----	----	----	12-Apr-2022	21-Apr-2022	✔
EP033: C1 - C4 Hydrocarbon Gases									
Amber VOC Vial - Sulfuric Acid (EP033)	MW5d, MW6		07-Apr-2022	----	----	----	12-Apr-2022	21-Apr-2022	✔
Amber VOC Vial - Sulfuric Acid (EP033)	MW4		07-Apr-2022	----	----	----	04-May-2022	21-Apr-2022	✖
EP075(SIM)A: Phenolic Compounds									
Amber Glass Bottle - Unpreserved (EP075(SIM))	MW2, MW4, MW5d, FD01,	MW6, RB01	07-Apr-2022	12-Apr-2022	14-Apr-2022	✔	12-Apr-2022	22-May-2022	✔



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))		07-Apr-2022	12-Apr-2022	14-Apr-2022	✓	12-Apr-2022	22-May-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)		07-Apr-2022	12-Apr-2022	14-Apr-2022	✓	12-Apr-2022	22-May-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
Amber VOC Vial - Sulfuric Acid (EP080)		07-Apr-2022	11-Apr-2022	21-Apr-2022	✓	11-Apr-2022	21-Apr-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		07-Apr-2022	12-Apr-2022	14-Apr-2022	✓	12-Apr-2022	22-May-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
Amber VOC Vial - Sulfuric Acid (EP080)		07-Apr-2022	11-Apr-2022	21-Apr-2022	✓	11-Apr-2022	21-Apr-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		07-Apr-2022	11-Apr-2022	21-Apr-2022	✓	11-Apr-2022	21-Apr-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
EP090: Organotin Compounds (Soluble)								
Amber Glass Bottle - Unpreserved (EP090S)		07-Apr-2022	14-Apr-2022	14-Apr-2022	✓	14-Apr-2022	24-May-2022	✓
MW1, MW5d,	MW5s, MW6							



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
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)		07-Apr-2022	20-Apr-2022	04-Oct-2022	✓	20-Apr-2022	04-Oct-2022	✓
MW1,	MW2,							
MW4,	MW5s,							
MW5d,	MW6,							
FD01,	RB01							
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X)		07-Apr-2022	20-Apr-2022	04-Oct-2022	✓	20-Apr-2022	04-Oct-2022	✓
MW1,	MW2,							
MW4,	MW5s,							
MW5d,	MW6,							
FD01,	RB01							
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X)		07-Apr-2022	20-Apr-2022	04-Oct-2022	✓	20-Apr-2022	04-Oct-2022	✓
MW1,	MW2,							
MW4,	MW5s,							
MW5d,	MW6,							
FD01,	RB01							
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X)		07-Apr-2022	20-Apr-2022	04-Oct-2022	✓	20-Apr-2022	04-Oct-2022	✓
MW1,	MW2,							
MW4,	MW5s,							
MW5d,	MW6,							
FD01,	RB01							
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)		07-Apr-2022	20-Apr-2022	04-Oct-2022	✓	20-Apr-2022	04-Oct-2022	✓
MW1,	MW2,							
MW4,	MW5s,							
MW5d,	MW6,							
FD01,	RB01							
MM514: E.coli & Total Coliforms MPN by Colilert								
Sterile Plastic Bottle - Sodium Thiosulfate (MM514)		07-Apr-2022	----	----	----	08-Apr-2022	08-Apr-2022	✓
MW1,	MW2,							
MW4,	MW5s,							
MW5d,	MW6							



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)							
C1 - C4 Gases	EP033	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	33	12.12	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	0	15	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	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
Laboratory Control Samples (LCS)							
C1 - C4 Gases	EP033	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	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
Method Blanks (MB)							
C1 - C4 Gases	EP033	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	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
Matrix Spikes (MS)							
C1 - C4 Gases	EP033	2	40	5.00	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	
Matrix Spikes (MS) - Continued							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	6.06	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	0	15	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	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
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Free and Total CO2	EA165-P	WATER	In house: Referenced to APHA 4500-CO2 D. This method is compliant with NEPM Schedule B(3)
Corrosion Classification for Steel and Concrete Piles	* EA167	WATER	In house: Exposure classification is determined according to Australian Standard AS2159-2009.
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA seal method 2 017-1-L
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45um 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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 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 Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 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 Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 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 Schedule B(3)
Organotin Compounds (Soluble)	EP090S	WATER	In house: Referenced to USEPA SW 846 - 8270 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 Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
E.coli & Total Coliforms by MPN Colilert	MM514	WATER	Microbiological analysis subcontracted to ALS Scoresby (NATA Accredited Laboratory No. 992).
Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM 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 purging.
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.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

Data Validation

APPENDIX F

1 Introduction

The analytical data was checked and validated for its reliability and suitability for interpretive use, based on guidance in AS4482 and the NEPM ASC (2013). Key checks in the data validation process included:

- Samples were received by the laboratories in chilled eskies and in good condition;
- All samples were analysed as required on the chain of custody, and within recommended holding times;
- Field sample-id's in lab reports correlate to COC and field sample records;
- Review of rinsate blank results where applicable;
- Review of laboratory duplicate results and relative percent differences (RPDs);
- Review of field duplicate sample results and RPDs;
- Review of internal laboratory QAQC sample results, including laboratory check samples, matrix spike/matrix spike duplicate and surrogates met laboratory requirements; and
- The presence of potentially anomalous results.

2 Sample Integrity

The sampling was undertaken by suitably trained and experienced environmental scientists in accordance with relevant standards and guidelines. At the time of sampling, samples were placed into clean laboratory supplied and appropriately preserved bottles. The bottles were placed into chilled eskies under chain of custody documentation and despatched same day overnight courier to the laboratories.

Sample receipt advice from the laboratories and chain of custody records (**Appendix E**) show that samples were received by the laboratories chilled and intact, and analysed within the recommended holding times, with the following exceptions:

- ALS batch EM2206432 Amendment 1
 - C1-C4 gases in samples MW2 and MW4 were analysed outside the analytical due date. This may result in under reporting of the results in these samples. All remaining samples analysed for C1-C4 gases were within holding times.

3 Sample Laboratory Analysis

Samples were analysed by a NATA accredited laboratory, ALS, for the required analysis. Internal laboratory QA/QC results are included in **Appendix E** and reported QA/QC results for method blanks, laboratory duplicates, lab control standards (LCS), matrix spike/matrix spike duplicates (MS/MSD) and surrogates were reported that were largely within laboratory data quality objectives. There were some exceptions that included:

- ALS batch EM2206432 Amendment 1:
 - C1-C4 gases MS recovery was not determined in sample MW4 for methane; background level greater than or equal to 4 x spike level.
 - Organotin surrogate recovery in sample MW5s (Tripropyltin; 18.4%), was less than the lower data quality objective (24.0-116 %). This may indicate underreporting of tributyltin in this sample.

APPENDIX F

- Quality control parameter frequency compliance was not within the specification for organotin compounds.

These reporting of MS and surrogate recoveries and quality control frequency compliance outside laboratory DQOs represented minor instances in the dataset and are not considered to affect the overall data quality of the dataset.

5 Rinsate Blanks and Field Blanks

A Rinsate blank was collected on the day of sampling during fieldwork which included:

- RB01_07/4/22 (off glove used for sampling).

The rinsate blank was analysed for metals, PFAS, TRH, TPH and/or BTEXN, phenols and PAH.

A field blank sample FB01, consisting of laboratory rinsate water used in the field, was also collected during the sampling event. The field blank was placed on hold and not analysed until rinsate blank results were reviewed. The field blank was not analysed for this batch.

Rinsate blank results are presented in **Table B4**, with results reported below detection limits and indicating that cross-contamination in the field did not occur during sampling.

6 Field Duplicates

Blind field duplicates were collected at a rate of 1 per 20 primary samples and 1 in 10 primary samples for PFAS.

The following primary sample-field duplicate pairs were collected:

- FD01 at site MW5s.

The results of the primary and field duplicate results with relative percent difference calculations are presented in **Table B3**.

Primary and duplicate results correlated well, with the majority of calculated RPDs in the range of 0-50%:

- In total there were 89 duplicate pairs, with 2 pairs (or 2%) with RPDs above 30% for inorganic compounds and >50% for organic compounds.
- Of these 2 pairs, one of the RPD exceedances were due to a relatively small difference between low concentrations – i.e. results less than 10 times the limit of reporting and are not considered significant.
- The remaining pair reported RPD above 30% with results greater than the 10 times limit of reporting and was due to a larger variation in the concentration of zinc. This sample contained a higher concentration of suspended sediment during sampling, which can influence results.

Overall, the primary and duplicate analysis reported good correlation between results and indicated a high level of precision and accuracy in the dataset.

7 Anomalous Results

Anomalous results were not identified in the dataset.

APPENDIX F

8 Conclusion

Based on the findings of the review, the groundwater dataset is considered reliable and suitable for interpretive use.

Table F1 - Water Quality QA/QC Results (Field Duplicate)
JN22377: Sels Point CSA



			Batch	EM2206432	EM2206432	Relative Percentile Difference %	Pairs	Over 50%	Over 50% & >10 x LOR
			Sample ID	MW5s	FD01				
			Sampling Date	7/04/2022	7/04/2022				
			Sampling Type	Primary	Duplicate				
Parameter Suite	Analyte Name	Units	LOR						
Dissolved Metals	Arsenic	µg/L	1	10	12	18%	1		
	Cadmium	µg/L	0.1	<0.1	<0.1	0%	1		
	Chromium	µg/L	1	3	4	29%	1		
	Copper	µg/L	1	<1	<1	0%	1		
	Lead	µg/L	1	<1	<1	0%	1		
	Nickel	µg/L	1	98	100	2%	1		
	Zinc	µg/L	5	8	16	67%	1	1	
Perfluoroalkyl Sulfonic Acids	Mercury	µg/L	0.1	<0.1	<0.1	0%	1		
	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01	<0.01	0%	1		
	Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01	<0.01	0%	1		
Perfluoroalkyl Carboxylic Acids	Perfluorodecane sulfonic acid (PFDS)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorobutanoic acid (PFBA)	µg/L	0.1	<0.1	<0.1	0%	1		
	Perfluoropentanoic acid (PFPeA)	µg/L	0.02	0.04	0.05	22%	1		
	Perfluorohexanoic acid (PFHxA)	µg/L	0.02	0.04	0.06	40%	1		
	Perfluoroheptanoic acid (PFHpA)	µg/L	0.02	<0.02	0.02	67%	1	1	
	Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.02	0.02	0%	1		
	Perfluorononanoic acid (PFNA)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorodecanoic acid (PFDA)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorododecanoic acid (PFDoDA)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorotridecanoic acid (PFTriDA)	µg/L	0.02	<0.02	<0.02	0%	1		
Perfluoroalkyl Sulfonamides	Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	<0.05	<0.05	0%	1		
	Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.02	0%	1		
	N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	0%	1		
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	0%	1		
	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05	<0.05	<0.05	0%	1		
	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	0%	1		
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.02	0%	1		
(n:2) Fluorotelomer Sulfonic Acids	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.02	0%	1		
	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05	<0.05	<0.05	0%	1		
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05	<0.05	<0.05	0%	1		
	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05	<0.05	<0.05	0%	1		
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05	<0.05	<0.05	0%	1		
PFAS Sums	Sum of PFAS	µg/L	0.01	0.1	0.15	40%	1		
	Sum of PFHxS and PFOS	µg/L	0.01	<0.01	<0.01	0%	1		
	Sum of PFAS (WA DER List)	µg/L	0.01	0.1	0.15	40%	1		
Total Petroleum Hydrocarbons	C6 - C9 Fraction	µg/L	20	<20	<20	0%	1		
	C10 - C14 Fraction	µg/L	50	220	250	13%	1		
	C15 - C28 Fraction	µg/L	100	840	910	8%	1		
	C29 - C36 Fraction	µg/L	50	280	320	13%	1		
	C10 - C36 Fraction (sum)	µg/L	50	1340	1480	10%	1		
Total Recoverable Hydrocarbons - NEPM 2013 Fractions	C6 - C10 Fraction	µg/L	20	<20	<20	0%	1		
	C6 - C10 Fraction minus BTEX (F1)	µg/L	20	<20	<20	0%	1		
	>C10 - C16 Fraction	µg/L	100	320	340	6%	1		
	>C16 - C34 Fraction	µg/L	100	940	1030	9%	1		
	>C34 - C40 Fraction	µg/L	100	160	190	17%	1		
	>C10 - C40 Fraction (sum)	µg/L	100	1420	1560	9%	1		
	>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100	320	340	6%	1		

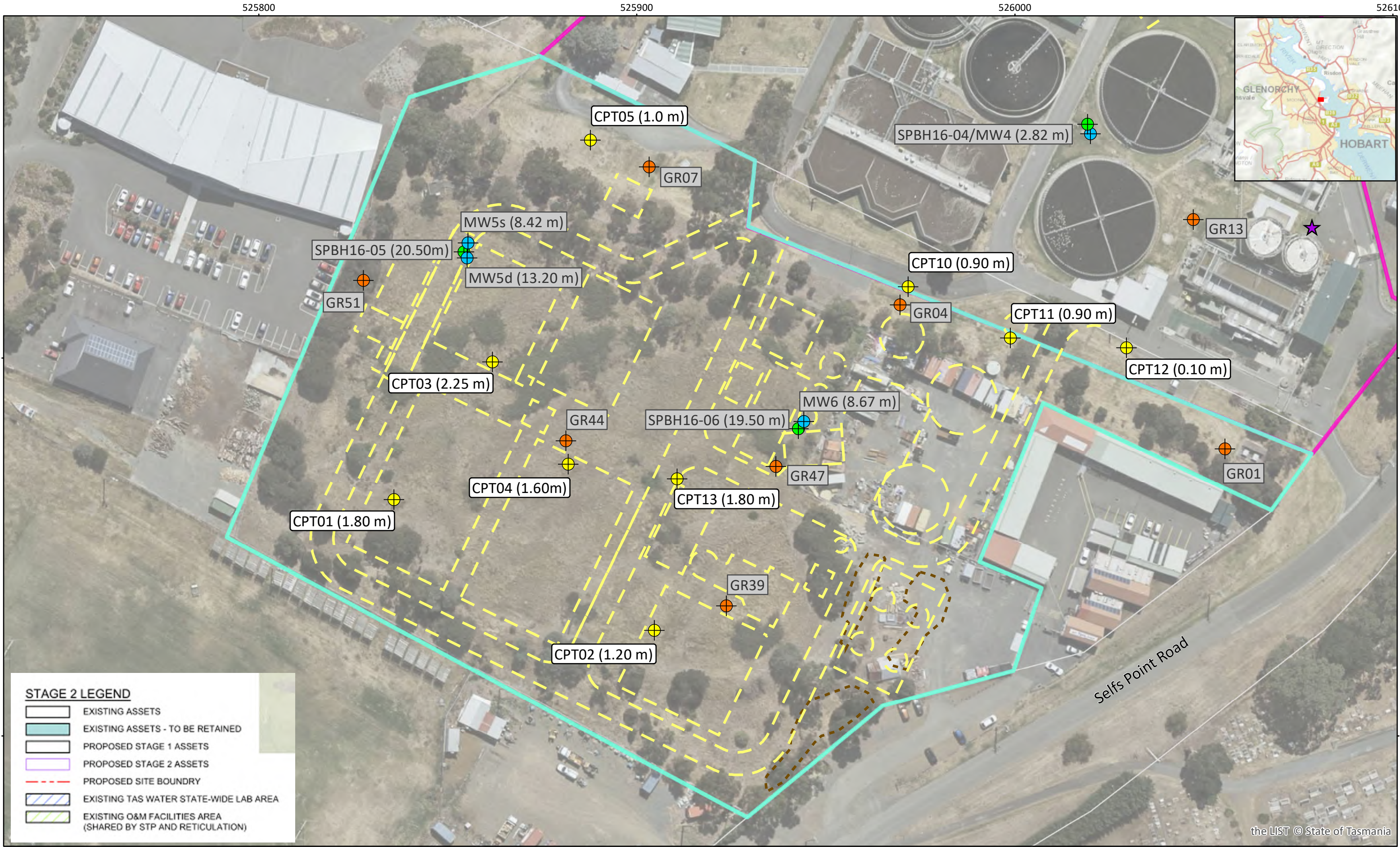
Parameter Suite	Analyte Name	Units	Batch	EM2206432	EM2206432	Relative Percentile Difference %	Pairs	Over 50%	Over 50% & > 10 x LOR
			Sample ID	MW5s	FD01				
			Sampling Date	7/04/2022	7/04/2022				
			Sampling Type	Primary	Duplicate				
BTEXN	LOR								
	Benzene	µg/L	1	<1	<1	0%	1		
	Toluene	µg/L	2	<2	<2	0%	1		
	Ethylbenzene	µg/L	2	<2	<2	0%	1		
	meta- & para-Xylene	µg/L	2	<2	<2	0%	1		
	ortho-Xylene	µg/L	2	<2	<2	0%	1		
	Total Xylenes	µg/L	2	<2	<2	0%	1		
	Sum of BTEX	µg/L	1	<1	<1	0%	1		
Phenolic Compounds	Naphthalene	µg/L	5	<5	<5	0%	1		
	Phenol	µg/L	1	<1.0	<1.2	0%	1		
	2-Chlorophenol	µg/L	1	<1.0	<1.2	0%	1		
	2-Methylphenol	µg/L	1	<1.0	<1.2	0%	1		
	3- & 4-Methylphenol	µg/L	2	<2.0	<2.4	0%	1		
	2-Nitrophenol	µg/L	1	<1.0	<1.2	0%	1		
	2,4-Dimethylphenol	µg/L	1	<1.0	<1.2	0%	1		
	2,4-Dichlorophenol	µg/L	1	<1.0	<1.2	0%	1		
	2,6-Dichlorophenol	µg/L	1	<1.0	<1.2	0%	1		
	4-Chloro-3-methylphenol	µg/L	1	<1.0	<1.2	0%	1		
	2,4,6-Trichlorophenol	µg/L	1	<1.0	<1.2	0%	1		
	2,4,5-Trichlorophenol	µg/L	1	<1.0	<1.2	0%	1		
	Pentachlorophenol	µg/L	2	<2.0	<2.4	0%	1		
Polynuclear Aromatic Hydrocarbons	Naphthalene	µg/L	1	<1.0	<1.0	0%	1		
	Acenaphthylene	µg/L	1	1.6	1.4	13%	1		
	Acenaphthene	µg/L	1	1.6	1.3	21%	1		
	Fluorene	µg/L	1	<1.0	<1.0	0%	1		
	Phenanthrene	µg/L	1	3.6	3.4	6%	1		
	Anthracene	µg/L	1	1.4	1.4	0%	1		
	Fluoranthene	µg/L	1	9.2	8.8	4%	1		
	Pyrene	µg/L	1	9.3	8.9	4%	1		
	Benz(a)anthracene	µg/L	1	3.4	3.1	9%	1		
	Chrysene	µg/L	1	3.5	3.2	9%	1		
	Benzo(b+j)fluoranthene	µg/L	1	3.7	3	21%	1		
	Benzo(k)fluoranthene	µg/L	1	3.3	3.1	6%	1		
	Benzo(a)pyrene	µg/L	0.5	4.7	4.1	14%	1		
	Indeno(1.2.3.cd)pyrene	µg/L	1	3.1	2.6	18%	1		
	Dibenz(a.h)anthracene	µg/L	1	<1.0	<1.0	0%	1		
	Benzo(g,h,i)perylene	µg/L	1	4	3.4	16%	1		
	Sum of polycyclic aromatic hydrocarbons	µg/L	0.5	52.4	47.7	9%	1		
	Benzo(a)pyrene TEQ (zero)	µg/L	0.5	6.1	5.3	14%	1		

Table F2 - Water Quality QA/QC Results (Rinsate Blank)
JN22377: Selfs Point CSA

			Batch	EM2206432
			Sample ID	RB01
			Sampling Date	7/04/2022
Parameter Suite	Analyte Name	Units	LOR	
Dissolved Metals	Arsenic	µg/L	1	<1
	Cadmium	µg/L	0.1	<0.1
	Chromium	µg/L	1	<1
	Copper	µg/L	1	<1
	Lead	µg/L	1	<1
	Nickel	µg/L	1	<1
	Zinc	µg/L	5	<5
	Mercury	µg/L	0.1	<0.1
Perfluoroalkyl Sulfonic Acids	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02	<0.02
	Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02	<0.02
	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01
	Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02	<0.02
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01
	Perfluorodecane sulfonic acid (PFDS)	µg/L	0.02	<0.02
Perfluoroalkyl Carboxylic Acids	Perfluorobutanoic acid (PFBA)	µg/L	0.1	<0.1
	Perfluoropentanoic acid (PFPeA)	µg/L	0.02	<0.02
	Perfluorohexanoic acid (PFHxA)	µg/L	0.02	<0.02
	Perfluoroheptanoic acid (PFHpA)	µg/L	0.02	<0.02
	Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01
	Perfluorononanoic acid (PFNA)	µg/L	0.02	<0.02
	Perfluorodecanoic acid (PFDA)	µg/L	0.02	<0.02
	Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	<0.02
	Perfluorododecanoic acid (PFDoDA)	µg/L	0.02	<0.02
	Perfluorotridecanoic acid (PFTTrDA)	µg/L	0.02	<0.02
	Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	<0.05
Perfluoroalkyl Sulfonamides	Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02
	N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05
	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05	<0.05
	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02
	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02
(n:2) Fluorotelomer Sulfonic Acids	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05	<0.05
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05	<0.05
	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05	<0.05
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05	<0.05
PFAS Sums	Sum of PFAS	µg/L	0.01	<0.01
	Sum of PFHxS and PFOS	µg/L	0.01	<0.01
	Sum of PFAS (WA DER List)	µg/L	0.01	<0.01
Total Petroleum Hydrocarbons	C6 - C9 Fraction	µg/L	20	<20
	C10 - C14 Fraction	µg/L	50	<50
	C15 - C28 Fraction	µg/L	100	<100
	C29 - C36 Fraction	µg/L	50	<50
	C10 - C36 Fraction (sum)	µg/L	50	<50
Total Recoverable Hydrocarbons - NEPM 2013 Fractions	C6 - C10 Fraction	µg/L	20	<20
	C6 - C10 Fraction minus BTEX (F1)	µg/L	20	<20
	>C10 - C16 Fraction	µg/L	100	<100
	>C16 - C34 Fraction	µg/L	100	<100
	>C34 - C40 Fraction	µg/L	100	<100
	>C10 - C40 Fraction (sum)	µg/L	100	<100
	>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100	<100

			Batch	EM2206432
			Sample ID	RB01
			Sampling Date	7/04/2022
Parameter Suite	Analyte Name	Units	LOR	
BTEXN	Benzene	µg/L	1	<1
	Toluene	µg/L	2	<2
	Ethylbenzene	µg/L	2	<2
	meta- & para-Xylene	µg/L	2	<2
	ortho-Xylene	µg/L	2	<2
	Total Xylenes	µg/L	2	<2
	Sum of BTEX	µg/L	1	<1
	Naphthalene	µg/L	5	<5
Phenolic Compounds	Phenol	µg/L	1	<1.0
	2-Chlorophenol	µg/L	1	<1.0
	2-Methylphenol	µg/L	1	<1.0
	3- & 4-Methylphenol	µg/L	2	<2.0
	2-Nitrophenol	µg/L	1	<1.0
	2,4-Dimethylphenol	µg/L	1	<1.0
	2,4-Dichlorophenol	µg/L	1	<1.0
	2,6-Dichlorophenol	µg/L	1	<1.0
	4-Chloro-3-methylphenol	µg/L	1	<1.0
	2,4,6-Trichlorophenol	µg/L	1	<1.0
	2,4,5-Trichlorophenol	µg/L	1	<1.0
	Pentachlorophenol	µg/L	2	<2.0
Polynuclear Aromatic Hydrocarbons	Naphthalene	µg/L	1	<1.0
	Acenaphthylene	µg/L	1	<1.0
	Acenaphthene	µg/L	1	<1.0
	Fluorene	µg/L	1	<1.0
	Phenanthrene	µg/L	1	<1.0
	Anthracene	µg/L	1	<1.0
	Fluoranthene	µg/L	1	<1.0
	Pyrene	µg/L	1	<1.0
	Benz(a)anthracene	µg/L	1	<1.0
	Chrysene	µg/L	1	<1.0
	Benzo(b+j)fluoranthene	µg/L	1	<1.0
	Benzo(k)fluoranthene	µg/L	1	<1.0
	Benzo(a)pyrene	µg/L	0.5	<0.5
	Indeno(1.2.3.cd)pyrene	µg/L	1	<1.0
	Dibenz(a,h)anthracene	µg/L	1	<1.0
	Benzo(g,h,i)perylene	µg/L	1	<1.0
	Sum of polycyclic aromatic hydrocarbons	µg/L	0.5	<0.5
	Benzo(a)pyrene TEQ (zero)	µg/L	0.5	<0.5

Figures



Legend GHD 2021 Test pit/bore EM&C 2016 Surface soil NATA analysed Soil bore Groundwater well	UST location Stockpiles Proposed Stages 1&2 Assets Cadastral parcels Site Boundaries New Town Bay Wetlands Existing STP site	N Scale = 1:900 0 25 50 Meters	Site: Selfs Point STP Concept Design 10 Selfs Point Road, New Town, TAS (JN22377) Date: 10 May 2022 Size: A3 Version: B	Client: ERA Planning for TasWater Drawn: MU Approved: EH/LF	Title: 75% Concept Design Stage 2 and Previous Investigations (Southern) Drawing # 0089-DWG-SELST01-GA-C-001 	Figure 2 Coordinate System: GDA2020 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 2020 Scale Factor: 0.9996 Units: Meter
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GHD 2021 Test pit/bore EM&C 2016 Surface soil NATA analysed Soil bore Groundwater well Approx. location anecdotal AST
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Stockpiles

Drainage line

Proposed Stages 1&2 Assets

Cadastral parcels

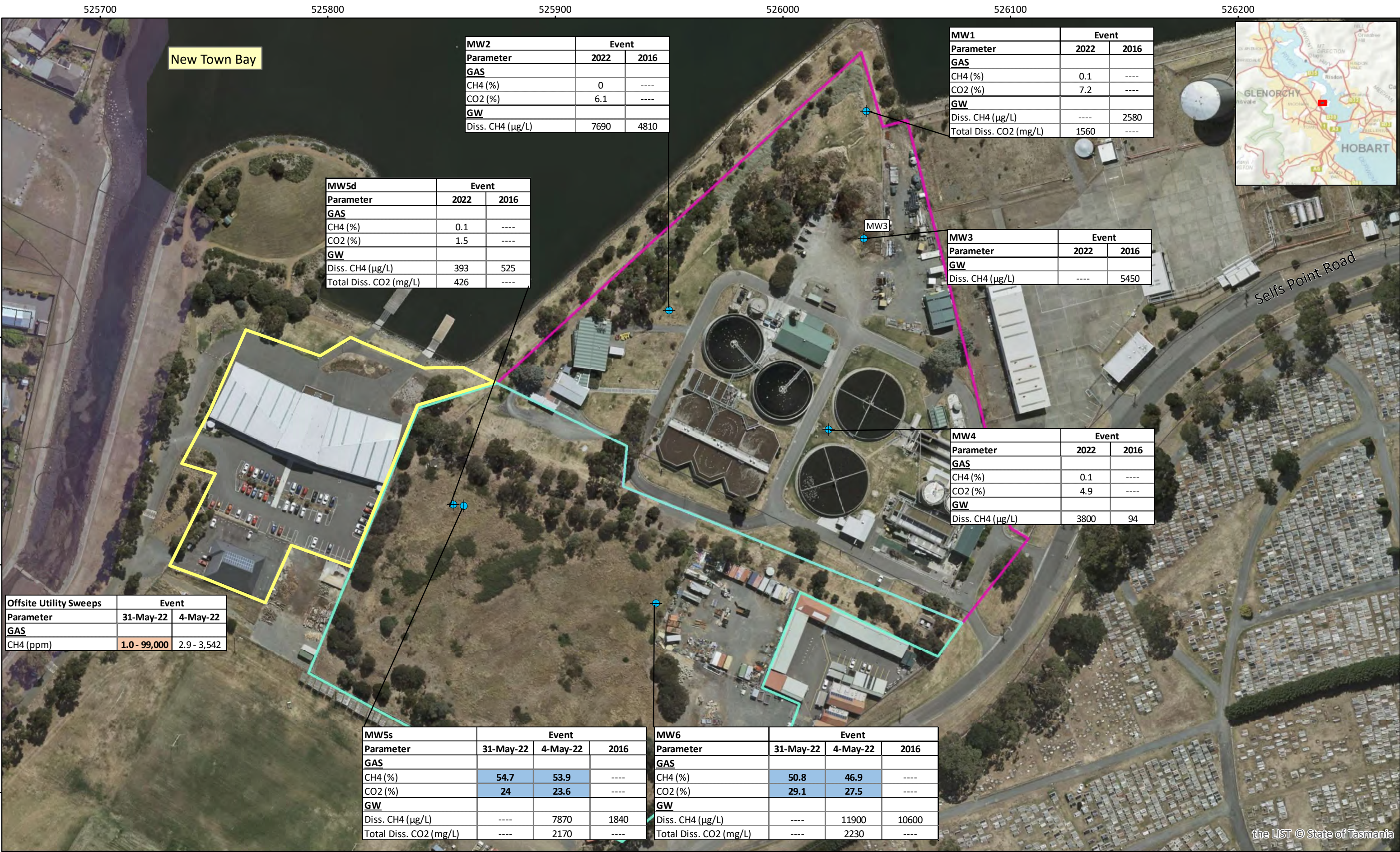
Site Boundaries

New Town Bay Wetlands

Existing STP site



Legend ● GW well ID (reduced water level mAHd) ● GW well ID (not sampled) ➡ Inferred GW flow direction - - Inferred GW contour mAHd *Contours are limited on number of data points	Site Boundaries New Town Bay Wetlands Existing STP site	N Scale = 1:1,200 0 25 50 Meters	Site: Selfs Point STP Concept Design 10-12 Selfs Point Road, New Town, TAS (JN22377) Date: 10 May 2022 Size: A3 Version: B	Client: ERA Planning for TasWater Drawn: MU Approved: EH/LF	Title: Groundwater Reduced Levels (RL) - Inferred Contours and Flow	Figure 4 Coordinate System: GDA2020 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 2020 Scale Factor: 0.9996 Units: Meter
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Legend

- Groundwater well
- Offsite Sweeps Area

Site Boundaries

- New Town Bay Wetlands
- Existing STP site
- Cadastral parcels

Landfill Gas Exceedances (BPBM 2015)

- Subsurface Geology Action level = 1.25%
- Utility Sweep Action Level = 10,000ppm

CH4 = Methane
CO2 = Carbon Dioxide

N

Scale = 1:1,500

0 25 50 Meters

Site:
Selfs Point STP Concept Design
10-12 Selfs Point Road, New Town,
TAS (JN22377)

Date: 7 June 2022
Size: A3 Version: B

Client:
ERA Planning for TasWater

Drawn: MU
Approved: LF

Title:
Landfill Gas Screening and Dissolved
Gases in Groundwater

Figure 5

Coordinate System: GDA2020 MGA Zone 55
Projection: Transverse Mercator
Datum: GDA 2020
Scale Factor: 0.9996
Units: Meter

Analytical Results

		Lower and Upper Explosive Limit (LEL / UEL) for methane in air (SWA, 2011)	Action Level utility services on and adjacent landfill (Vic BPEM 2015)	Action Level subsurface geology (LSG 2004 and Vic BPEM 2015)	Sample ID	MW1	MW2	MW4	MW5d	MW5s		MW6	
					Sampling Date	4/05/2022	4/05/2022	4/05/2022	4/05/2022	4/05/2022	31/05/2022	4/05/2022	31/05/2022
Equipment	Analyte Name				Units								
Gauging	Depth to Water (DTW)				mBTOC	2.186	1.902	1.858	6.76	6.802	6.55	6.701	6.46
	Total Well Depth (TD)				mBTOC	3.92	4.21	2.75	13.15	8.26	8.26	8.574	8.574
	Well Screen Interval as measured 4th May 2022				mBTOC	1.50 - 3.92	0.70 - 4.21	1.95 - 2.75	~10.5	5.60 - 8.26	5.60 - 8.26	5.75 - 8.57	5.75 - 8.57
GA5000	Atmospheric Pressure				mb	1008	1008	1009	1009	1009	982	1009	982
	Relative Pressure (Well)				mb	0.03	-0.03	-5.91	15.54	0.1	-0.04	0.07	0.07
	Internal flow				L/h	0	0	-2.9	6.9	0.1	0	-0.1	0
	Methane (CH ₄)	5% / 15%		1.25%	% v/v	0.1	0	0.1	0.1	53.9	54.7	46.9	50.8
	Carbon Dioxide (CO ₂)			7.6 % (1.5% above b'ground*	% v/v	7.2	6.1	4.9	1.5	23.6	24.3	27.5	29.1
	Oxygen (O ₂)				% v/v	14.1	16.1	13	20.1	0	0	0.2	0.9
	Carbon Monoxide (CO)				ppm	0	0	0	0	1	1	0	1
	Hydrogen Sulfide (H ₂ S)				ppm	0	0	0	0	3	0	0	0
	Nitrogen Balance (N)				% v/v	78.5	77.8	82	78.3	22.6	21	25.4	19.3
	Peak Methane (CH ₄)				% v/v	0.1	0	0.1	2.5	54	54.8	47	50.9
	Peak Carbon Dioxide (CO ₂)				% v/v	7.2	6.1	5	1.6	23.6	24.3	27.5	29.1
	Min O ₂				% v/v	14.1	16.1	13	20.1	0	0	0.2	0.9
	Aspiration Time				sec	180	180	180	180	180	180	180	180

Notes

EPA Victoria BEPM (2015).
TAS DPIWE (2004) Safe Work Australia (2011), Confined Spaces - Code of Practice

Best practice environmental management; Siting, design, operation and rehabilitation of landfills. Publication 788.3.
Landfill Sustainability Guide; Landfill gas

* Preliminary value based on MW1-MW3 average + 1.5%

1.81 SWL above screened interval

Attached Table B0.2 - Landfill Gas Preliminary Screening Results - Utilities / Service Alignments
JN22377: Selfs Point CSA

				Date	Methane (CH ₄)	Methane (CH ₄)
Sweep location	Type	Easting	Northing	Unit	ppm	%
Action Level utility services on and adjacent landfill (Vic BPEM 2015)					10,000	1.0%
Lower and Upper Explosive Limit (LEL / UEL) for methane in air (SWA, 2011)						5% / 15%
	Sewer	525772	5256017	4/05/2022	3,542	0.35%
Grated pit adjacent rowing shed and car park (GP1)	Stormwater	525805	5256036	4/05/2022	6.4	--
Grated pit with Ag pipe (3 pipes) central car park (GP2)	Stormwater	525782	5256031	4/05/2022	32.6	--
Grated pit central garden bed car park (GP3)	Stormwater	525763	5256040	4/05/2022	5.5 - 28.9	--
Grated pit near Marine Pde (GP4)	Stormwater	525752	5256059	4/05/2022	2.9	--
Utility Screening Event 2 - 31 May 2022						
Ag Outlet - open space - NE rowing shed	Stormwater	525838	5256076	31/05/2022	1.3	--
Stop Valve - open space - NE rowing shed	Water	525844	5256082	31/05/2022	1.0	--
Fire Point - open space - NE rowing shed	Fire Valve	525845	5256081	31/05/2022	1.3	--
Crack near Rowing shed	Tarmac	525778	5256059	31/05/2022	89.6	--
Water Valve (WV1) adjacent Rowing shed	Water	525791	5256044	31/05/2022	1.4	--
Water Valve (WV2) adjacent Rowing shed	Water	525794	5256072	31/05/2022	1.3	--
Water Point (WP1) - NE Rowing shed	Water	525835	5256060	31/05/2022	1.0	--
Sewer valve cover - southern side car park (Sewer1)	Sewer	525773	5256017	31/05/2022	2.0	--
Grated pit adjacent rowing shed and car park (GP1)	Stormwater	525805	5256037	31/05/2022	3.6	--
Grated pit with Ag pipe (3 pipes) central car park (GP2)	Stormwater	525782	5256031	31/05/2022	790	--
Grated pit central garden bed car park (GP3)	Stormwater	525763	5256038	31/05/2022	2.4	--
Grated pit near Marine Pde (GP4)	Stormwater	525751	5256060	31/05/2022	2.0	--
Grated pit Bridge Club car park (GP5)	Stormwater	525775	5256007	31/05/2022	7.3	--
Grated Pit Bridge Club car park (GP6)	Stormwater	525747	5256016	31/05/2022	1.4	--
Grated pit Bridge Club car park (GP7)	Stormwater	525732	5256000	31/05/2022	1.0	--
Crack in Tarmac Bridge Club car park	Tarmac	525758	5256008	31/05/2022	29.9	--
Green Lid - in tarmac adjacent to Bridge Club (unknown utility type)	Water	525772	5256001	31/05/2022	6,700	0.67%
Stormwater Trap - in tarmac adjacent to Bridge Club	Stormwater	525773	5256004	31/05/2022	339	--
Wall Vent 1 - outer brickwork Bridge Club	Structure	525749	5255993	31/05/2022	48.9	--
Wall Vent 2 - outer brickwork Bridge Club	Structure	525752	5255992	31/05/2022	51.9	--
Wall Vent 3 - outer brickwork Bridge Club	Structure	525755	5255990	31/05/2022	83.9	--
Tarmac adjacent to Bridge Club	Tarmac	525771	5256004	31/05/2022	99,000	9.9%

Notes

EPA Victoria BPEM (2015). Best practice environmental management; Siting, design, operation and rehabilitation of landfills. Publication 788.3.

TAS DPIWE (2004). Landfill Sustainability Guide; Landfill gas

Safe Work Australia (2011). Confined Spaces - Code of Practice

Attached Table B1 - Groundwater Gauging Results
JN22377: Selfs Point CSA

Well ID	Round Measured	Easting	Northing	Casing (m)	Bore Depth (mBTOC)	Bore Depth (mBGL)	Depth to Groundwater (mBTOC)	(A) Depth to Groundwater (mBGL)	(B) Elevation surveyed (mAHD)	RL mAHD (B - A)
MW1	April 2022	526036.61	5256199.32		3.920	3.920	2.155	2.155	2.365	0.210
MW2	April 2022	525949.96	5256111.78		4.205	4.205	1.880	1.880	2.334	0.454
MW3	EM&C - May 2016	526035.58	5256143.32					1.620	2.306	0.686
MW4	April 2022	526020.04	5256059.36		2.750	2.750	1.810	1.810	3.065	1.255
MW5d (deep)	April 2022	525855.12	5256026.52	0.700	13.150	12.450	6.962	6.262	7.503	1.241
MW5s (shallow)	April 2022	525855.28	5256030.47	0.755	8.264	7.509	6.895	6.140	7.538	1.398
MW6	April 2022	525944.20	5255983.18	0.750	8.574	7.824	6.855	6.105	7.663	1.558

m: meters

GL: ground level

mBTOC: meters below to of casing

mBGL: meters below ground level

mAHD: meters above Australian Height Datum

Attached Table B2 - Groundwater Results
JN22377: Selfs Point CSA



		Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2- <4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Intrusive Maintenance Workers (shallow trench) 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10)	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines	AS2159-2009 Piling Installation and Design Exposure Classification Guidelines		Sample ID	MW1	MW2	MW4	MW5d	MW5s	MW6
Parameter Suite	Analyte Name							Units	LOR						
Gauging	Depth to Water (DTW)							mBTOC		2.16	1.88	1.81	6.96	6.90	6.86
	Total Well Depth (TD)							mBTOC		3.92	4.21	2.75	13.15	8.26	8.574
	Well Screen Interval as measured 4th May 2022							mBTOC		1.50 - 3.92	0.70 - 4.21	1.95 - 2.75	~10.5 -13.15	5.60 - 8.26	5.75 - 8.57
Field Parameters	pH (field)	5.9-7.7					<5.5 (concrete), <5	pH Unit	0.1	7.0	7.1	7.2	6.6	6.7	6.5
	pH (lab)	5.9-7.7						pH Unit	0.01	7.5	----	----	7.7	7.3	6.9
	Dissolved Oxygen	7.5-12.9						mg/L	0.1	0.51	0.31	2.4	1.9	0.66	0.33
	Electrical Conductivity	66.9-178.3						µs/cm	1	4006	2363	1867	18230	8849	4862
	Redox Potential							mV	1	-170	-167	-113	-56	-115	-146
	Turbidity	1.6-7.8						NTU	0.1	13	66	20	2.8	169	46
	Temperature	4.0-17.2						°C	0.1	16.6	17.6	20.6	17.0	16.9	17.2
	Water Observations									Light brown, slightly turbid, no odour, no sheen	Slightly turbid, no odour, no sheen	Very slightly turbid, no odour, no sheen	Clear, no odour, no sheen	Grey, turbid, strong HC odour, slow recharge	Light sheen, light to moderate turbidity, no odour
Corrosion Classification	Exposure Classification - Steel Piles									Non Aggressive	----	----	Mild	Mild	Non Aggressive
	Exposure Classification - Concrete Piles									Mild	----	----	Mild	Mild	Mild
Physico-Chemical	Sulfate						1000 (concrete)	mg/L	1	96	----	----	785	<1	<1
	Chloride						<6000 (concrete), <1000 (steel)	mg/L	1	470	----	----	6230	1890	657
Dissolved Metals	Arsenic				100			µg/L	1	22	37	2	1	10	4
	Cadmium	0.7**			20			µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium	27/4.4 (CrIII/CrVI)			500 (CrVI)			µg/L	1	1	<1	<1	<1	3	1
	Copper	1.3			20000			µg/L	1	<1	<1	<1	<1	<1	<1
	Lead	4.4			100			µg/L	1	<1	<1	<1	<1	<1	<1
	Nickel	7**			200			µg/L	1	20	11	7	12	98	18
	Zinc	8			3000			µg/L	5	8	40	14	15	8	25
	Mercury				10			µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
CO2 - Free and Total	Free Carbon Dioxide							mg/L	1	96	----	----	20	241	496
	Total Carbon Dioxide							mg/L	1	1560	----	----	426	2170	2230
C1-C4 Hydrocarbon Gases	Methane							µg/L	10	----	7690	3800	393	7870	11900
	Ethene							µg/L	10	----	<10	<10	<10	<10	<10
	Ethane							µg/L	10	----	<10	<10	<10	<10	<10
	Propene							µg/L	10	----	<10	<10	<10	<10	<10
	Propane							µg/L	10	----	<10	<10	<10	<10	<10
	Butene							µg/L	10	----	<10	<10	<10	<10	<10
	Butane							µg/L	10	----	<10	<10	<10	<10	<10
Perfluoroalkyl Sulfonic Acids	Perfluorobutane sulfonic acid (PFBS)							µg/L	0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluoropentane sulfonic acid (PFPeS)							µg/L	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorohexane sulfonic acid (PFHxS)					2	2	µg/L	0.01	0.18	<0.01	<0.01	<0.01	<0.01	<0.01
	Perfluoroheptane sulfonic acid (PFHpS)							µg/L	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorooctane sulfonic acid (PFOS)	0.00023*				2	2	µg/L	0.01	0.19	0.01	0.03	<0.01	<0.01	<0.01
	Perfluorodecane sulfonic acid (PFDS)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroalkyl Carboxylic Acids	Perfluorobutanoic acid (PFBA)							µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Perfluoropentanoic acid (PFPeA)							µg/L	0.02	0.34	<0.02	<0.02	<0.02	0.04	<0.02
	Perfluorohexanoic acid (PFHxA)							µg/L	0.02	0.28	<0.02	<0.02	<0.02	0.04	<0.02
	Perfluoroheptanoic acid (PFHpA)							µg/L	0.02	0.19	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorooctanoic acid (PFOA)	19*				10^	10^	µg/L	0.01	0.49	0.02	0.02	<0.01	0.02	<0.01
	Perfluorononanoic acid (PFNA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorodecanoic acid (PFDA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluoroundecanoic acid (PFUnDA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorododecanoic acid (PFDoDA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorotridecanoic acid (PFTTrDA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorotetradecanoic acid (PFTeDA)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Attached Table B2 - Groundwater Results
JN22377: Selfs Point CSA



		Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2- <4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Intrusive Maintenance Workers (shallow trench) 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10)	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines	AS2159-2009 Piling Installation and Design Exposure Classification Guidelines		Sample ID	MW1	MW2	MW4	MW5d	MW5s	MW6
Parameter Suite	Analyte Name							Units	LOR						
Perfluoroalkyl Sulfonamides	Perfluorooctane sulfonamide (FOSA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	N-Methyl perfluorooctane sulfonamide (MeFOSA)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)							µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
(n:2) Fluorotelomer Sulfonic Acids	4:2 Fluorotelomer sulfonic acid (4:2 FTS)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	8:2 Fluorotelomer sulfonic acid (8:2 FTS)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)							µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PFAS Sums	Sum of PFAS							µg/L	0.01	1.79	0.03	0.05	<0.01	0.1	<0.01
	Sum of PFHxS and PFOS					2^	2^	µg/L	0.01	0.37	0.01	0.03	<0.01	<0.01	<0.01
	Sum of PFAS (WA DER List)							µg/L	0.01	1.73	0.03	0.05	<0.01	0.1	<0.01
Total Petroleum Hydrocarbons	C6 - C9 Fraction	30000^^						µg/L	20	<20	<20	<20	<20	<20	<20
	C10 - C14 Fraction	30000^^						µg/L	50	<50	<50	<50	<50	220	140
	C15 - C28 Fraction	5000^^						µg/L	100	180	110	<100	<100	840	670
	C29 - C36 Fraction	5000^^						µg/L	50	<50	<50	<50	<50	280	70
	C10 - C36 Fraction (sum)							µg/L	50	180	110	<50	<50	1340	880
Total Recoverable Hydrocarbons - NEPM 2013 Fractions	C6 - C10 Fraction							µg/L	20	<20	<20	<20	<20	<20	<20
	C6 - C10 Fraction minus BTEX (F1)	30000^^	6000	NL				µg/L	20	<20	<20	<20	<20	<20	<20
	>C10 - C16 Fraction	30000^^						µg/L	100	<100	<100	<100	<100	320	230
	>C16 - C34 Fraction	5000^^						µg/L	100	180	100	<100	<100	940	620
	>C34 - C40 Fraction	5000^^						µg/L	100	<100	<100	<100	<100	160	<100
	>C10 - C40 Fraction (sum)							µg/L	100	180	100	<100	<100	1420	850
	>C10 - C16 Fraction minus Naphthalene (F2)	30000^^	NL	NL				µg/L	100	<100	<100	<100	<100	320	230
BTEXN	Benzene	500**/3000^^	5000	NL	10			µg/L	1	<1	<1	<1	<1	<1	<1
	Toluene	180	NL	NL	8000			µg/L	2	<2	<2	<2	<2	<2	<2
	Ethylbenzene	80	NL	NL	3000			µg/L	2	<2	<2	<2	<2	<2	<2
	meta- & para-Xylene	75	NL	NL				µg/L	2	<2	<2	<2	<2	<2	<2
	ortho-Xylene		NL	NL				µg/L	2	<2	<2	<2	<2	<2	<2
	Total Xylenes		NL	NL	6000			µg/L	2	<2	<2	<2	<2	<2	<2
	Sum of BTEX	20000^^						µg/L	1	<1	<1	<1	<1	<1	<1
	Naphthalene	50**	NL	NL				µg/L	5	<5	<5	<5	<5	<5	<5
Phenolic Compounds	Phenol	400						µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2-Chlorophenol				3000			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2-Methylphenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3- & 4-Methylphenol							µg/L	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	2-Nitrophenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2,4-Dimethylphenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2,4-Dichlorophenol				2000			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2,6-Dichlorophenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4-Chloro-3-methylphenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2,4,6-Trichlorophenol				200			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2,4,5-Trichlorophenol							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Pentachlorophenol	11**			100			µg/L	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0

Attached Table B2 - Groundwater Results
JN22377: Selfs Point CSA

		Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2-<4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Intrusive Maintenance Workers (shallow trench) 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10)	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines	AS2159-2009 Piling Installation and Design Exposure Classification Guidelines		Sample ID	MW1	MW2	MW4	MW5d	MW5s	MW6
								Units	LOR						
Parameter Suite	Analyte Name														
Polynuclear Aromatic Hydrocarbons	Naphthalene	50**						µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Acenaphthylene							µg/L	1	<1.0	<1.0	<1.0	<1.0	1.6	<1.0
	Acenaphthene							µg/L	1	<1.0	<1.0	<1.0	<1.0	1.6	<1.0
	Fluorene							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Phenanthrene	0.6**						µg/L	1	<1.0	<1.0	<1.0	<1.0	3.6	<1.0
	Anthracene	0.01**						µg/L	1	<1.0	<1.0	<1.0	<1.0	1.4	<1.0
	Fluoranthene	1.0**						µg/L	1	<1.0	<1.0	<1.0	<1.0	9.2	<1.0
	Pyrene							µg/L	1	<1.0	<1.0	<1.0	<1.0	9.3	<1.0
	Benz(a)anthracene							µg/L	1	<1.0	<1.0	<1.0	<1.0	3.4	<1.0
	Chrysene							µg/L	1	<1.0	<1.0	<1.0	<1.0	3.5	<1.0
	Benzo(b+j)fluoranthene							µg/L	1	<1.0	<1.0	<1.0	<1.0	3.7	<1.0
	Benzo(k)fluoranthene							µg/L	1	<1.0	<1.0	<1.0	<1.0	3.3	<1.0
	Benzo(a)pyrene	0.1**			0.1			µg/L	0.5	<0.5	<0.5	<0.5	<0.5	4.7	<0.5
	Indeno(1.2.3.cd)pyrene							µg/L	1	<1.0	<1.0	<1.0	<1.0	3.1	<1.0
	Dibenz(a.h)anthracene							µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Benzo(g.h.i)perylene							µg/L	1	<1.0	<1.0	<1.0	<1.0	4	<1.0
Bacteriological	Sum of polycyclic aromatic hydrocarbons							µg/L	0.5	<0.5	<0.5	<0.5	<0.5	52.4	<0.5
	Benzo(a)pyrene TEQ (zero)							µg/L	0.5	<0.5	<0.5	<0.5	<0.5	6.1	<0.5
Bacteriological	Escherichia coli (Colilert)							orgs/100m	1	0	<10	0	1	<10	<10
	Total Coliforms (Colilert)							orgs/100m	1	3	<10	15	14	<10	<10
Organotin Compounds (Soluble)	Tributyltin	0.006						µgSn/L	0.002	<0.002	----	----	<0.002	<0.002	<0.002

Abbreviation Notes	
EPA 2021	Tasmanian EPA DGVs for Aquatic Ecosystems of the Derwent Estuary-Bruny Catchment
EPA 2020	Tasmanian EPA UPSS Regulations (2020)
PFAS	Per and Poly Fluoroalkylated Substances
HEPA 2020	Heads of EPA Australia and NZ
PFAS NEMP/HEPA	PFAS National Environmental Management Plan (HEPA, 2018)
TV	Trigger Value
HMTV	Hardness Modified Trigger Value derived per ANZECC (2000)
GV	Guideline Value
SPWQM	State Policy on Water Quality Management (1997)
WQG	Water Quality Guideline
ANZG 2018	Australian Water Quality Guidelines https://www.waterquality.gov.au/anz-guidelines
NHMRC 2018	Australian Drinking Water Guidelines, NHMRC 2018
NHMRC 2019	Guidance on PFAS in Recreational Water (NHMRC 2019)
**	HEPA 2018 and ANZG 2018, 99% guideline value for bioaccumulative contaminants
*	HEPA, 2018, 95% guideline value
^	Some recreational water resources may be used less frequently than the assumed guidelines (150 days/year), and (in rare cases) some may be used more frequently.
^^	Tasmanian EPA UPSS Regulations (2020) inferred LNAPL; petrol TPH means the total concentration of TPH between C6 and C14 or TRH between C6 and C16
1.81	SWL above screened interval

Attached Table B3 - Historical Groundwater Results
JN22377: Selfs Point SCA

Parameter Suite	Analyte Name	Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2-<4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Maintenance Intrusive Workers HSL-D 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines	Units	Sample ID	MW1		MW2		MW3	MW4		MW5d		MW5s		MW6	
								Sampling Date	9/05/2016	7/04/2022	9/05/2016	7/04/2022	9/05/2016	11/05/2016	7/04/2022	10/05/2016	7/04/2022	10/05/2016	7/04/2022	11/05/2016	7/04/2022
									LOR												
Gauging	Depth to Water (DTW)						mBTOC	0.1	1.550	2.155	1.635	1.880	1.620	1.312	1.810	6.782	6.962	6.505	6.895	6.739	6.855
	Total Well Depth (TD)						mBTOC	0.1	4.000	3.920	4.500	4.205	4.500	3.500	2.750	13.20	13.150	8.000	8.264	8.670	8.574
	Well Screen Interval						mBTOC	0.1	0.98-3.98	1.50 - 3.92	1.26-4.26	0.70 - 4.21	1.28-4.28	1.82-2.82	1.95 - 2.75	10.2-13.2	~10.5 -13.15	5.42-8.42	5.60 - 8.26	5.67 - 8.67	5.75 - 8.57
Physico-Chemical	Ammonia						mg/L	0.01	2.76	----	3.11	----	10.6	0.96	----	9.26	----	101	----	85.5	----
	Sulfate						mg/L	1	138	96	22	----	92	341	----	874	785	<10	<1	20	<1
	Chloride						mg/L	1	263	470	421	----	5660	343	----	7870	6230	3040	1890	1180	657
Dissolved Metals	Arsenic				100		µg/L	1	8	22	22	37	19	5	2	3	1	23	10	2	4
	Cadmium	0.7**			20		µg/L	0.1	<0.1	<0.1	0.7	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Chromium	7/4.4 (CrIII/CrVI)			500 (CrVI)		µg/L	1	3	1	<1	<1	<1	<1	<1	<1	<1	2	3	1	1
	Copper	1.3			20000		µg/L	1	2	<1	1	<1	<1	5	<1	<1	<1	<1	<1	<1	<1
	Lead	4.4			100		µg/L	1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1
	Nickel	7**			200		µg/L	1	39	20	12	11	13	50	7	7	12	19	98	24	18
	Zinc	8			3000		µg/L	5	24	8	67	40	85	121	14	18	15	11	8	10	25
	Mercury				10		µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
C1-C4 Hydrocarbon Gases	Methane						µg/L	10	2580	----	4810	7690	5450	94	3800	525	393	1840	7870	10600	11900
Perfluoroalkyl Sulfonic Acids	Perfluorobutane sulfonic acid (PFBS)						µg/L	0.02	----	0.06	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluoropentane sulfonic acid (PFPeS)						µg/L	0.02	----	0.04	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorohexane sulfonic acid (PFHxS)					2	µg/L	0.01	----	0.18	----	<0.01	----	----	<0.01	----	<0.01	----	<0.01	----	<0.01
	Perfluoroheptane sulfonic acid (PFHpS)						µg/L	0.02	----	0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorooctane sulfonic acid (PFOS)	0.00023*				2	µg/L	0.01	----	0.19	----	0.01	----	----	0.03	----	<0.01	----	<0.01	----	<0.01
	Perfluorodecane sulfonic acid (PFDS)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
Perfluoroalkyl Carboxylic Acids	Perfluorobutanoic acid (PFBA)						µg/L	0.1	----	<0.1	----	<0.1	----	----	<0.1	----	<0.1	----	<0.1	----	<0.1
	Perfluoropentanoic acid (PFPeA)						µg/L	0.02	----	0.34	----	<0.02	----	----	<0.02	----	<0.02	----	0.04	----	<0.02
	Perfluorohexanoic acid (PFHxA)						µg/L	0.02	----	0.28	----	<0.02	----	----	<0.02	----	<0.02	----	0.04	----	<0.02
	Perfluoroheptanoic acid (PFHpA)						µg/L	0.02	----	0.19	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorooctanoic acid (PFOA)	19*				10^	µg/L	0.01	----	0.49	----	0.02	----	----	0.02	----	<0.01	----	0.02	----	<0.01
	Perfluorononanoic acid (PFNA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorodecanoic acid (PFDA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluoroundecanoic acid (PFUnDA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorododecanoic acid (PFDoDA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorotridecanoic acid (PFTriDA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	Perfluorotetradecanoic acid (PFTeDA)						µg/L	0.05	----	<0.05	----	<0.05	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05

Attached Table B3 - Historical Groundwater Results
JN22377: Selfs Point SCA

		Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion	NEPM (2013) Groundwater HSLs for Vapour Intrusion	NHMRC (2008 & 2021) Recreational Guidelines	PFAS National Environmental Management Plan (2020)															
			Commercial/Industrial HSL-D	Maintenance Workers HSL-D	(Based on Australian Drinking Water Guidelines x10	Human Health, Recreational Guidelines	Sample ID	MW1		MW2		MW3	MW4		MW5d		MW5s		MW6		
			GW depth 2- <4m, SAND				Sampling Date	9/05/2016	7/04/2022	9/05/2016	7/04/2022	9/05/2016	11/05/2016	7/04/2022	10/05/2016	7/04/2022	10/05/2016	7/04/2022	11/05/2016	7/04/2022	
Parameter Suite	Analyte Name			2-4m			Units	LOR													
Perfluoroalkyl Sulfonamides	Perfluorooctane sulfonamide (FOSA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	N-Methyl perfluorooctane sulfonamide (MeFOSA)						µg/L	0.05	----	<0.05	----	<0.05	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)						µg/L	0.05	----	<0.05	----	<0.05	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)						µg/L	0.05	----	<0.05	----	<0.05	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)						µg/L	0.05	----	<0.05	----	<0.05	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)						µg/L	0.02	----	<0.02	----	<0.02	----	----	<0.02	----	<0.02	----	<0.02	----	<0.02
(n:2) Fluorotelomer Sulfonic Acids	4:2 Fluorotelomer sulfonic acid (4:2 FTS)						µg/L	0.05	----	<0.05	----	<0.05	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)						µg/L	0.05	----	<0.05	----	<0.05	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	8:2 Fluorotelomer sulfonic acid (8:2 FTS)						µg/L	0.05	----	<0.05	----	<0.05	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)						µg/L	0.05	----	<0.05	----	<0.05	----	----	<0.05	----	<0.05	----	<0.05	----	<0.05
PFAS Sums	Sum of PFAS						µg/L	0.01	----	1.79	----	0.03	----	----	0.05	----	<0.01	----	0.1	----	<0.01
	Sum of PFHxS and PFOS					2^	µg/L	0.01	----	0.37	----	0.01	----	----	0.03	----	<0.01	----	<0.01	----	<0.01
	Sum of PFAS (WA DER List)						µg/L	0.01	----	1.73	----	0.03	----	----	0.05	----	<0.01	----	0.1	----	<0.01
Total Recoverable Hydrocarbons - NEPM 2013 Fractions	C6 - C10 Fraction						µg/L	20	----	<20	----	<20	----	----	<20	----	<20	----	<20	----	<20
	C6 - C10 Fraction minus BTEX (F1)	30000^^	6000	NL			µg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	>C10 - C16 Fraction	30000^^					µg/L	100	----	<100	----	<100	----	----	<100	----	<100	----	320	----	230
	>C16 - C34 Fraction	5000^^					µg/L	100	200	180	<100	100	<100	<100	<100	<100	69900	940	270	620	
	>C34 - C40 Fraction	5000^^					µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	17800	160	<100	<100	
	>C10 - C40 Fraction (sum)						µg/L	100	----	180	----	100	----	----	<100	----	<100	----	1420	----	850
	>C10 - C16 Fraction minus Naphthalene (F2)	30000^^	NL	NL			µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	5210	320	160	230	
BTEXN	Benzene	500**/3000^^	5000	NL	10		µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Toluene	180	NL	NL	8000		µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Ethylbenzene	80	NL	NL	3000		µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	meta- & para-Xylene	75	NL	NL			µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	ortho-Xylene		NL	NL			µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Total Xylenes		NL	NL	6000		µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Sum of BTEX	20000^^					µg/L	1	----	<1	----	<1	----	----	<1	----	<1	----	<1	----	<1
	Naphthalene	50**	NL	NL			µg/L	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	12	<5	6	<5

Attached Table B3 - Historical Groundwater Results
JN22377: Sels Point SCA

Parameter Suite	Analyte Name	Aquatic Ecosystem Protection - Slightly to Moderately Disturbed 95% (EPA 2020, EPA 2021, AWQG 2018, HEPA 2020)	NEPM (2013) Groundwater HSLs for Vapour Intrusion Commercial/Industrial HSL-D GW depth 2-<4m, SAND	NEPM (2013) Groundwater HSLs for Vapour Intrusion Maintenance Workers HSL-D 2-4m	NHMRC (2008 & 2021) Recreational Guidelines (Based on Australian Drinking Water Guidelines x10	PFAS National Environmental Management Plan (2020) Human Health, Recreational Guidelines	Units	Sample ID	MW1		MW2		MW3	MW4		MW5d		MW5s		MW6	
								Sampling Date	9/05/2016	7/04/2022	9/05/2016	7/04/2022	9/05/2016	11/05/2016	7/04/2022	10/05/2016	7/04/2022	10/05/2016	7/04/2022	11/05/2016	7/04/2022
									LOR												
Polynuclear Hydrocarbons	Naphthalene	50**					µg/L	1	<2	<1.0	<2	<1.0	<2	<2	<1.0	<2	<1.0	54	<1.0	4	<1.0
	Acenaphthylene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	1.6	----	<1.0
	Acenaphthene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	1.6	----	<1.0
	Fluorene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	<1.0	----	<1.0
	Phenanthrene	0.6**					µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.6	----	<1.0
	Anthracene	0.01**					µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	1.4	----	<1.0
	Fluoranthene	1.0**					µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	9.2	----	<1.0
	Pyrene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	9.3	----	<1.0
	Benz(a)anthracene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.4	----	<1.0
	Chrysene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.5	----	<1.0
	Benzo(b+j)fluoranthene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.7	----	<1.0
	Benzo(k)fluoranthene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.3	----	<1.0
	Benzo(a)pyrene	0.1**			0.1		µg/L	0.5	<2	<0.5	<2	<0.5	<2	<2	<0.5	<2	<0.5	498	4.7	<2	<0.5
	Indeno(1.2.3.cd)pyrene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	3.1	----	<1.0
	Dibenz(a.h)anthracene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	<1.0	----	<1.0
	Benzo(g,h,i)perylene						µg/L	1	----	<1.0	----	<1.0	----	----	<1.0	----	<1.0	----	4	----	<1.0
	Sum of polycyclic aromatic hydrocarbons						µg/L	0.5	5	<0.5	<2	<0.5	<2	<2	<0.5	<2	<0.5	6410	52.4	8	<0.5
	Benzo(a)pyrene TEQ (zero)						µg/L	0.5	----	<0.5	----	<0.5	----	----	<0.5	----	<0.5	----	6.1	----	<0.5
Bacteriological	Escherichia coli (Colilert)						orgs/100m	1	<10	0	97	<10	<10	220	0	9	1	610	<10	20	<10
	Total Coliforms (Colilert)						orgs/100m	1	590	3	>24000	<10	11000	6900	15	>2000	14	>24000	<10	9800	<10

Abbreviation Notes

EPA 2021 Tasmanian EPA DGVs for Aquatic Ecosystems of the Derwent Estuary-Bruny Catchment

EPA 2020 Tasmanian EPA UPSS Regulations (2020)

PFAS Per and Poly Fluoroalkylated Substances

HEPA Heads of EPA Australia and NZ

PFAS NEMP/HEPA PFAS National Environmental Management Plan (HEPA, 2018)

TV Trigger Value

HMTV Hardness Modified Trigger Value derived per ANZECC (2000)

GV Guideline Value

SPWQM State Policy on Water Quality Management (1997)

WQG Water Quality Guideline

ANZG 2018 Australian Water Quality Guidelines <https://www.waterquality.gov.au/anz-guidelines>

NHMRC 2018 Australian Drinking Water Guidelines, NHMRC 2018

NHMRC 2019 Guidance on PFAS in Recreational Water (NHMRC 2019)

* HEPA 2018 and ANZG 2018, 99% guideline value for bioaccumulative contaminants

** HEPA, 2018, 95% guideline value

^ Some recreational water resources may be used less frequently than the assumed guidelines (150 days/year), and (in rare cases) some may be used more frequently.

^^ Tasmanian EPA UPSS Regulations (2020) inferred LNAPL; petrol TPH means the total concentration of TPH between C6 and C14 or TRH between C6 and C16

WorkSafe Record

EASTING-528514mE
NORTHING-5253030mN
(APPROX. ONLY)

EVACUATION & ASSEMBLY POINTS

← EVACUATION ROUTE
(A) LAB ASSEMBLY
(B) PLANT ASSEMBLY

BUILDING LEGEND

- ① BULK STORAGE
- ② CHLORINE BUILDING
- ③ DEWATERING STORAGE
- ④ LABORATORY
- ⑤ LOWER PUMP HOUSE (LEVEL 2)
- ⑥ OIL STORE
- ⑦ SAMPLING ROOM
- ⑧ SLUDGE ROOM
- ⑨ STORE ROOM (LEVEL 3)
- ⑩ WATERING CONTROL ROOM (LEVEL 3)
- ⑪ WORKSHOP

LEGEND

- LEGEND**

 BOUNDARY FENCE
 STORMWATER, JUNCTION PIT, GRATED PIT
 SEWER, MANHOLE
 WATER, STOP VALVE
 FIRE HYDRANT
 FIRE PLUG
 FIRE EXTINGUISHER DRY CHEMICAL / CO₂
 ELECTRICAL ISOLATION POINT
 INTERNAL ROADWAY
 CAR PARKING

HOBART
CITY
COUNCIL

SOUTHERN TASMANIAN
ROWING ASSOCIATION

HOBART
CITY
COUNCIL

WETLANDS

SITE PLAN
SCALE 1:1000 @ A3



SHELL
PETROLIUM

EFFLUENT
PUMP
STATION



DIGESTERS

PRIMARY
SEDIMENTATION



40



PUBL



POINT

3338.002-SP02

GDA 94 POSITION MANIFEST LOCATION

EASTING-528514mE
NORTHING-5253030mN
(APPROX. ONLY)

PROPERTY IDENTITY NUMBER

5527258

EVACUATION & ASSEMBLY POINTS

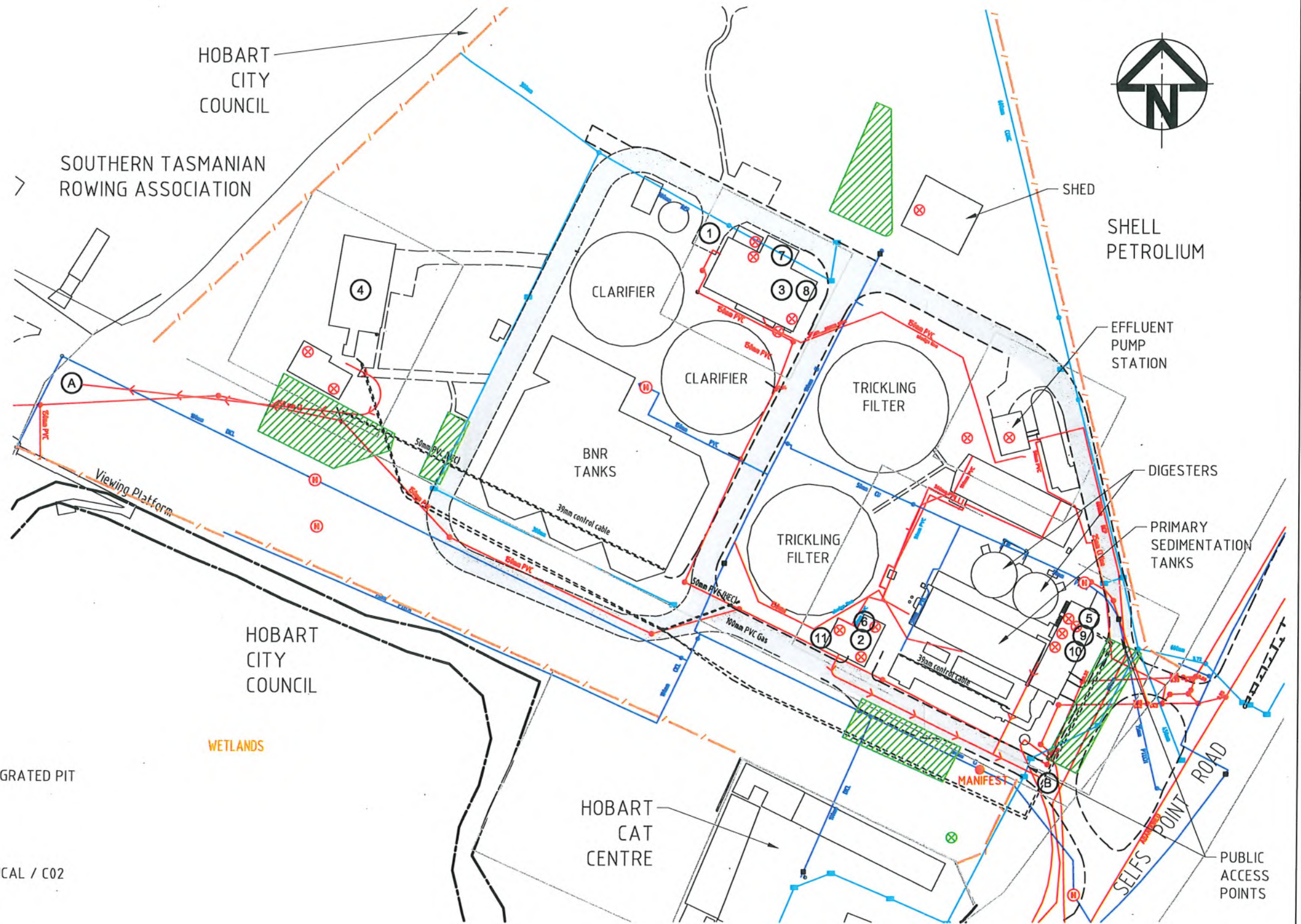
- ← EVACUATION ROUTE
- (A) LAB ASSEMBLY
- (B) PLANT ASSEMBLY

BUILDING LEGEND

- 1 BULK STORAGE
- 2 CHLORINE BUILDING
- 3 DEWATERING STORAGE
- 4 LABORATORY
- 5 LOWER PUMP HOUSE (LEVEL 2)
- 6 OIL STORE
- 7 SAMPLING ROOM
- 8 SLUDGE ROOM
- 9 STORE ROOM (LEVEL 3)
- 10 WATERING CONTROL ROOM (LEVEL 3)
- 11 WORKSHOP

LEGEND

- / — BOUNDARY FENCE
- STORMWATER, JUNCTION PIT, GRATED PIT
- SEWER, MANHOLE
- WATER, STOP VALVE
- ⊕ FIRE HYDRANT
- ⊕ FIRE PLUG
- ⊕ FIRE EXTINGUISHER DRY CHEMICAL / CO2
- ⊕ ELECTRICAL ISOLATION POINT
- INTERNAL ROADWAY
- ▨ CAR PARKING



SITE PLAN
SCALE 1:1000 @ A3

DO NOT SCALE THIS DRAWING. Use only dimensions shown. All dimensions should be checked on site. Drawing to be read in conjunction with the associated notes and specifications. Drawing to be read in conjunction with all other services, architectural and structural. These designs, drawings and specifications are copyright and must not be altered, reproduced or copied wholly or in any part without the written permission of SEMF Pty Ltd. All rights reserved.



DRAWING CHECK				CO-ORDINATION CHECK				CLIENT	PROJECT	TITLE	SCALE	DRAWING NO.	REV.
REV.	DESCRIPTION	DRN	CHK	APP	DATE	SIGNATURE	DATE						
A	PRELIMINARY ONLY				18.3.10			 southern water	DANGEROUS SUBSTANCES NOTIFICATION ASSESSMENT	SELVES POINT WWTW EMERGENCY PLANS SITE LOCATION & PLAN	1:1000	3338.002-SP02	A



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Gladstone, Hobart,
Launceston, Melbourne
and Sydney

DANGEROUS SUBSTANCES
NOTIFICATION ASSESSMENT

SELVES POINT WWTW
EMERGENCY PLANS
SITE LOCATION & PLAN

STATUS: PRELIMINARY ONLY
NOT TO BE USED FOR CONSTRUCTION
SCALE: 1:1000
DRAWING NO.: 3338.002-SP02
REV.: A

Dangerous Goods Storage Details for Selfs Point, Hobart City Council

Site Number: 3037

Item No.	Correct Technical Name of Goods	UN No.	Class	Sub-Risk	Packaging Group	HAZCHEM Code	Amount (kilolitre/tonnes)	Nature of Storage	Australian Standard	DG Reg.
1	Chlorine	1071	2.3	8	N/A	2XE	1.840 kl	2 x 920kg drums	2927	53(3)
2	Calcium Hypochlorite	2880	5.1	---	II or III	2W	0.160 t	2 x 80 kg drums	3780	53(8)
3	Methane (Natural Gas)	1971	2.1	---	N/A	2[S]E		By product		
4	Diesel	N/A	3	---	---	---	4500 l	Underground tank	1940	53(4)
5	Ferric Sulphate (4% Sulfuric Acid)	1760	8	---	II	2R	3 kl	Aboveground tank	3780	53(8)

R E LEESON
INSPECTOR/MANAGEMENT SPECIALIST

Date: 30 September 1998

Field Sheets

Daily Running Sheet

Sampling Event:

Date:	07 / 04 / 2022	Project Name:	Selfs Point GMW
Job Number:	JN22377	Client:	Dan Elson - ERA Planning
Location Details:	12 Selfs Point Rd, New Town	Personnel:	EH & MU

Weather: Sunny, clear

[illegible]

Groundwater Sampling Sheet

Well-ID:

MW1

Date:	07/04/22	Sampled By:	EH/MU	Photo	☒
Job Number:	JN 22377	Stickup/Flush:	Flush	Stabilised	☒
Project Name:	Self Point	Locked/Key Type:	-	Obs Complete	☒
Client:	San Elson - EPA Planning	Height TOC (m):	-		

Location Details:

MW1 near point opp Derwent

Well Condition / Maintenance:

Good, Landfill gas cap, Left tubing in well

Gauging

Gauging Date/Time:	0819 - 07/04/22	Well Diameter (D) (mm):	50mm
Depth to Water (DTW) (mTOC):	2.155	Screen Interval (m) - From:	To:
Total Well Depth (TD) (mTOC):	3.920	Bore Volume:	2.55

Bore Volume
Calcs:

Bore Volume =

(3.9 - 2.16) x 1.9625

TD (m) - DTW (m)

CO2 = 7380 ppm over
 PID = 2.1 ppm
 VOC = 0.0 ppm

Well Purging

Purging Date/Time:	07/04/22 0935	Purging Method:	Low Flow
Purge Depth:	3.30m	DTW 2.13m	Total Purge Volume: 3.5L

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
9:35	2.10	0.5	16.5	0.74	4339	7.00	-163.2	46.82	3
948	2.27	1.0	16.6	0.80	4186	7.00	-162.8	38.79	3
9:55	2.30	1.5	16.7	0.67	4123	7.01	-167.1	45.02	3
956	2.30	2.0	16.7	0.64	4063	7.01	-168.4	44.02	3
957	2.305	2.5	16.7	0.58	4018	7.01	-169.1	36.83	3
1000	2.295	3.0	16.6	0.55	4017	7.01	-169.4	22.05	2
1004	2.320	3.5	16.6	0.51	4006	7.00	-169.6	13.04	2

Observations during purging (odour, colour, turbidity)

No odour or sheen, light brown, slightly turbid

Pump: 15psi

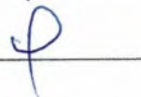
Sampling Not-sampled

Sampling Date/Time:	07/04/22	Start:	1005	Finish:	10:20
Sampling Method:	Low Flow	Sampling Depth (m):	2.32		

Lab Analysis

Time on Bottles/COC:	1005	2AG	Metals Field Filtered?	☒ YES	NO
Sample Bottles Number:	2F4 0.22	Type: 5P + 1AG + 2V + 2PFA	DOC Field Filtered?	YES	NO
Analysis:	AG per work order	Lab QA/QC			
QAQC Information:	Daily RB, FB				

Signoff:



* Lab QA/QC

2AG + 2PFAS

* samples

5P + 2V + 1AG

Groundwater Sampling Sheet

Well-ID:

MW2

Date:	07/04/22	Sampled By:	EH/MO	Photo	☒
Job Number:	JN 22377	Stickup/Flush:	Flush	Stabilised	☒
Project Name:	Self Point	Locked/Key Type:	-	Obs Complete	☒
Client:	Don Elson - EPA Planning	Height TOC (m):	-		

Location Details: MW2 west side

Well Condition / Maintenance: Good. Landfill gas cap. Left tubing in well

Gauging

Gauging Date/Time:	07/04/20 0830	Well Diameter (D) (mm):	50mm
Depth to Water (DTW) (mTOC):	1.880	Screen Interval (m) - From:	To:
Total Well Depth (TD) (mTOC):	4.205	Bore Volume:	4.55

Bore Volume
Calcs:

Bore Volume =

4.2188

x 1.9625

TD (m) - DTW (m)

CO2 = 7320ppm aer
 PID = 0.0ppm
 VOC = 0.0

Well Purging

Purging Date/Time:	07/04/22 1040	Purging Method:	Low Flow
Purge Depth:	2.9m	DTW = 1.785	Total Purge Volume: 3.5L

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
10:56	2.09	0.5	18.1	0.46	2328	7.05	-164.6	65.0	2
11:00	2.185	1.0	18.3	0.53	2349	7.04	-162	53.6	2
11:02	2.202	1.5	18.3	0.48	2363	7.04	-162	39.0	2
11:07	2.210	2.0	19.0	0.45	2375	7.04	-162.9	36.5	1
11:15	2.14	2.5	18.5	0.37	2404	7.05	-166.7	65.0	1
11:24	2.190	3.0	18.0	0.32	2374	7.05	-167.3	65.9	1
11:30	2.25	3.5	17.6	0.31	2363	7.05	-167.0	66.2	1

Observations during purging (odour, colour, turbidity)

no odour, no sheen, slightly turbid.

Pump = 15psi

Sampling

Not sampled

Sampling Date/Time:	07/04/22	Start:	1130	Finish:	1145
Sampling Method:	Low Flow	Sampling Depth (m):	2.9		

Lab Analysis

Time on Bottles/COC:	1130	Metals Field Filtered?	☒ YES	NO		
Sample Bottles Number:	7	Type:	4P+1AG+2V	DOC Field Filtered?	☒ YES	NO
Analysis:	As per work order					
QAQC Information:	Daily RB/FB					

Signoff:



* RBO1 2V+3P+1AG
 * FBO1 2V+3P+1AG

4P + 2V + 1AG

Groundwater Sampling Sheet

Well-ID:

MW4

Date:	07/04/22	Sampled By:	EH/MU	Photo	☒
Job Number:	JN 22377	Stickup/Flush:	Flush	Stabilised	☒
Project Name:	Self Point	Locked/Key Type:	-	Obs Complete	☒
Client:	Don Elson - ERA Planning	Height TOC (m):	-		

Location Details:

MW4 near tanks

Well Condition / Maintenance:

Good. Landfill gas cap - left tubing in well

Gauging

Gauging Date/Time:	07/04/22 0838	Well Diameter (D) (mm):	50mm
Depth to Water (DTW) (mTOC):	1.81	Screen Interval (m) - From:	To:
Total Well Depth (TD) (mTOC):	2.75	Bore Volume:	1.85

Bore Volume
Calcs:

Bore Volume = 2.75×1.81 x 1.9625
TD (m) - DTW (m)

CO₂ = 3980 ppm over
AD = 0.0 ppm

Well Purging

Purging Date/Time:	07/04/22 1156	Purging Method:	Low Flow
Purge Depth:	2.2m DTW 1.81m	Total Purge Volume:	2.5L

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
1207	1.81	0.5	21.1	1.99	1882	7.24	-105.7	78.8	2
1212	1.81	1.0	20.1	2.44	1872	7.22	-113.0	35.0	2
1216	1.82	1.5	20.1	2.48	1872	7.22	-112.7	24.0	2
1219	1.81	2.0	20.4	2.59	1868	7.22	-111.9	20.4	2
1223	1.81	2.5	20.6	2.42	1867	7.21	-113.3	20.0	2

Observations during purging (odour, colour, turbidity)

No odour, no sheen, very slightly turbid.

* Pump: 15psi

Sampling

~~Not sampled~~

Sampling Date/Time:	07/04/22	Start:	1223	Finish:	1239
Sampling Method:	Low Flow	Sampling Depth (m):	2.75		

Lab Analysis

Time on Bottles/COC:	1223	Metals Field Filtered?	☒ YES NO
Sample Bottles Number:	7 + 3	Type:	4P + 2V + 1AG - 2P + 1AG
Analysis:	As per work order	DOC Field Filtered?	☒ YES NO
QA/QC Information:	Daily RB/FB		

* Lab QA/QC
2PFA's + 1AG

Signoff:



4P + 2V + 1AG

Groundwater Sampling Sheet

Well-ID:

MW5-Deep

Date:	07/04/22	Sampled By:	EH/MU	Photo	☒
Job Number:	JN 22377	Stickup/Flush:	stickup	Stabilised	☒
Project Name:	Self Point	Locked/Key Type:	-	Obs Complete	☒
Client:	Dan Elson - EFA Planning	Height TOC (m):	-		

Location Details: MW5 - Deep near rowing shed.

Well Condition / Maintenance: Good condition, landfill gas cap

'left tubing in well'

Gauging

Gauging Date/Time: 07/04/22 0900 Well Diameter (D) (mm): 50mm Casing = 0.70m
 Depth to Water (DTW) (mTOC): 6.962 Screen Interval (m) - From: To:
 Total Well Depth (TD) (mTOC): 13.150 Bore Volume:

Bore Volume
 Calcs: Bore Volume = () x 1.9625
 TD (m) - DTW (m)

CO₂ = 1560ppm CH₄ = 4 % LEL
 VOC = 1.8ppm
 NO 00002

Well Purging

Purging Date/Time: 7/4/22 14:38 Purging Method: low flow
 Purge Depth: 11.00 DTW 6.96 Total Purge Volume: 4.0 L

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
14:43	6.998	0.5	18.8	1.09	8499	6.76	-106.7	5.16	2
14:46	7.01	1.0	17.9	0.93	11058	6.75	-118.2	4.89	2
14:48	7.02	1.5	17.6	1.13	14694	6.69	-112.1	6.28	2
14:51	7.025	2.0	17.4	1.35	16846	6.63	-95.4	4.40	2
14:54	7.03	2.5	17.1	1.57	17574	6.60	-76.7	3.49	2
14:57	7.025	3.0	17.0	1.69	17930	6.59	-68.0	3.44	2
14:59	7.01	3.5	17.0	1.81	18172	6.59	-61.5	3.13	2
15:03	7.025	4.0	17.0	1.92	18230	6.59	-56.4	2.81	2

Observations during purging (odour, colour, turbidity)

Clear, no odour, no sheen

pump 26 psi

Sampling Not sampled

Sampling Date/Time: 7/4/22 Start: 1503 Finish: 1515
 Sampling Method: low flow Sampling Depth (m): 11.0 m

Lab Analysis

Time on Bottles/COC: 1503 Metals Field Filtered? ☒ YES NO
 Sample Bottles Number: 11 Type: SP + 4V + 2AG DOC Field Filtered? ☒ YES NO
 Analysis: As per work order
 QA/QC Information: Daily FB/RB

Signoff:

①

Main Sample: SP + 4V + 1AG
 Lab QA/QC: 1AG

2 AG
 4 V
 5 P

Groundwater Sampling Sheet

Well-ID:

MWS - Shallow

Date:	07/04/22	Sampled By:	EH/MU	Photo	✓
Job Number:	JN 22377	Stickup/Flush:	stickup	Stabilised	✓
Project Name:	Self Point	Locked/Key Type:	-	Obs Complete	✓
Client:	Dan Elson - EPA Planning	Height TOC (m):	-		

Location Details: MWS - near ring ditch.

Well Condition / Maintenance: Good

Gauging

Gauging Date/Time: 07/04/22 0905 Well Diameter (D) (mm): 50mm Casing = 0.755m
 Depth to Water (DTW) (mTOC): 6.895 Screen Interval (m) - From: To:
 Total Well Depth (TD) (mTOC): 8.264 Bore Volume: 1.37L

Bore Volume Calcs: Bore Volume = $8.26 \times 6.89 \times 1.9625$ CO₂ = over CH₄ = over
 TD (m) - DTW (m) VOC = 1.8ppm
 Strong HC odour

Well Purging

Purging Date/Time: 07/04/22 1523 Purging Method: Low Flow
 Purge Depth: 7.8m DTW: 6.70 Total Purge Volume:

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
15:58	6.97	0.5	18.5	0.86	8804	6.77	-113.0	40.17	1
16:03	7.08	1.0	17.6	1.13	8870	6.75	-107.0	123.56	1
16:08	7.235	1.5	16.9	0.66	8849	6.72	-115.4	168.95	1

Observations during purging (odour, colour, turbidity)

Sampled before stabilisation due to lack of water recharge
 Strong HC odour, grey, turbid * Pump: 25psi

Sampling

Not sampled
 Sampling Date/Time: 07/04/22 Start: 1610 Finish: 1650
 Sampling Method: Low Flow Sampling Depth (m): 7.80

Lab Analysis

Time on Bottles/COC: 1610 Metals Field Filtered? YES NO
 Sample Bottles Number: 10+2+6 Type: DOC Field Filtered? YES NO
 Analysis: As per work order
 QA/QC Information: Daily RB/FB

Signoff: 

Main Sample: SP + 4V + 1AG
 FD: 1AG + 2V + 3P
 Lab QA/QC: 2AG

Groundwater Sampling Sheet

Date: 07/04/22		Sampled By: EH/MU		Well-ID: MW6	
Job Number: JN 22371		Stickup/Flush: Stickup		Photo: ☒	
Project Name: Self Pmt		Locked/Key Type: -		Stabilised: ☒	
Client: Don Elson - EPA Planning		Height TOC (m): -		Obs Complete: ☒	

Location Details:

Well Condition / Maintenance:

Gauging

Gauging Date/Time: 07/04/22 0852 Well Diameter (D) (mm): 50mm Casing = 0.75m
 Depth to Water (DTW) (mTOC): 6.855 Screen Interval (m) - From: To:
 Total Well Depth (TD) (mTOC): 8.574 Bore Volume:

Bore Volume	Bore Volume = 2.57 x 1.9625	CO2 = over	CH4 = over
Calcs:	TD (m) - DTW (m)	VOC = 0.0 ppm	

Well Purging

Purging Date/Time: 7/04/22 1340 Purging Method: Low Flow
 Purge Depth: 7.4m DTW = 6.82m Total Purge Volume: 2.5L

Field Chemistry

Time	DTW (mTOC)	Vol (L)	Temp (°C)	DO (ppm)	EC (us/cm)	pH	Redox (mV)	Turbidity (NTU)	Pump Rate (CPM)
13:45	6.88	0.5	18.2	0.44	4861	6.53	-138.3	50.16	2
13:49	6.918	1.0	17.3	0.45	4848	6.50	-138.5	57.71	2
13:51	6.93	1.5	17.4	0.38	4857	6.50	-141.3	56.98	2
13:55	6.835	2.0	17.3	0.35	4856	6.50	-143.2	54.03	2
14:00	6.95	2.5	17.2	0.33	4862	6.50	-145.5	45.55	2-

Observations during purging (odour, colour, turbidity)

Light sheen, light to moderate turbidity, no odour

Sampling ~~Not sampled~~

Sampling Date/Time: 07/04/22 Start: 1400 Finish: 1415
 Sampling Method: Low Flow Sampling Depth (m): 7.4m

Lab Analysis

Time on Bottles/COC: 1400	Metals Field Filtered? ☒ YES NO
Sample Bottles Number: 12 Type: SP+3AG+4V	DOC Field Filtered? YES NO
Analysis: AS per work order	
QA/QC Information: Daily RB/RB	

Signoff:

+ extra QC sample.
 3 AG
 4 V
 5 P.

Main Sample: SP+4V+2AG
 Lab QA/QC: 2AG



Site:	SELS Point	GA5000 Number:	
Date:	4/5/22	Calibration Cert Photo?	☒ Y ☐ N
Monitoring Personnel:	elt + LC	Fresh Air Check Done?	☒ Y ☐ N
Nearest BOM station:			
Start Time:	12.02	End Time:	
Atmospheric Pressure at START (BOM):	1008.7	Atmospheric Pressure at END (BOM):	
Atmospheric Pressure at START (GA5000):	1008	Atmospheric Pressure at END (GA5000):	

[illegible]

6.842-1 rtx
removed

Table 4a
Groundwater Results

Total Recoverable Hydrocarbons, Benzene, Toluene, Ethylbenzene, Xylenes, Polycyclic Aromatic Hydrocarbons										
Sample ID	Sample Date	Depth To Water (m)	Confining Geology	Total Recoverable Hydrocarbons (mg/L) with Silica Gel Cleanup				Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)
				F1 C6 - C10 less BTEX	F2 >C10 - C16 less Naphthalene	F3 >C16 - C34	F4 >C34 - C40			
MM1	09-May-16	1.550	CLAY	<0.02	<0.1	<0.1	<0.1	<0.001	<0.002	<0.002
MM2	09-May-16	1.635	CLAY	<0.02	<0.1	<0.1	<0.1	<0.001	<0.002	<0.002
MM3	09-May-16	1.620	CLAY	<0.02	<0.1	<0.1	<0.1	<0.001	<0.002	<0.002
MM4	11-May-16	1.312	CLAY	<0.02	<0.1	<0.1	<0.1	<0.001	<0.002	<0.002
MM5-5	10-May-16	6.505	SILT	<0.02	<0.10	<0.10	<0.10	<0.001	<0.002	<0.002
MM5-D	10-May-16	6.782	SILT	<0.02	4.15	63.7	15.5	<0.001	<0.002	<0.002
MM6	11-May-15	6.739	SILT	<0.02	<0.1	<0.1	<0.1	<0.001	<0.002	<0.002
Limit of Reporting water ALS Laboratory				0.02	0.1	0.1	0.1	0.001	0.002	0.002

NOMINATED INVESTIGATION CRITERIA

(b) NEPM GW HSL 'C' for Vapour intrusion	SILT: 4 - 8 m	NL	NL	-	-	NL	NL	NL	-	-	NL
(b) NEPM GW HSL 'D' for Vapour intrusion	SILT: 4 - 8 m	NL	NL	-	-	30	NL	NL	-	-	NL
(b) NEPM GW HSL 'D' for Vapour intrusion	CLAY: 2 - 4 m	NL	NL	-	-	30	NL	NL	-	-	NL
(b) CRC CARE HSL 'MMV' for Vapour intrusion	ALL	NL	NL	-	-	NL	NL	NL	-	-	NL
(b) ANZECC Trigger Values for Marine ecosystem (95% species protection)	-	-	-	-	-	-	-	-	-	-	-
(b) NEPM GIL for Marine water ecosystem protection	-	-	-	-	-	0.500	-	-	-	-	-
(b) Solubility limit SAND, SILT and CLAY	9	3	-	-	-	59	61	3.9	-	-	21

Table Notes

- (c) Australian and new Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy, Australian and New Zealand Environment and Conservation Council, 200
- 1) Assessment criteria for a commercial site ('D') are obtained from National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (NEPC, 1999)
- 2) Laboratory analysis of naphthalene is conducted using two separate methods, EPO80: extracting sample from the vial preserved for volatiles and EPO75(SIM)B: extracting sample from the uprease naphthalene concentration from EPO80 is used for F2 calculation.
- , " " denotes analyte not tested by laboratory, or no criteria available.
- Highlighted values exceed nominated investigation criteria

Table Abbreviations

NEPM: National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013
 CRC CARE: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment
 HSL: Health Screening Level
 GIL: Groundwater Investigation Level
 MMV: Intrusive Maintenance Worker
 mBS: metre below ground surface

Actual
 Screen 1.5m
 Screen 0.7m
 Screen 2.1.95m
 5.600 mBS
 Screen 5.75-8.55
 5.75-8.55
 3.55 - 9.0m
 Estimated
 1.2 - 4.0m
 1.5 - 4.5m
 1.5 - 4.5m
 2.0 - 4.5m
 4.5 - 8.0m
 10.6 - 13.95m



Latest Weather Observations for Hobart

IDT60901

Issued at 9:11 pm EST Wednesday 4 May 2022 (issued every 10 minutes, with the page automatically refreshed every 10 minutes)

Station Details ID: 094029 Name: HOBART (ELLERSLIE ROAD) Lat: -42.89 Lon: 147.33 Height: 50.5 m

Data from the previous 72 hours. | See also: [Recent months at Hobart](#)

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
04/09:00pm	9.6	7.7	6.5	81	1.4	W	6	15	3	8	1012.6	1012.6	0.8
04/08:30pm	9.9	7.4	6.6	80	1.5	W	9	11	5	6	1012.4	1012.4	0.8
04/08:00pm	10.6	8.9	5.8	72	2.2	SSE	4	9	2	5	1012.2	1012.2	0.8
04/07:30pm	10.8	9.0	7.1	78	1.8	S	6	9	3	5	1012.1	1012.1	0.8
04/07:00pm	10.9	9.0	6.8	76	1.9	WSW	6	9	3	5	1011.5	1011.5	0.8
04/06:30pm	11.0	7.8	6.7	75	2.0	WNW	13	20	7	11	1011.1	1011.1	0.8
04/06:00pm	11.6	7.9	6.5	71	2.4	NW	15	20	8	11	1010.7	1010.7	0.8
04/05:30pm	11.5	9.0	6.4	71	2.4	W	9	15	5	8	1010.4	1010.4	0.8
04/05:00pm	11.8	8.9	6.7	71	2.4	WNW	11	19	6	10	1009.7	1009.8	0.8
04/04:30pm	12.4	9.6	6.9	69	2.6	NW	11	19	6	10	1009.3	1009.4	0.8
04/04:00pm	12.7	10.6	6.7	67	2.9	NNE	7	15	4	8	1009.2	1009.3	0.8
04/03:30pm	12.9	11.3	8.0	72	2.4	NNE	6	9	3	5	1009.3	1009.4	0.8
04/03:00pm	12.6	10.4	7.9	73	2.3	SSE	9	13	5	7	1008.9	1009.0	0.8
04/02:30pm	12.9	10.4	8.2	73	2.3	WNW	11	19	6	10	1008.7	1008.8	0.8
04/02:00pm	14.4	11.8	7.9	65	3.2	NNW	11	15	6	8	1008.6	1008.7	0.4
04/01:30pm	14.2	10.9	8.2	67	3.0	NNW	15	22	8	12	1008.7	1008.8	0.4
04/01:00pm	14.1	11.1	9.1	72	2.6	NNW	15	24	8	13	1008.4	1008.5	0.4
04/12:30pm	13.6	10.9	8.9	73	2.4	NW	13	20	7	11	1008.5	1008.6	0.4
04/12:00pm	13.3	11.1	9.2	76	2.1	NNW	11	19	6	10	1008.2	1008.3	0.4
04/11:30am	12.9	10.1	9.9	82	1.5	N	15	24	8	13	1008.6	1008.7	0.4
04/11:00am	13.3	10.1	9.9	80	1.8	N	17	24	9	13	1009.0	1009.1	0.2
04/10:30am	13.2	10.3	9.6	79	1.8	N	15	22	8	12	1009.0	1009.1	0.2
04/10:00am	13.0	8.6	8.9	76	2.1	NNW	22	30	12	16	1008.8	1008.9	0.2
04/09:30am	13.3	10.4	9.5	78	1.9	NNW	15	20	8	11	1008.4	1008.5	0.0
04/09:00am	13.0	10.9	9.8	81	1.6	N	11	15	6	8	1008.3	1008.4	3.2
04/08:30am	13.3	12.4	11.2	87	1.1	N	7	11	4	6	1008.6	1008.7	2.6
04/08:00am	13.2	11.9	11.4	89	1.0	NE	9	11	5	6	1008.0	1008.1	2.4
04/07:30am	12.9	12.8	10.8	87	1.1	WSW	2	7	1	4	1007.8	1007.9	2.4
04/07:00am	13.3	13.3	11.2	87	1.1	SE	2	6	1	3	1007.5	1007.6	2.0
04/06:30am	13.5	12.1	11.0	85	1.3	NW	9	17	5	9	1006.9	1007.0	1.8
04/06:00am	13.6	11.1	11.0	84	1.4	NW	15	19	8	10	1006.7	1006.8	1.8
04/05:30am	13.6	11.9	11.3	86	1.2	NW	11	17	6	9	1006.5	1006.6	1.6
04/05:00am	13.7	11.7	11.4	86	1.2	NNW	13	17	7	9	1006.2	1006.3	1.6
04/04:30am	13.7	12.1	11.4	86	1.2	NW	11	17	6	9	1006.0	1006.1	1.6
04/04:00am	13.6	11.5	11.3	86	1.2	NW	13	20	7	11	1005.9	1006.0	1.2
04/03:30am	13.8	11.3	11.1	84	1.4	NNW	15	24	8	13	1005.6	1005.7	1.2
04/03:00am	14.0	10.6	10.6	80	1.8	NNW	19	26	10	14	1006.0	1006.1	1.2
04/02:30am	14.7	10.1	9.7	72	2.6	NW	24	39	13	21	1006.5	1006.6	0.8
04/02:00am	15.9	13.2	10.4	70	2.9	WNW	15	22	8	12	1006.6	1006.7	0.0
04/01:30am	16.7	12.8	9.4	62	3.8	NNW	20	28	11	15	1005.8	1005.9	0.0
04/01:00am	16.7	12.0	9.4	62	3.8	N	24	35	13	19	1005.6	1005.7	0.0
04/12:30am	17.1	11.9	9.0	59	4.2	NNW	26	41	14	22	1005.8	1005.9	0.0
04/12:00am	17.2	13.1	8.6	57	4.4	N	20	35	11	19	1005.9	1006.0	0.0

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
03/11:30pm	17.4	13.3	8.8	57	4.4	N	20	35	11	19	1006.3	1006.4	0.0
03/11:00pm	17.3	13.7	8.4	56	4.6	N	17	28	9	15	1006.8	1006.9	0.0
03/10:30pm	17.2	14.3	8.1	55	4.6	NNE	13	19	7	10	1007.1	1007.2	0.0
03/10:00pm	17.3	13.7	8.2	55	4.7	NNE	17	30	9	16	1007.3	1007.4	0.0
03/09:30pm	17.6	14.3	7.9	53	4.9	NNE	15	22	8	12	1007.5	1007.6	0.0
03/09:00pm	17.6	13.4	7.6	52	5.1	NNE	19	30	10	16	1007.6	1007.7	0.0
03/08:30pm	17.9	13.7	7.6	51	5.2	NNE	19	30	10	16	1007.7	1007.8	0.0
03/08:00pm	18.1	13.7	7.5	50	5.4	N	20	35	11	19	1007.8	1007.9	0.0
03/07:30pm	18.3	14.1	7.4	49	5.5	N	19	32	10	17	1007.9	1008.0	0.0
03/07:00pm	18.6	13.8	7.4	48	5.7	N	22	33	12	18	1008.0	1008.1	0.0
03/06:30pm	18.8	14.1	7.6	48	5.7	N	22	35	12	19	1007.8	1007.9	0.0
03/06:00pm	19.1	14.0	7.5	47	5.9	N	24	44	13	24	1007.9	1008.0	0.0
03/05:30pm	19.4	15.0	7.2	45	6.2	N	20	32	11	17	1007.7	1007.8	0.0
03/05:00pm	19.8	14.6	7.2	44	6.4	N	24	44	13	24	1007.5	1007.6	0.0

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
03/04:30pm	19.9	15.5	7.3	44	6.4	N	20	32	11	17	1007.7	1007.8	0.0
03/04:00pm	20.1	15.7	7.5	44	6.5	N	20	30	11	16	1007.8	1007.9	0.0
03/03:35pm	20.4	13.9	6.7	41	6.9	NNW	30	48	16	26	1008.1	1008.2	0.0
03/03:30pm	20.5	13.6	6.5	40	7.1	NNW	32	48	17	26	1008.2	1008.3	0.0
03/03:26pm	20.5	14.4	6.5	40	7.1	NNW	28	48	15	26	1008.2	1008.3	0.0
03/03:00pm	20.7	15.4	7.0	41	7.0	NNW	24	37	13	20	1008.3	1008.4	0.0
03/02:30pm	20.8	14.8	7.1	41	7.0	NNW	28	46	15	25	1008.3	1008.4	0.0
03/02:29pm	20.8	14.8	7.1	41	7.0	NNW	28	46	15	25	1008.3	1008.4	0.0
03/02:00pm	21.0	14.6	6.9	40	7.2	NW	30	41	16	22	1008.3	1008.4	0.0
03/01:30pm	20.9	14.1	7.5	42	6.9	NW	33	52	18	28	1008.3	1008.4	0.0
03/01:22pm	21.0	14.0	6.9	40	7.2	NW	33	52	18	28	1008.3	1008.4	0.0
03/01:00pm	21.1	15.5	7.3	41	7.1	NW	26	46	14	25	1008.5	1008.6	0.0
03/12:34pm	21.2	14.6	7.8	42	7.0	NW	32	50	17	27	1008.8	1008.9	0.0
03/12:30pm	21.1	14.4	8.0	43	6.8	NW	33	50	18	27	1008.9	1009.0	0.0
03/12:03pm	20.3	13.8	8.3	46	6.3	NW	32	50	17	27	1009.3	1009.4	0.0
03/12:00pm	20.4	13.7	8.1	45	6.4	NW	33	50	18	27	1009.4	1009.5	0.0
03/11:36am	20.3	14.7	8.6	47	6.1	NW	28	54	15	29	1009.8	1009.9	0.0
03/11:30am	20.1	14.1	8.8	48	5.9	NW	30	44	16	24	1009.9	1010.0	0.0
03/11:23am	20.0	14.5	9.0	49	5.8	NNW	28	46	15	25	1010.0	1010.1	0.0
03/11:00am	19.6	14.0	8.9	50	5.6	NNW	28	39	15	21	1010.4	1010.4	0.0
03/10:30am	19.0	14.2	8.9	52	5.3	NNW	24	33	13	18	1010.6	1010.6	0.0
03/10:00am	18.5	14.1	9.0	54	5.0	NNW	22	32	12	17	1010.9	1010.9	0.0
03/09:30am	17.9	13.1	9.0	56	4.6	N	24	33	13	18	1011.1	1011.1	0.0
03/09:00am	17.3	14.3	9.2	59	4.2	N	15	22	8	12	1011.5	1011.5	0.0
03/08:30am	16.2	14.4	9.4	64	3.5	NNW	9	15	5	8	1011.8	1011.8	0.0
03/08:00am	15.7	13.9	9.4	66	3.3	NNW	9	13	5	7	1011.7	1011.7	0.0
03/07:30am	15.6	13.7	9.1	65	3.3	NNW	9	13	5	7	1011.7	1011.7	0.0
03/07:00am	15.7	13.8	8.9	64	3.5	NW	9	13	5	7	1011.7	1011.7	0.0
03/06:30am	16.0	13.3	9.0	63	3.6	NW	13	19	7	10	1011.8	1011.8	0.0
03/06:00am	15.7	13.4	8.9	64	3.5	NW	11	17	6	9	1011.8	1011.8	0.0
03/05:30am	16.0	13.3	9.0	63	3.6	NW	13	20	7	11	1011.8	1011.8	0.0
03/05:00am	16.5	12.7	9.0	61	3.9	NNW	19	28	10	15	1011.5	1011.5	0.0
03/04:30am	16.4	12.4	8.9	61	3.9	NNW	20	32	11	17	1011.4	1011.4	0.0
03/04:00am	16.1	12.1	9.1	63	3.6	NNW	20	28	11	15	1011.1	1011.1	0.0
03/03:30am	15.7	12.7	9.4	66	3.3	NNW	15	24	8	13	1011.6	1011.6	0.0
03/03:00am	15.4	12.4	9.3	67	3.2	NNW	15	22	8	12	1011.6	1011.6	0.0
03/02:30am	15.4	13.6	9.3	67	3.1	N	9	15	5	8	1011.8	1011.8	0.0
03/02:00am	14.6	13.1	9.2	70	2.8	NNW	7	13	4	7	1012.0	1012.0	0.0
03/01:30am	14.6	13.1	9.2	70	2.8	NW	7	9	4	5	1012.1	1012.1	0.0
03/01:00am	14.6	12.8	9.4	71	2.7	NW	9	15	5	8	1012.5	1012.5	0.0
03/12:30am	14.3	12.5	9.3	72	2.6	NW	9	13	5	7	1012.6	1012.6	0.0
03/12:00am	14.6	12.1	9.6	72	2.6	NW	13	17	7	9	1012.9	1012.9	0.0

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
02/11:30pm	14.8	12.6	9.4	70	2.8	NW	11	13	6	7	1012.9	1012.9	0.0
02/11:00pm	15.2	13.1	9.6	69	2.9	WNW	11	13	6	7	1013.3	1013.3	0.0
02/10:30pm	15.7	14.3	9.6	67	3.2	NW	7	11	4	6	1013.6	1013.6	0.0
02/10:00pm	16.2	14.9	9.8	66	3.4	NNW	7	11	4	6	1014.0	1014.0	0.0
02/09:30pm	16.5	15.2	10.1	66	3.4	NW	7	11	4	6	1014.2	1014.2	0.0
02/09:00pm	16.5	14.1	10.1	66	3.4	NW	13	20	7	11	1014.0	1014.0	0.0
02/08:30pm	16.5	13.7	10.1	66	3.4	NW	15	22	8	12	1013.9	1013.9	0.0
02/08:00pm	16.7	14.3	10.1	65	3.5	NW	13	22	7	12	1014.0	1014.0	0.0
02/07:30pm	16.6	13.9	10.2	66	3.4	NW	15	26	8	14	1014.0	1014.0	0.0
02/07:00pm	17.1	13.8	10.9	67	3.3	NNW	19	28	10	15	1014.0	1014.0	0.0
02/06:30pm	18.0	13.6	10.4	61	4.1	NNW	24	37	13	20	1013.6	1013.6	0.0
02/06:00pm	18.2	13.4	10.3	60	4.2	NW	26	39	14	21	1013.5	1013.5	0.0
02/05:30pm	18.5	12.9	10.1	58	4.5	NW	30	44	16	24	1013.1	1013.1	0.0
02/05:15pm	18.6	13.3	9.9	57	4.6	NW	28	46	15	25	1013.1	1013.1	0.0
02/05:00pm	18.7	13.0	9.8	56	4.7	WNW	30	44	16	24	1013.0	1013.0	0.0
02/04:35pm	19.2	13.8	9.4	53	5.2	NW	28	46	15	25	1013.1	1013.1	0.0
02/04:30pm	19.2	14.1	9.1	52	5.3	NW	26	41	14	22	1013.1	1013.1	0.0
02/04:00pm	19.5	14.8	9.1	51	5.5	NW	24	37	13	20	1012.6	1012.6	0.0
02/03:30pm	20.0	14.9	9.3	50	5.7	WNW	26	41	14	22	1012.9	1012.9	0.0
02/03:00pm	20.0	15.0	9.6	51	5.6	NW	26	41	14	22	1012.9	1012.9	0.0
02/02:30pm	20.4	15.3	9.3	49	5.9	NW	26	43	14	23	1012.7	1012.7	0.0
02/02:06pm	20.4	14.2	9.3	49	5.9	NW	32	50	17	27	1012.8	1012.8	0.0
02/02:00pm	20.5	14.2	9.1	48	6.0	NW	32	46	17	25	1012.9	1012.9	0.0
02/01:30pm	20.5	14.1	9.4	49	5.9	NW	33	50	18	27	1013.0	1013.0	0.0
02/01:07pm	20.1	14.6	9.1	49	5.8	NW	28	46	15	25	1012.8	1012.8	0.0
02/01:00pm	20.8	15.1	9.7	49	6.0	NW	30	44	16	24	1012.8	1012.8	0.0
02/12:30pm	21.2	16.3	9.8	48	6.1	NW	26	39	14	21	1013.2	1013.2	0.0
02/12:09pm	20.6	15.3	9.8	50	5.8	NNW	28	46	15	25	1013.4	1013.4	0.0
02/12:00pm	20.7	17.2	10.2	51	5.7	NNW	19	37	10	20	1013.6	1013.6	0.0
02/11:30am	19.2	15.6	9.9	55	5.0	NNW	19	30	10	16	1014.2	1014.2	0.0

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
02/11:00am	19.6	15.9	10.0	54	5.1	NNW	20	37	11	20	1014.3	1014.3	0.0
02/10:30am	19.2	15.0	9.9	55	5.0	NNW	22	32	12	17	1014.3	1014.3	0.0
02/10:00am	18.4	15.1	9.7	57	4.6	N	17	30	9	16	1014.3	1014.3	0.0
02/09:30am	17.5	13.4	10.1	62	3.9	N	22	30	12	16	1014.4	1014.4	0.0
02/09:00am	16.4	12.3	10.0	66	3.4	N	22	37	12	20	1014.5	1014.5	0.0
02/08:30am	15.9	12.2	10.2	69	3.0	N	20	28	11	15	1014.4	1014.4	0.0
02/08:00am	14.5	11.7	10.1	75	2.3	NNW	15	24	8	13	1014.5	1014.5	0.0
02/07:30am	14.6	11.0	10.0	74	2.4	NNW	19	26	10	14	1014.2	1014.2	0.0
02/07:00am	14.6	11.0	9.8	73	2.5	NW	19	22	10	12	1013.8	1013.8	0.0
02/06:30am	14.2	11.7	9.6	74	2.4	NW	13	20	7	11	1013.8	1013.8	0.0
02/06:00am	13.6	11.5	9.8	78	2.0	W	11	15	6	8	1013.5	1013.5	0.0
02/05:30am	13.3	11.5	9.5	78	1.9	NW	9	17	5	9	1013.5	1013.5	0.0
02/05:00am	13.6	11.8	9.6	77	2.1	W	9	15	5	8	1013.2	1013.2	0.0
02/04:30am	14.0	12.6	9.4	74	2.4	WNW	7	15	4	8	1012.9	1012.9	0.0
02/04:00am	14.2	11.6	9.4	73	2.5	W	13	22	7	12	1012.7	1012.7	0.0
02/03:30am	14.6	11.4	9.8	73	2.5	WNW	17	20	9	11	1012.7	1012.7	0.0
02/03:00am	14.9	10.3	9.7	71	2.7	WNW	24	33	13	18	1012.5	1012.5	0.0
02/02:30am	14.9	10.0	9.9	72	2.6	NW	26	35	14	19	1012.7	1012.7	0.0
02/02:00am	15.2	10.3	10.0	71	2.7	NW	26	35	14	19	1012.8	1012.8	0.0
02/01:30am	15.1	11.1	10.3	73	2.5	NW	22	32	12	17	1012.9	1012.9	0.0
02/01:00am	14.7	11.3	10.5	76	2.2	NW	19	24	10	13	1013.0	1013.0	0.0
02/12:30am	15.0	12.8	10.8	76	2.2	NW	13	20	7	11	1013.0	1013.0	0.0
02/12:00am	14.9	13.1	10.9	77	2.1	WNW	11	17	6	9	1012.9	1012.9	0.0

Date/Time EST	Temp °C	App Temp °C	Dew Point °C	Rel Hum %	Delta-T °C	Wind					Press QNH hPa	Press MSL hPa	Rain since 9am mm
						Dir	Spd km/h	Gust km/h	Spd kts	Gust kts			
01/11:30pm	14.7	12.9	10.7	77	2.1	NNW	11	17	6	9	1012.6	1012.6	0.0
01/11:00pm	15.1	11.8	10.9	76	2.2	NNW	19	39	10	21	1012.1	1012.1	0.0
01/10:30pm	14.8	13.4	10.8	77	2.1	NW	9	24	5	13	1012.5	1012.5	0.0
01/10:00pm	14.9	11.1	11.3	79	1.9	NW	22	35	12	19	1012.3	1012.3	0.0
01/09:30pm	15.8	12.3	10.3	70	2.9	WNW	19	30	10	16	1012.4	1012.4	0.0

Hobart, Tasmania

May 2022 Daily Weather Observations

Most observations from Battery Point, but cloud, evaporation and sunshine from Hobart Airport.

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am					3 pm						
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C					km/h	local	°C	%	g th		km/h	hPa	°C	%	g th		km/h	hPa
1	Su	11.8	18.8	1.0	4.2		WNW	52	16:44	15.4	49	4	NNW	19	1011.9	18.0	64	7	NW	20	1009.9
2	Mo	13.2	21.7	0	2.6		NW	50	13:16	16.4	66	6	N	22	1014.5	20.0	51	7	NW	26	1012.9
3	Tu	14.2	21.4	0	4.0		NNW	54	11:36	17.3	59	7	N	15	1011.5	20.7	41	7	NNW	24	1008.4
4	We	12.8	14.4	3.2	2.8		NNW	43	00:17	13.0	81	7	N	11	1008.4	12.6	73	7	SSE	9	1009.0
5	Th	4.7	14.4	0.8	1.8		S	54	22:25	6.4	88	2	NNW	15	1017.5	12.5	72	8	SSW	26	1016.8
6	Fr	6.4	13.5	85.2			S	87	02:52	9.4	91	7	SSW	17	1009.1	13.3	63	7	NNW	24	1005.5
7	Sa	9.4	12.2	5.0	1.8		SSW	63	14:56	11.1	82	7	SW	19	999.6	11.0	85	8	SSW	33	1003.4
8	Su	9.6	16.6	19.8			SW	54	00:17	12.1	75	3	N	4	1019.7	14.9	52	2	SSW	17	1021.3
9	Mo	4.6	16.1	0.2	1.8		NNW	26	10:36	7.6	79	1	NNW	15	1029.1	15.8	47	1	N	9	1027.3
10	Tu	5.8	18.0	0	1.2		NW	35	04:46	8.4	81	1	N	13	1031.0	16.4	51	1	NE	9	1029.4
11	We	6.1	15.1	0	2.0		NW	33	04:57	9.3	73	3	N	15	1031.2	14.1	62	7	NNW	15	1028.2
12	Th	9.3	14.3	0	0.4		NW	35	10:32	10.7	82	7	N	15	1024.9	14.2	72	8	NNW	7	1020.4
13	Fr	7.4	16.7	0	0.4		NNW	26	04:31	9.8	90	3	NNW	13	1017.9	15.5	69	7	ESE	13	1016.7
14	Sa	9.8	17.7	3.2	0.6		NW	46	21:52	12.4	94	7	N	7	1009.3	16.8	79	3	NW	7	1002.5
15	Su	12.3	19.9	0.2	1.2		NW	50	11:48	16.0	63	5	NNW	15	1004.2	18.3	51	7	WNW	17	998.2
16	Mo	7.3	12.5	8.4	2.2		WNW	72	00:46	9.7	72	2	NNW	20	1001.1	9.9	64	2	NNW	28	1001.6
17	Tu	6.1	14.2	5.8	1.8		W	59	12:22	9.7	68	6	N	20	1005.4	13.2	50	7	NNW	28	1004.1
18	We	7.1	12.5	1.0	1.8		W	67	12:40	9.0	72	7	NNW	22	1002.9	11.4	55	4	SW	30	1007.2
19	Th	9.0	13.6	0.8	1.2		WSW	57	09:26	11.0	65	4	SW	37	1019.6	12.0	50	2	SW	22	1024.3
20	Fr	5.0	13.1	0	2.0		WSW	50	00:17	7.7	78	7	WNW	11	1034.1	12.0	66	6	E	9	1033.8
21	Sa	4.1	13.0	0	0.8		NNW	28	10:25	6.2	88	7	NNW	9	1036.9	12.6	59	2	N	7	1034.0
22	Su	4.0	11.5	0	1.2		NNW	33	07:42	6.7	83	7	NW	17	1032.9	11.2	65	7	NNW	15	1031.0
23	Mo	6.1	15.3	0	0.8		NNW	28	01:58	7.1	86	1	NNW	15	1032.0	15.0	56	1	NNW	9	1029.6
24	Tu	6.8	14.8	0	1.6		NNW	26	10:42	7.5	84	6	NNW	19	1031.4	12.7	62	2	ESE	11	1028.8
25	We	3.0	15.4	0	0.8		NNW	43	09:53	4.2	93	1	NW	26	1026.6	13.9	62	1	NE	11	1023.2
26	Th	3.7	14.8	0	1.0		NNW	31	01:50	4.8	95	3	NNW	20	1019.4	12.8	70	7	N	15	1014.6
27	Fr	4.7	16.0	0	0.6		NNW	33	04:41	12.4	69	7	WNW	9	1014.5	14.6	46	7	NW	20	1014.6
28	Sa	4.6	15.6	0	1.4		NW	37	07:29	5.6	82	6	NNW	17	1011.8	14.6	55	3	N	2	1009.0
29	Su	3.5	11.9	0	1.0		NNW	22	09:48	5.3	91	7	NNW	7	1010.3	10.6	76	3	Calm		1006.1
30	Mo	4.2	13.4	0	0.6		NNW	28	09:32	7.4	87	1	NNW	13	996.0	11.9	61	5	NE	9	989.9
31	Tu	4.0	10.2	0	0.8		NNW	28	05:31	5.1	87	7	NNW	9	983.9	10.1	64	7	NNW	17	983.4
Statistics for May 2022																					
Mean		7.1	15.1		1.5					9.5	79	4		15	1016.1	14.0	61	4		15	1014.4
Lowest		3.0	10.2	0	0.4					4.2	49	1	N	4	983.9	9.9	41	1	Calm		983.4
Highest		14.2	21.7	85.2	4.2		S	87		17.3	95	7	SW	37	1036.9	20.7	85	8	SSW	33	1034.0
Total				134.6	44.4																

IDCJDW7021.202205 Prepared at 13:03 UTC on Tuesday 7 June 2022

Source of data

Temperature, humidity, wind, pressure and rainfall observations are from Hobart (Ellerslie Road) (station 094029). Cloud, evaporation and sunshine observations are from Hobart Airport (station 094008).

Conditions at Hobart Airport may be markedly different to those in the city on some days. Some cloud observations are from automated equipment; these are somewhat different to those made by a human observer and may not appear every day.

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Other times and other places

The **last 14 months** of Daily Weather Observations for Hobart, Tasmania are also here on this web site:

[Jun 22](#) [May 22](#) [Apr 22](#) [Mar 22](#) [Feb 22](#) [Jan 22](#) [Dec 21](#) [Nov 21](#)
[Oct 21](#) [Sep 21](#) [Aug 21](#) [Jul 21](#) [Jun 21](#) [May 21](#)

Daily Weather Observations are also routinely prepared for hundreds of **other locations** in [Tasmania](#) and [across Australia](#). To get other months or places not on this web site, [contact us](#).

Climate statistics

If you are after **long-term averages** relevant to Hobart, Tasmania, look at the tables for [Hobart \(Ellerslie Road\)](#) or [Hobart Airport](#).

Maps and tables of average conditions for [locations across Australia](#) are also available.

More information

If you are using these pages, you are deemed to have understood the **important information** in [these notes](#). They cover how the data are obtained, how they are processed, and what each column means.

If you have **any questions** about this product, or you want any other weather or climate information, please [contact us](#).

Laboratory Certificates of Analysis

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EM2206432

Amendment : 1

Client : **ELGIN ASSOCIATES PTY LTD**
 Contact : SOPHIE LE ROUX
 Address : 258 Argyle St
 NORTH HOBART TAS 7000

Laboratory : Environmental Division Melbourne
 Contact : Peter Ravlic
 Address : 4 Westall Rd Springvale VIC Australia
 3171

E-mail : sophie.leroux@elgin.com.au
 Telephone : ----
 Facsimile : ----

E-mail : peter.ravlic@alsglobal.com
 Telephone : +6138549 9645
 Facsimile : +61-3-8549 9626

Project : Selfs Point CSA
 Order number : JN22377
 C-O-C number : ----
 Site : ----
 Sampler : EH, MU

Page : 1 of 3
 Quote number : EM2017ELGASS0003 (EN/222)
 QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 08-Apr-2022 11:55
 Client Requested Due : 05-May-2022
 Date

Issue Date : 03-May-2022
 Scheduled Reporting Date : **05-May-2022**

Delivery Details

Mode of Delivery : Carrier
 No. of coolers/boxes : 2
 Receipt Detail :

Security Seal : Intact.
 Temperature : 5.4°C - Ice Bricks present
 No. of samples received / analysed : 9 / 8

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
- **The scheduled reporting date has been extended due to analytical testing conducted by ALS interstate laboratories.**
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale, ALS Scoresby, ALS Brisbane 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 laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Preliminary results will be available on 19/4/22. However the final report with hydrocarbon gases, tributyltin, E.coli and total coliforms analysis will be complete on 22/4/22.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

Method Sample ID	Sample Container Received	Preferred Sample Container for Analysis
Dissolved Mercury by FIMS : EG035F		
RB01	- Clear Plastic Bottle - Unfiltered; Lab-acidified	- Clear Plastic Bottle - Nitric Acid; Filtered
Dissolved Metals by ICP-MS - Suite A : EG020A-F		
RB01	- Clear Plastic Bottle - Unfiltered; Lab-acidified	- Clear Plastic Bottle - Nitric Acid; Filtered

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	Sampling date / time	Sample ID	WATER - Corr. Schedule 1 Water on Steel & Concrete Piles (AS2159-2009)	WATER - EA165-PH CO2 - Free and Total (Default)	WATER - EP033 C1 - C4 Gases in Water	WATER - EP090S Organotins (TBT) Brisbane	WATER - EP231X PFAS - Full Suite (28 analytes)	WATER - MM514 E.coli & Total Coliforms by MPN Colliert	WATER - W-27 TRHIBTEXN/PAH/Phenols/8 Metals
EM2206432-001	07-Apr-2022 00:00	MW1	✓	✓		✓	✓	✓	✓
EM2206432-002	07-Apr-2022 00:00	MW2			✓		✓	✓	✓
EM2206432-003	07-Apr-2022 00:00	MW4			✓		✓	✓	✓
EM2206432-004	07-Apr-2022 00:00	MW5s	✓	✓	✓	✓	✓	✓	✓
EM2206432-005	07-Apr-2022 00:00	MW5d	✓	✓	✓	✓	✓	✓	✓
EM2206432-006	07-Apr-2022 00:00	MW6	✓	✓	✓	✓	✓	✓	✓
EM2206432-007	07-Apr-2022 00:00	FD01					✓		✓
EM2206432-008	07-Apr-2022 00:00	RB01					✓		✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	(On Hold) WATER No analysis requested
EM2206432-009	07-Apr-2022 00:00	FB01	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

CERTIFICATE OF ANALYSIS

Work Order	: EM2206432	Page	: 1 of 13
Amendment	: 1		
Client	: ELGIN ASSOCIATES PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: SOPHIE LE ROUX	Contact	: Peter Ravlic
Address	: 258 Argyle St NORTH HOBART TAS 7000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: Selfs Point CSA	Date Samples Received	: 08-Apr-2022 11:55
Order number	: JN22377	Date Analysis Commenced	: 08-Apr-2022
C-O-C number	: ----	Issue Date	: 09-May-2022 09:42
Sampler	: EH, MU		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 9		
No. of samples analysed	: 8		



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

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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>
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Gaston Allende	R&D Chemist	Sydney Organics, Smithfield, NSW
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Samantha Smith	Assistant Laboratory Manager	WRG Subcontracting, Springvale, VIC
Sarah Ashworth	Laboratory Manager - Brisbane	Brisbane Organics, Stafford, QLD
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- EP090S-Organotin: Sample 'MW5s' shows poor surrogate recovery due to matrix interference. Confirmed by re-extraction and re-analysis.
- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) 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.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- Corrosion assessment for Concrete and Steel piles in water per Australian Standard AS2159-2009 is based on the specific exposure condition. In the absence of exposure condition information being supplied, assessment is made according to Tables 6.4.2 C & 6.5.2 C for groundwater, selecting the most severe classification. Refer to AS2159-2009 section 6.4 for further interpretation of corrosion assessment. ALS is not NATA accredited for Corrosion Assessment comments.
- EP075(SIM): EM2206432_007 Particular samples required dilution prior to analysis due to matrix interferences. LOR values have been adjusted accordingly.
- Amendment (3/5/22): This report has been amended to report dissolved gases (EP033) on samples 2, 3 and CO2 (EP165-P) on sample1 (MW1)
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- E.coli & Total Coliforms by MPN (MM514) is conducted by ALS Scoresby NATA accreditation no. 992, site no. 989.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

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

Sample ID

				MW1	MW2	MW4	MW5s	MW5d
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00
Compound	CAS Number	LOR	Unit	EM2206432-001	EM2206432-002	EM2206432-003	EM2206432-004	EM2206432-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.54	----	----	7.26	7.67
EA165: CO2 - Free and Total								
Free Carbon Dioxide as CO2	85540-96-1	1	mg/L	96	----	----	241	20
Total Carbon Dioxide as CO2	85540-96-1	1	mg/L	1560	----	----	2170	426
EA167: Corrosion Classification (per AS2159-2009)								
Ø Exposure Classification - Concrete Piles	----	-	-	Mild	----	----	Mild	Mild
Ø Exposure Classification - Steel Piles	----	-	-	Non Aggressive	----	----	Mild	Mild
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	96	----	----	<1	785
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	470	----	----	1890	6230
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	0.022	0.037	0.002	0.010	0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	0.003	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	0.020	0.011	0.007	0.098	0.012
Zinc	7440-66-6	0.005	mg/L	0.008	0.040	0.014	0.008	0.015
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP033: C1 - C4 Hydrocarbon Gases								
Methane	74-82-8	10	µg/L	----	7690	3800	7870	393
Ethene	74-85-1	10	µg/L	----	<10	<10	<10	<10
Ethane	74-84-0	10	µg/L	----	<10	<10	<10	<10
Propene	115-07-1	10	µg/L	----	<10	<10	<10	<10
Propane	74-98-6	10	µg/L	----	<10	<10	<10	<10
Butene	25167-67-3	10	µg/L	----	<10	<10	<10	<10
Butane	106-97-8	10	µg/L	----	<10	<10	<10	<10
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW1	MW2	MW4	MW5s	MW5d
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	
Compound	CAS Number	LOR	Unit	EM2206432-001	EM2206432-002	EM2206432-003	EM2206432-004	EM2206432-005	
				Result	Result	Result	Result	Result	
EP075(SIM)A: Phenolic Compounds - Continued									
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	<1.0	1.6	<1.0	
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	<1.0	1.6	<1.0	
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	<1.0	3.6	<1.0	
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	<1.0	1.4	<1.0	
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	<1.0	9.2	<1.0	
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	<1.0	9.3	<1.0	
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	<1.0	3.4	<1.0	
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	<1.0	3.5	<1.0	
Benzo(b+j)fluoranthene	205-99-2	205-82-3	1.0	µg/L	<1.0	<1.0	3.7	<1.0	
Benzo(k)fluoranthene	207-08-9		1.0	µg/L	<1.0	<1.0	3.3	<1.0	
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	4.7	<0.5	
Indeno(1,2,3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	<1.0	3.1	<1.0	
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	<1.0	4.0	<1.0	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	52.4	<0.5	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	<0.5	<0.5	6.1	<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	220	<50	
C15 - C28 Fraction	----	100	µg/L	180	110	<100	840	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	280	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	180	110	<50	1340	<50	
EP080/071: Total Recoverable Hvdrocarbons - NEPM 2013 Fractions									



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW1	MW2	MW4	MW5s	MW5d
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00
Compound	CAS Number	LOR	Unit	EM2206432-001	EM2206432-002	EM2206432-003	EM2206432-004	EM2206432-005
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
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	320	<100
>C16 - C34 Fraction	----	100	µg/L	180	100	<100	940	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	160	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	180	100	<100	1420	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	320	<100
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	----	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
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.06	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.18	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.19	0.01	0.03	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW1	MW2	MW4	MW5s	MW5d
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00
Compound	CAS Number	LOR	Unit	EM2206432-001	EM2206432-002	EM2206432-003	EM2206432-004	EM2206432-005
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.34	<0.02	<0.02	0.04	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.28	<0.02	<0.02	0.04	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.19	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.49	0.02	0.02	0.02	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW1	MW2	MW4	MW5s	MW5d
Sampling date / time					07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00
Compound	CAS Number	LOR	Unit		EM2206432-001	EM2206432-002	EM2206432-003	EM2206432-004	EM2206432-005
					Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		1.79	0.03	0.05	0.10	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		0.37	0.01	0.03	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		1.73	0.03	0.05	0.10	<0.01
MM514: E.coli & Total Coliforms MPN by Colilert									
Escherichia coli (Colilert)	----	1	orgs/100mL		0	<10	0	<10	1
Total Coliforms (Colilert)	----	1	orgs/100mL		3	<10	15	<10	14
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		29.5	29.7	26.6	28.9	30.5
2-Chlorophenol-D4	93951-73-6	1.0	%		75.0	74.7	67.3	71.4	71.9
2,4,6-Tribromophenol	118-79-6	1.0	%		81.9	80.1	70.6	87.9	78.7
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		94.2	90.7	83.8	89.5	85.6
Anthracene-d10	1719-06-8	1.0	%		86.7	83.3	77.1	79.5	78.2
4-Terphenyl-d14	1718-51-0	1.0	%		83.8	79.3	75.3	73.4	78.8
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		109	110	107	103	106
Toluene-D8	2037-26-5	2	%		104	103	103	101	97.4
4-Bromofluorobenzene	460-00-4	2	%		104	101	106	102	101
EP090S: Organotin Surrogate									
Tripolytin	----	5	%		24.6	----	----	18.4	41.4
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		101	91.1	92.3	101	97.3
13C8-PFOA	----	0.02	%		99.1	106	101	96.8	100



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW6	FD01	RB01	----	----
Sampling date / time					07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit		EM2206432-006	EM2206432-007	EM2206432-008	-----	-----
					Result	Result	Result	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		6.90	----	----	----	----
EA165: CO2 - Free and Total									
Free Carbon Dioxide as CO2	85540-96-1	1	mg/L		496	----	----	----	----
Total Carbon Dioxide as CO2	85540-96-1	1	mg/L		2230	----	----	----	----
EA167: Corrosion Classification (per AS2159-2009)									
Ø Exposure Classification - Concrete Piles	----	-	-		Mild	----	----	----	----
Ø Exposure Classification - Steel Piles	----	-	-		Non Aggressive	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		<1	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		657	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		0.004	0.012	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		0.001	0.004	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		0.018	0.100	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L		0.025	0.016	<0.005	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
EP033: C1 - C4 Hydrocarbon Gases									
Methane	74-82-8	10	µg/L		11900	----	----	----	----
Ethene	74-85-1	10	µg/L		<10	----	----	----	----
Ethane	74-84-0	10	µg/L		<10	----	----	----	----
Propene	115-07-1	10	µg/L		<10	----	----	----	----
Propane	74-98-6	10	µg/L		<10	----	----	----	----
Butene	25167-67-3	10	µg/L		<10	----	----	----	----
Butane	106-97-8	10	µg/L		<10	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	<1.2	<1.0	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.2	<1.0	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	<1.2	<1.0	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	<2.4	<2.0	----	----



Analytical Results

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

Sample ID

				MW6	FD01	RB01	----	----
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2206432-006	EM2206432-007	EM2206432-008	-----	-----
				Result	Result	Result	----	----

EP075(SIM)A: Phenolic Compounds - Continued

2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	<1.2	<1.0	----	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	<1.2	<1.0	----	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	<1.2	<1.0	----	----
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	<1.2	<1.0	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	<1.2	<1.0	----	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	<1.2	<1.0	----	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	<1.2	<1.0	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	<2.4	<2.0	----	----

EP075(SIM)B: Polynuclear Aromatic Hydrocarbons

Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	1.4	<1.0	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	1.3	<1.0	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	3.4	<1.0	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	1.4	<1.0	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	8.8	<1.0	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	8.9	<1.0	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	3.1	<1.0	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	3.2	<1.0	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	3.0	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	3.1	<1.0	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	4.1	<0.5	----	----
Indeno(1,2,3-cd)pyrene	193-39-5	1.0	µg/L	<1.0	2.6	<1.0	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	3.4	<1.0	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	47.7	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	5.3	<0.5	----	----

EP080/071: Total Petroleum Hydrocarbons

C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L	140	250	<50	----	----
C15 - C28 Fraction	----	100	µg/L	670	910	<100	----	----
C29 - C36 Fraction	----	50	µg/L	70	320	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	880	1480	<50	----	----

EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions



Analytical Results

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

Sample ID

				MW6	FD01	RB01	----	----
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2206432-006	EM2206432-007	EM2206432-008	-----	-----
Result				Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	230	340	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	620	1030	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	190	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	850	1560	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	230	340	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	<0.01	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW6	FD01	RB01	----	----
Sampling date / time				07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2206432-006	EM2206432-007	EM2206432-008	-----	-----
				Result	Result	Result	----	----
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.05	<0.02	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.06	<0.02	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.02	<0.02	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.02	<0.01	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW6	FD01	RB01	----	----
Sampling date / time					07-Apr-2022 00:00	07-Apr-2022 00:00	07-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit		EM2206432-006	EM2206432-007	EM2206432-008	-----	-----
					Result	Result	Result	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	0.15	<0.01	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	0.15	<0.01	----	----
MM514: E.coli & Total Coliforms MPN by Colilert									
Escherichia coli (Colilert)	----	1	orgs/100mL		<10	----	----	----	----
Total Coliforms (Colilert)	----	1	orgs/100mL		<10	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		30.2	24.4	32.6	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		74.2	57.3	80.7	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%		83.8	66.1	83.8	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		87.9	72.0	99.8	----	----
Anthracene-d10	1719-06-8	1.0	%		79.7	73.9	88.9	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		77.9	65.0	88.9	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		114	109	108	----	----
Toluene-D8	2037-26-5	2	%		108	102	103	----	----
4-Bromofluorobenzene	460-00-4	2	%		103	108	103	----	----
EP090S: Organotin Surrogate									
Tripolytin	----	5	%		33.4	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		92.4	86.0	133	----	----
13C8-PFOA	----	0.02	%		97.6	94.7	101	----	----



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	51
2-Chlorophenol-D4	93951-73-6	30	114
2,4,6-Tribromophenol	118-79-6	26	133
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	35	127
Anthracene-d10	1719-06-8	44	122
4-Terphenyl-d14	1718-51-0	44	124
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
EP090S: Organotin Surrogate			
Tripopyltin	----	24	116
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(WATER) EP090: Organotin Compounds (Soluble)

(WATER) EP090S: Organotin Surrogate

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP033: C1 - C4 Hydrocarbon Gases

QUALITY CONTROL REPORT

Work Order : **EM2206432**

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Amendment : **1**

Client : **ELGIN ASSOCIATES PTY LTD**

Laboratory : Environmental Division Melbourne

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Project : Selfs Point CSA

Date Samples Received : 08-Apr-2022

Order number : JN22377

Date Analysis Commenced : 08-Apr-2022

C-O-C number : ----

Issue Date : 09-May-2022

Sampler : EH, MU

Site : ----

Quote number : EN/222

No. of samples received : 9

No. of samples analysed : 8



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

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

Signatories	Position	Accreditation Category
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
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Gaston Allende	R&D Chemist	Sydney Organics, Smithfield, NSW
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Samantha Smith	Assistant Laboratory Manager	WRG Subcontracting, Springvale, VIC
Sarah Ashworth	Laboratory Manager - Brisbane	Brisbane Organics, Stafford, QLD
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General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA005P: pH by PC Titrator (QC Lot: 4285835)									
EM2206380-003	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.96	7.87	1.1	0% - 20%
EM2206378-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.61	7.61	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4279186)									
EM2206435-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	283	281	0.6	0% - 20%
EM2206265-010	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	9	12	30.7	0% - 50%
ED045G: Chloride by Discrete Analyser (QC Lot: 4279185)									
EM2206265-010	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	111	112	0.0	0% - 20%
EM2206441-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	2460	2490	1.2	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4282617)									
EM2206365-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
EM2206365-010	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4282619)									
EM2206432-002	MW2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.037	0.036	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.011	0.012	0.0	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.040	0.039	3.8	No Limit
EM2206553-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.028	0.006	128	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4282618)									
EM2206432-001	MW1	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EM2206547-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 4283921)									
EM2206365-004	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EM2206432-005	MW5d	EP033: Methane	74-82-8	10	µg/L	393	380	3.5	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 4318699)									
EM2206432-002	MW2	EP033: Methane	74-82-8	10	µg/L	7690	7540	1.9	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 4318699) - continued									
EM2207680-004	Anonymous	EP033: Methane	74-82-8	10	µg/L	4460	4950	10.3	0% - 20%
		EP033: Ethene	74-85-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Ethane	74-84-0	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propene	115-07-1	10	µg/L	<10	<10	0.0	No Limit
		EP033: Propane	74-98-6	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butene	25167-67-3	10	µg/L	<10	<10	0.0	No Limit
		EP033: Butane	106-97-8	10	µg/L	<10	<10	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 4277990)									
EM2206432-001	MW1	EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	<2.0	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4277990)									
EM2206432-001	MW1	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	<1.0	0.0	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4277989)							
EM2206319-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4277989) - continued									
EM2206319-001	Anonymous	EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	0.0	No Limit
EM2206432-004	MW5s	EP071: C15 - C28 Fraction	----	100	µg/L	840	750	11.4	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	220	170	22.7	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	280	250	11.6	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	µg/L	1340	1170	13.5	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4278071)									
EM2206319-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EM2206343-026	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4277989)									
EM2206319-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	0.0	No Limit
EM2206432-004	MW5s	EP071: >C10 - C16 Fraction	----	100	µg/L	320	270	17.5	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	940	840	11.4	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	160	150	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	100	µg/L	1420	1260	11.9	0% - 50%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4278071)									
EM2206319-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EM2206343-026	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4278071)									
EM2206319-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
EM2206343-026	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4294552)									
EM2206432-001	MW1	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.18	0.20	12.1	0% - 50%



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4294552) - continued									
EM2206432-001	MW1	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.19	0.17	6.6	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.06	0.08	28.7	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EM2206603-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.07	0.08	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.14	0.13	11.2	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4294552)									
EM2206432-001	MW1	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.49	0.46	6.3	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.34	0.31	7.3	0% - 50%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.28	0.26	7.8	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.19	0.19	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EM2206603-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4294552)									
EM2206432-001	MW1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4294552) - continued									
EM2206432-001	MW1	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EM2206603-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4294552)							
EM2206432-001	MW1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EM2206603-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4294552)									
EM2206432-001	MW1	EP231X: Sum of PFAS	----	0.01	µg/L	1.79	1.71	4.6	0% - 20%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231P: PFAS Sums (QC Lot: 4294552) - continued									
EM2206432-001	MW1	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.37	0.37	0.0	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	1.73	1.67	3.5	0% - 20%
EM2206603-005	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.21	0.21	0.0	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.21	0.21	0.0	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.21	0.21	0.0	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EA005P: pH by PC Titrator (QCLot: 4285835)								
EA005-P: pH Value	----	----	pH Unit	----	7 pH Unit	101	98.8	101
				----	9 pH Unit	99.9	99.3	101
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4279186)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	115	85.8	117
				<1	500 mg/L	109	80.0	120
ED045G: Chloride by Discrete Analyser (QCLot: 4279185)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	92.8	85.0	115
				<1	1000 mg/L	96.8	85.0	122
EG020F: Dissolved Metals by ICP-MS (QCLot: 4282617)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	89.0	111
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	83.5	111
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	105	83.2	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	101	83.1	107
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.8	84.6	108
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	84.3	110
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	106	86.3	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 4282619)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	89.0	111
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	102	83.5	111
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	83.2	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.4	83.1	107
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.8	84.6	108
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.6	84.3	110
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	110	86.3	112
EG035F: Dissolved Mercury by FIMS (QCLot: 4282618)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	81.1	71.6	116
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 4283921)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	96.6	86.0	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	93.1	87.0	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	95.4	87.0	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	94.8	85.0	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	98.2	84.0	112
EP033: Butene	25167-67-3	10	µg/L	<10	99.61 µg/L	105	83.0	115
EP033: Butane	106-97-8	10	µg/L	<10	102.18 µg/L	108	85.0	115



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 4318699)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	96.2	86.0	114
EP033: Ethene	74-85-1	10	µg/L	<10	50.29 µg/L	96.3	87.0	111
EP033: Ethane	74-84-0	10	µg/L	<10	54.43 µg/L	95.8	87.0	111
EP033: Propene	115-07-1	10	µg/L	<10	73.97 µg/L	94.0	85.0	113
EP033: Propane	74-98-6	10	µg/L	<10	78.28 µg/L	94.6	84.0	112
EP033: Butene	25167-67-3	10	µg/L	<10	99.61 µg/L	90.8	83.0	115
EP033: Butane	106-97-8	10	µg/L	<10	102.18 µg/L	93.1	85.0	115
EP075(SIM)A: Phenolic Compounds (QCLot: 4277990)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	34.1	17.8	51.1
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	75.6	43.2	107
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	68.9	39.2	98.7
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	64.3	35.5	91.3
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	73.4	34.4	124
EP075(SIM): 2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	74.2	44.4	112
EP075(SIM): 2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	70.1	45.3	115
EP075(SIM): 2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	71.2	44.3	116
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	77.1	46.6	117
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	80.9	38.2	122
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	79.1	43.2	123
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	77.4	48.1	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4277990)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	77.7	42.8	114
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	91.4	48.6	119
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	95.4	47.0	117
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	94.9	49.5	119
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	88.7	49.4	121
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	87.3	48.4	122
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	91.6	50.3	124
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	92.1	50.0	126
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	87.4	49.4	127
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	92.2	48.7	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	85.3	54.5	134
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	85.0	56.1	134
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	86.7	55.6	135
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	81.6	54.4	126
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	81.7	54.5	126
EP075(SIM): Benzo(a,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	80.6	54.4	126



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4277989)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	4000 µg/L	80.9	47.2	122
EP071: C15 - C28 Fraction	----	100	µg/L	<100	16900 µg/L	82.5	52.9	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	8090 µg/L	83.0	50.4	127
EP071: C10 - C36 Fraction (sum)	----	50	µg/L	<50	28990 µg/L	82.3	51.5	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4278071)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	108	66.2	134
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4277989)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	5830 µg/L	78.6	49.1	125
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	21700 µg/L	83.7	51.6	128
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1560 µg/L	86.1	47.2	130
EP071: >C10 - C40 Fraction (sum)	----	100	µg/L	<100	29090 µg/L	82.9	51.2	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4278071)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	114	66.2	132
EP080: BTEXN (QCLot: 4278071)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	115	68.8	127
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	113	72.9	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	113	71.7	130
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	111	72.3	136
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	113	75.9	134
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	117	68.3	131
EP090: Organotin Compounds (Soluble) (QCLot: 4287226)								
EP090S: Tributyltin	56573-85-4	2	ngSn/L	<2	147 ngSn/L	87.4	30.7	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4294552)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	106	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	99.9	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	93.2	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	92.6	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	89.2	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	87.5	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4294552)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	84.3	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	98.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	99.5	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	98.9	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	95.7	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	103	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	104	71.0	129



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4294552) - continued								
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	97.4	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	102	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	90.7	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4294552)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	97.3	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	104	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	97.5	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	89.6	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	100	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	103	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	96.5	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4294552)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	99.5	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 µg/L	102	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	113	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	120	70.0	130
EP231P: PFAS Sums (QCLot: 4294552)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number			Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4279186)							
EM2206432-001	MW1	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	110	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4279185)							
EM2206432-001	MW1	ED045G: Chloride	16887-00-6	400 mg/L	85.3	70.0	142



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4282617)							
EM2206365-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	106	76.6	124
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	98.4	74.6	118
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	93.5	71.0	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	97.2	76.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	89.2	75.0	133
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	98.2	73.0	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	97.8	75.0	131
EG020F: Dissolved Metals by ICP-MS (QCLot: 4282619)							
EM2206432-002	MW2	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	99.0	76.6	124
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	98.6	74.6	118
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	96.5	71.0	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	97.1	76.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	95.9	75.0	133
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	96.6	73.0	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	94.8	75.0	131
EG035F: Dissolved Mercury by FIMS (QCLot: 4282618)							
EM2206432-002	MW2	EG035F: Mercury	7439-97-6	0.01 mg/L	76.9	70.0	120
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 4283921)							
EM2206365-005	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	99.7	70.0	130
		EP033: Ethene	74-85-1	50.29 µg/L	86.4	70.0	130
		EP033: Ethane	74-84-0	54.43 µg/L	95.9	70.0	130
		EP033: Propene	115-07-1	73.97 µg/L	75.8	70.0	130
		EP033: Propane	74-98-6	78.28 µg/L	98.5	70.0	130
		EP033: Butene	25167-67-3	99.61 µg/L	85.0	70.0	130
		EP033: Butane	106-97-8	102.18 µg/L	108	70.0	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 4318699)							
EM2206432-003	MW4	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70.0	130
		EP033: Ethene	74-85-1	50.29 µg/L	82.7	70.0	130
		EP033: Ethane	74-84-0	54.43 µg/L	90.1	70.0	130
		EP033: Propene	115-07-1	73.97 µg/L	82.3	70.0	130
		EP033: Propane	74-98-6	78.28 µg/L	81.8	70.0	130
		EP033: Butene	25167-67-3	99.61 µg/L	80.3	70.0	130
		EP033: Butane	106-97-8	102.18 µg/L	81.4	70.0	130
EP075(SIM)A: Phenolic Compounds (QCLot: 4277990)							
EM2206432-003	MW4	EP075(SIM): Phenol	108-95-2	5 µg/L	42.6	15.0	61.0
		EP075(SIM): 2-Chlorophenol	95-57-8	5 µg/L	91.3	35.0	131
		EP075(SIM): 2-Nitrophenol	88-75-5	5 µg/L	94.5	39.0	121



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 4277990) - continued							
EM2206432-003	MW4	EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	5 µg/L	97.1	32.0	130
		EP075(SIM): Pentachlorophenol	87-86-5	5 µg/L	124	11.0	147
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4277990)							
EM2206432-003	MW4	EP075(SIM): Acenaphthene	83-32-9	5 µg/L	117	39.3	123
		EP075(SIM): Pyrene	129-00-0	5 µg/L	114	44.0	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4277989)							
EM2206319-004	Anonymous	EP071: C10 - C14 Fraction	----	4000 µg/L	74.6	48.0	126
		EP071: C15 - C28 Fraction	----	16900 µg/L	76.8	51.7	132
		EP071: C29 - C36 Fraction	----	8090 µg/L	77.5	50.5	127
		EP071: C10 - C36 Fraction (sum)	----	28990 µg/L	76.6	50.2	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4278071)							
EM2206319-002	Anonymous	EP080: C6 - C9 Fraction	----	280 µg/L	102	33.9	126
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4277989)							
EM2206319-004	Anonymous	EP071: >C10 - C16 Fraction	----	5830 µg/L	72.5	48.0	128
		EP071: >C16 - C34 Fraction	----	21700 µg/L	78.0	50.4	130
		EP071: >C34 - C40 Fraction	----	1560 µg/L	81.0	47.4	131
		EP071: >C10 - C40 Fraction (sum)	----	29090 µg/L	77.3	50.0	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4278071)							
EM2206319-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	98.8	34.0	122
EP080: BTEXN (QCLot: 4278071)							
EM2206319-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	118	56.3	133
		EP080: Toluene	108-88-3	20 µg/L	117	60.4	132
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4294552)							
EM2206432-003	MW4	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.222 µg/L	108	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	92.1	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.228 µg/L	91.4	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	102	69.0	134
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	84.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4294552)							
EM2206432-003	MW4	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	78.7	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	104	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	106	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	96.5	72.0	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	110	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	106	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	95.9	69.0	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4294552) - continued							
EM2206432-003	MW4	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	92.3	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	76.9	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	101	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4294552)							
EM2206432-003	MW4	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	104	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	104	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	90.7	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	88.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	108	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	99.3	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	104	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4294552)							
EM2206432-003	MW4	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	99.0	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.238 µg/L	105	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	118	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.242 µg/L	80.0	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order : **EM2206432**

Page : 1 of 9

Amendment : **1**

Client : **ELGIN ASSOCIATES PTY LTD**

Laboratory : Environmental Division Melbourne

Contact : SOPHIE LE ROUX

Telephone : +6138549 9645

Project : Selfs Point CSA

Date Samples Received : 08-Apr-2022

Site : ----

Issue Date : 09-May-2022

Sampler : EH, MU

No. of samples received : 9

Order number : JN22377

No. of samples analysed : 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

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 : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP033: C1 - C4 Hydrocarbon Gases	EM2206432--003	MW4	Methane	74-82-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Regular Sample Surrogates

Sub-Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP090S: Organotin Surrogate	EM2206432-004	MW5s	Trippropyltin	----	18.4 %	24.0-116 %	Recovery less than lower data quality objective

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
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
MW1,	MW5s,	----	----	----	14-Apr-2022	07-Apr-2022	7
MW5d,	MW6						
EP033: C1 - C4 Hydrocarbon Gases							
Amber VOC Vial - Sulfuric Acid							
MW2,	MW4	----	----	----	04-May-2022	21-Apr-2022	13

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)					
Organotin Compounds (Soluble)	0	15	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Organotin Compounds (Soluble)	0	15	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
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)	MW5s, MW6	07-Apr-2022	----	----	----	14-Apr-2022	07-Apr-2022	✖
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)	MW5s, MW6	07-Apr-2022	----	----	----	12-Apr-2022	05-May-2022	✔
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)	MW5s, MW6	07-Apr-2022	----	----	----	12-Apr-2022	05-May-2022	✔
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F)	MW2, MW5s, MW6, FD01	07-Apr-2022	----	----	----	12-Apr-2022	04-Oct-2022	✔
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-F)	RB01	07-Apr-2022	----	----	----	12-Apr-2022	04-Oct-2022	✔
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F)	MW2, MW5s, MW6, FD01	07-Apr-2022	----	----	----	12-Apr-2022	05-May-2022	✔
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035F)	RB01	07-Apr-2022	----	----	----	12-Apr-2022	21-Apr-2022	✔
EP033: C1 - C4 Hydrocarbon Gases								
Amber VOC Vial - Sulfuric Acid (EP033)	MW5d, MW6	07-Apr-2022	----	----	----	12-Apr-2022	21-Apr-2022	✔
Amber VOC Vial - Sulfuric Acid (EP033)	MW4	07-Apr-2022	----	----	----	04-May-2022	21-Apr-2022	✖
EP075(SIM)A: Phenolic Compounds								
Amber Glass Bottle - Unpreserved (EP075(SIM))	MW2, MW5s, MW6, RB01	07-Apr-2022	12-Apr-2022	14-Apr-2022	✔	12-Apr-2022	22-May-2022	✔



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))		07-Apr-2022	12-Apr-2022	14-Apr-2022	✓	12-Apr-2022	22-May-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)		07-Apr-2022	12-Apr-2022	14-Apr-2022	✓	12-Apr-2022	22-May-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
Amber VOC Vial - Sulfuric Acid (EP080)		07-Apr-2022	11-Apr-2022	21-Apr-2022	✓	11-Apr-2022	21-Apr-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		07-Apr-2022	12-Apr-2022	14-Apr-2022	✓	12-Apr-2022	22-May-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
Amber VOC Vial - Sulfuric Acid (EP080)		07-Apr-2022	11-Apr-2022	21-Apr-2022	✓	11-Apr-2022	21-Apr-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		07-Apr-2022	11-Apr-2022	21-Apr-2022	✓	11-Apr-2022	21-Apr-2022	✓
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01							
EP090: Organotin Compounds (Soluble)								
Amber Glass Bottle - Unpreserved (EP090S)		07-Apr-2022	14-Apr-2022	14-Apr-2022	✓	14-Apr-2022	24-May-2022	✓
MW1, MW5d,	MW5s, MW6							

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

Method	Sample Date	Extraction / Preparation			Evaluation	Holding time breakdown		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation		Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01	07-Apr-2022	20-Apr-2022	04-Oct-2022	✓	20-Apr-2022	04-Oct-2022	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X)								
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01	07-Apr-2022	20-Apr-2022	04-Oct-2022	✓	20-Apr-2022	04-Oct-2022	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X)								
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01	07-Apr-2022	20-Apr-2022	04-Oct-2022	✓	20-Apr-2022	04-Oct-2022	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01	07-Apr-2022	20-Apr-2022	04-Oct-2022	✓	20-Apr-2022	04-Oct-2022	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)								
MW1, MW4, MW5d, FD01,	MW2, MW5s, MW6, RB01	07-Apr-2022	20-Apr-2022	04-Oct-2022	✓	20-Apr-2022	04-Oct-2022	✓
MM514: E.coli & Total Coliforms MPN by Colilert								
Sterile Plastic Bottle - Sodium Thiosulfate (MM514)								
MW1, MW4, MW5d,	MW2, MW5s, MW6	07-Apr-2022	----	----	----	08-Apr-2022	08-Apr-2022	✓



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)							
C1 - C4 Gases	EP033	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	33	12.12	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	0	15	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	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
Laboratory Control Samples (LCS)							
C1 - C4 Gases	EP033	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	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
Method Blanks (MB)							
C1 - C4 Gases	EP033	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	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
Matrix Spikes (MS)							
C1 - C4 Gases	EP033	2	40	5.00	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	
Matrix Spikes (MS) - Continued							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	6.06	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Organotin Compounds (Soluble)	EP090S	0	15	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	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
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Free and Total CO2	EA165-P	WATER	In house: Referenced to APHA 4500-CO2 D. This method is compliant with NEPM Schedule B(3)
Corrosion Classification for Steel and Concrete Piles	* EA167	WATER	In house: Exposure classification is determined according to Australian Standard AS2159-2009.
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA seal method 2 017-1-L
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(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 SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 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 Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 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 Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 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 Schedule B(3)
Organotin Compounds (Soluble)	EP090S	WATER	In house: Referenced to USEPA SW 846 - 8270 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 Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
E.coli & Total Coliforms by MPN Colilert	MM514	WATER	Microbiological analysis subcontracted to ALS Scoresby (NATA Accredited Laboratory No. 992).
Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM 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 purging.
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.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

Data Validation

APPENDIX F

1 Introduction

The analytical data was checked and validated for its reliability and suitability for interpretive use, based on guidance in AS4482 and the NEPM ASC (2013). Key checks in the data validation process included:

- Samples were received by the laboratories in chilled eskies and in good condition;
- All samples were analysed as required on the chain of custody, and within recommended holding times;
- Field sample-id's in lab reports correlate to COC and field sample records;
- Review of rinsate blank results where applicable;
- Review of laboratory duplicate results and relative percent differences (RPDs);
- Review of field duplicate sample results and RPDs;
- Review of internal laboratory QAQC sample results, including laboratory check samples, matrix spike/matrix spike duplicate and surrogates met laboratory requirements; and
- The presence of potentially anomalous results.

2 Sample Integrity

The sampling was undertaken by suitably trained and experienced environmental scientists in accordance with relevant standards and guidelines. At the time of sampling, samples were placed into clean laboratory supplied and appropriately preserved bottles. The bottles were placed into chilled eskies under chain of custody documentation and despatched same day overnight courier to the laboratories.

Sample receipt advice from the laboratories and chain of custody records (**Appendix E**) show that samples were received by the laboratories chilled and intact, and analysed within the recommended holding times, with the following exceptions:

- ALS batch EM2206432 Amendment 1
 - C1-C4 gases in samples MW2 and MW4 were analysed outside the analytical due date. This may result in under reporting of the results in these samples. All remaining samples analysed for C1-C4 gases were within holding times.

3 Sample Laboratory Analysis

Samples were analysed by a NATA accredited laboratory, ALS, for the required analysis. Internal laboratory QA/QC results are included in **Appendix E** and reported QA/QC results for method blanks, laboratory duplicates, lab control standards (LCS), matrix spike/matrix spike duplicates (MS/MSD) and surrogates were reported that were largely within laboratory data quality objectives. There were some exceptions that included:

- ALS batch EM2206432 Amendment 1:
 - C1-C4 gases MS recovery was not determined in sample MW4 for methane; background level greater than or equal to 4 x spike level.
 - Organotin surrogate recovery in sample MW5s (Tripropyltin; 18.4%), was less than the lower data quality objective (24.0-116 %). This may indicate underreporting of tributyltin in this sample.

APPENDIX F

- Quality control parameter frequency compliance was not within the specification for organotin compounds.

These reporting of MS and surrogate recoveries and quality control frequency compliance outside laboratory DQOs represented minor instances in the dataset and are not considered to affect the overall data quality of the dataset.

5 Rinsate Blanks and Field Blanks

A Rinsate blank was collected on the day of sampling during fieldwork which included:

- RB01_07/4/22 (off glove used for sampling).

The rinsate blank was analysed for metals, PFAS, TRH, TPH and/or BTEXN, phenols and PAH.

A field blank sample FB01, consisting of laboratory rinsate water used in the field, was also collected during the sampling event. The field blank was placed on hold and not analysed until rinsate blank results were reviewed. The field blank was not analysed for this batch.

Rinsate blank results are presented in **Table B4**, with results reported below detection limits and indicating that cross-contamination in the field did not occur during sampling.

6 Field Duplicates

Blind field duplicates were collected at a rate of 1 per 20 primary samples and 1 in 10 primary samples for PFAS.

The following primary sample-field duplicate pairs were collected:

- FD01 at site MW5s.

The results of the primary and field duplicate results with relative percent difference calculations are presented in **Table B3**.

Primary and duplicate results correlated well, with the majority of calculated RPDs in the range of 0-50%:

- In total there were 89 duplicate pairs, with 2 pairs (or 2%) with RPDs above 30% for inorganic compounds and >50% for organic compounds.
- Of these 2 pairs, one of the RPD exceedances were due to a relatively small difference between low concentrations – i.e. results less than 10 times the limit of reporting and are not considered significant.
- The remaining pair reported RPD above 30% with results greater than the 10 times limit of reporting and was due to a larger variation in the concentration of zinc. This sample contained a higher concentration of suspended sediment during sampling, which can influence results.

Overall, the primary and duplicate analysis reported good correlation between results and indicated a high level of precision and accuracy in the dataset.

7 Anomalous Results

Anomalous results were not identified in the dataset.

APPENDIX F

8 Conclusion

Based on the findings of the review, the groundwater dataset is considered reliable and suitable for interpretive use.

Table F1 - Water Quality QA/QC Results (Field Duplicate)
JN22377: Sels Point CSA



			Batch	EM2206432	EM2206432	Relative Percentile Difference %	Pairs	Over 50%	Over 50% & >10 x LOR
			Sample ID	MW5s	FD01				
			Sampling Date	7/04/2022	7/04/2022				
			Sampling Type	Primary	Duplicate				
Parameter Suite	Analyte Name	Units	LOR						
Dissolved Metals	Arsenic	µg/L	1	10	12	18%	1		
	Cadmium	µg/L	0.1	<0.1	<0.1	0%	1		
	Chromium	µg/L	1	3	4	29%	1		
	Copper	µg/L	1	<1	<1	0%	1		
	Lead	µg/L	1	<1	<1	0%	1		
	Nickel	µg/L	1	98	100	2%	1		
	Zinc	µg/L	5	8	16	67%	1	1	
Perfluoroalkyl Sulfonic Acids	Mercury	µg/L	0.1	<0.1	<0.1	0%	1		
	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01	<0.01	0%	1		
	Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01	<0.01	0%	1		
Perfluoroalkyl Carboxylic Acids	Perfluorodecane sulfonic acid (PFDS)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorobutanoic acid (PFBA)	µg/L	0.1	<0.1	<0.1	0%	1		
	Perfluoropentanoic acid (PFPeA)	µg/L	0.02	0.04	0.05	22%	1		
	Perfluorohexanoic acid (PFHxA)	µg/L	0.02	0.04	0.06	40%	1		
	Perfluoroheptanoic acid (PFHpA)	µg/L	0.02	<0.02	0.02	67%	1	1	
	Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.02	0.02	0%	1		
	Perfluorononanoic acid (PFNA)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorodecanoic acid (PFDA)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorododecanoic acid (PFDoDA)	µg/L	0.02	<0.02	<0.02	0%	1		
	Perfluorotridecanoic acid (PFTriDA)	µg/L	0.02	<0.02	<0.02	0%	1		
Perfluoroalkyl Sulfonamides	Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	<0.05	<0.05	0%	1		
	Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.02	0%	1		
	N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	0%	1		
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	0%	1		
	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05	<0.05	<0.05	0%	1		
	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	0%	1		
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.02	0%	1		
(n:2) Fluorotelomer Sulfonic Acids	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.02	0%	1		
	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05	<0.05	<0.05	0%	1		
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05	<0.05	<0.05	0%	1		
	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05	<0.05	<0.05	0%	1		
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05	<0.05	<0.05	0%	1		
PFAS Sums	Sum of PFAS	µg/L	0.01	0.1	0.15	40%	1		
	Sum of PFHxS and PFOS	µg/L	0.01	<0.01	<0.01	0%	1		
	Sum of PFAS (WA DER List)	µg/L	0.01	0.1	0.15	40%	1		
Total Petroleum Hydrocarbons	C6 - C9 Fraction	µg/L	20	<20	<20	0%	1		
	C10 - C14 Fraction	µg/L	50	220	250	13%	1		
	C15 - C28 Fraction	µg/L	100	840	910	8%	1		
	C29 - C36 Fraction	µg/L	50	280	320	13%	1		
	C10 - C36 Fraction (sum)	µg/L	50	1340	1480	10%	1		
Total Recoverable Hydrocarbons - NEPM 2013 Fractions	C6 - C10 Fraction	µg/L	20	<20	<20	0%	1		
	C6 - C10 Fraction minus BTEX (F1)	µg/L	20	<20	<20	0%	1		
	>C10 - C16 Fraction	µg/L	100	320	340	6%	1		
	>C16 - C34 Fraction	µg/L	100	940	1030	9%	1		
	>C34 - C40 Fraction	µg/L	100	160	190	17%	1		
	>C10 - C40 Fraction (sum)	µg/L	100	1420	1560	9%	1		
	>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100	320	340	6%	1		

Parameter Suite	Analyte Name	Units	Batch	EM2206432	EM2206432	Relative Percentile Difference %	Pairs	Over 50%	Over 50% & > 10 x LOR
			Sample ID	MW5s	FD01				
			Sampling Date	7/04/2022	7/04/2022				
			Sampling Type	Primary	Duplicate				
BTEXN	LOR								
	Benzene	µg/L	1	<1	<1	0%	1		
	Toluene	µg/L	2	<2	<2	0%	1		
	Ethylbenzene	µg/L	2	<2	<2	0%	1		
	meta- & para-Xylene	µg/L	2	<2	<2	0%	1		
	ortho-Xylene	µg/L	2	<2	<2	0%	1		
	Total Xylenes	µg/L	2	<2	<2	0%	1		
	Sum of BTEX	µg/L	1	<1	<1	0%	1		
Phenolic Compounds	Naphthalene	µg/L	5	<5	<5	0%	1		
	Phenol	µg/L	1	<1.0	<1.2	0%	1		
	2-Chlorophenol	µg/L	1	<1.0	<1.2	0%	1		
	2-Methylphenol	µg/L	1	<1.0	<1.2	0%	1		
	3- & 4-Methylphenol	µg/L	2	<2.0	<2.4	0%	1		
	2-Nitrophenol	µg/L	1	<1.0	<1.2	0%	1		
	2,4-Dimethylphenol	µg/L	1	<1.0	<1.2	0%	1		
	2,4-Dichlorophenol	µg/L	1	<1.0	<1.2	0%	1		
	2,6-Dichlorophenol	µg/L	1	<1.0	<1.2	0%	1		
	4-Chloro-3-methylphenol	µg/L	1	<1.0	<1.2	0%	1		
	2,4,6-Trichlorophenol	µg/L	1	<1.0	<1.2	0%	1		
	2,4,5-Trichlorophenol	µg/L	1	<1.0	<1.2	0%	1		
	Pentachlorophenol	µg/L	2	<2.0	<2.4	0%	1		
Polynuclear Aromatic Hydrocarbons	Naphthalene	µg/L	1	<1.0	<1.0	0%	1		
	Acenaphthylene	µg/L	1	1.6	1.4	13%	1		
	Acenaphthene	µg/L	1	1.6	1.3	21%	1		
	Fluorene	µg/L	1	<1.0	<1.0	0%	1		
	Phenanthrene	µg/L	1	3.6	3.4	6%	1		
	Anthracene	µg/L	1	1.4	1.4	0%	1		
	Fluoranthene	µg/L	1	9.2	8.8	4%	1		
	Pyrene	µg/L	1	9.3	8.9	4%	1		
	Benz(a)anthracene	µg/L	1	3.4	3.1	9%	1		
	Chrysene	µg/L	1	3.5	3.2	9%	1		
	Benzo(b+j)fluoranthene	µg/L	1	3.7	3	21%	1		
	Benzo(k)fluoranthene	µg/L	1	3.3	3.1	6%	1		
	Benzo(a)pyrene	µg/L	0.5	4.7	4.1	14%	1		
	Indeno(1.2.3.cd)pyrene	µg/L	1	3.1	2.6	18%	1		
	Dibenz(a.h)anthracene	µg/L	1	<1.0	<1.0	0%	1		
	Benzo(g,h,i)perylene	µg/L	1	4	3.4	16%	1		
	Sum of polycyclic aromatic hydrocarbons	µg/L	0.5	52.4	47.7	9%	1		
	Benzo(a)pyrene TEQ (zero)	µg/L	0.5	6.1	5.3	14%	1		

Table F2 - Water Quality QA/QC Results (Rinsate Blank)
JN22377: Selfs Point CSA

			Batch	EM2206432
			Sample ID	RB01
			Sampling Date	7/04/2022
Parameter Suite	Analyte Name	Units	LOR	
Dissolved Metals	Arsenic	µg/L	1	<1
	Cadmium	µg/L	0.1	<0.1
	Chromium	µg/L	1	<1
	Copper	µg/L	1	<1
	Lead	µg/L	1	<1
	Nickel	µg/L	1	<1
	Zinc	µg/L	5	<5
	Mercury	µg/L	0.1	<0.1
Perfluoroalkyl Sulfonic Acids	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02	<0.02
	Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02	<0.02
	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01
	Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02	<0.02
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01
	Perfluorodecane sulfonic acid (PFDS)	µg/L	0.02	<0.02
Perfluoroalkyl Carboxylic Acids	Perfluorobutanoic acid (PFBA)	µg/L	0.1	<0.1
	Perfluoropentanoic acid (PFPeA)	µg/L	0.02	<0.02
	Perfluorohexanoic acid (PFHxA)	µg/L	0.02	<0.02
	Perfluoroheptanoic acid (PFHpA)	µg/L	0.02	<0.02
	Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01
	Perfluorononanoic acid (PFNA)	µg/L	0.02	<0.02
	Perfluorodecanoic acid (PFDA)	µg/L	0.02	<0.02
	Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	<0.02
	Perfluorododecanoic acid (PFDoDA)	µg/L	0.02	<0.02
	Perfluorotridecanoic acid (PFTTrDA)	µg/L	0.02	<0.02
	Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	<0.05
Perfluoroalkyl Sulfonamides	Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02
	N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05
	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05	<0.05
	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02
	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02
(n:2) Fluorotelomer Sulfonic Acids	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05	<0.05
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05	<0.05
	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05	<0.05
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05	<0.05
PFAS Sums	Sum of PFAS	µg/L	0.01	<0.01
	Sum of PFHxS and PFOS	µg/L	0.01	<0.01
	Sum of PFAS (WA DER List)	µg/L	0.01	<0.01
Total Petroleum Hydrocarbons	C6 - C9 Fraction	µg/L	20	<20
	C10 - C14 Fraction	µg/L	50	<50
	C15 - C28 Fraction	µg/L	100	<100
	C29 - C36 Fraction	µg/L	50	<50
	C10 - C36 Fraction (sum)	µg/L	50	<50
Total Recoverable Hydrocarbons - NEPM 2013 Fractions	C6 - C10 Fraction	µg/L	20	<20
	C6 - C10 Fraction minus BTEX (F1)	µg/L	20	<20
	>C10 - C16 Fraction	µg/L	100	<100
	>C16 - C34 Fraction	µg/L	100	<100
	>C34 - C40 Fraction	µg/L	100	<100
	>C10 - C40 Fraction (sum)	µg/L	100	<100
	>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100	<100

			Batch	EM2206432
			Sample ID	RB01
			Sampling Date	7/04/2022
Parameter Suite	Analyte Name	Units	LOR	
BTEXN	Benzene	µg/L	1	<1
	Toluene	µg/L	2	<2
	Ethylbenzene	µg/L	2	<2
	meta- & para-Xylene	µg/L	2	<2
	ortho-Xylene	µg/L	2	<2
	Total Xylenes	µg/L	2	<2
	Sum of BTEX	µg/L	1	<1
	Naphthalene	µg/L	5	<5
Phenolic Compounds	Phenol	µg/L	1	<1.0
	2-Chlorophenol	µg/L	1	<1.0
	2-Methylphenol	µg/L	1	<1.0
	3- & 4-Methylphenol	µg/L	2	<2.0
	2-Nitrophenol	µg/L	1	<1.0
	2,4-Dimethylphenol	µg/L	1	<1.0
	2,4-Dichlorophenol	µg/L	1	<1.0
	2,6-Dichlorophenol	µg/L	1	<1.0
	4-Chloro-3-methylphenol	µg/L	1	<1.0
	2,4,6-Trichlorophenol	µg/L	1	<1.0
	2,4,5-Trichlorophenol	µg/L	1	<1.0
	Pentachlorophenol	µg/L	2	<2.0
Polynuclear Aromatic Hydrocarbons	Naphthalene	µg/L	1	<1.0
	Acenaphthylene	µg/L	1	<1.0
	Acenaphthene	µg/L	1	<1.0
	Fluorene	µg/L	1	<1.0
	Phenanthrene	µg/L	1	<1.0
	Anthracene	µg/L	1	<1.0
	Fluoranthene	µg/L	1	<1.0
	Pyrene	µg/L	1	<1.0
	Benz(a)anthracene	µg/L	1	<1.0
	Chrysene	µg/L	1	<1.0
	Benzo(b+j)fluoranthene	µg/L	1	<1.0
	Benzo(k)fluoranthene	µg/L	1	<1.0
	Benzo(a)pyrene	µg/L	0.5	<0.5
	Indeno(1.2.3.cd)pyrene	µg/L	1	<1.0
	Dibenz(a,h)anthracene	µg/L	1	<1.0
	Benzo(g,h,i)perylene	µg/L	1	<1.0
	Sum of polycyclic aromatic hydrocarbons	µg/L	0.5	<0.5
	Benzo(a)pyrene TEQ (zero)	µg/L	0.5	<0.5