Appendix C

Contaminated Land and Acid Sulfate Soils Impact Assessment

MARINUS LINK

Marinus Link

Contaminated Land and Acid Sulfate Soils Impact Assessment – Heybridge Converter Station, Tasmania

Tetra Tech Coffey Pty Ltd

20 November 2024

Reference: 754-MELEN215878ML_Sub_CSASS-Tas_R01

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20 November 2024

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Certified Environmental Practitioner (Site Contamination) report verification

I have reviewed and can confirm that all works and actions conducted to support this environmental assessment have been undertaken in general accordance with the National Environment Protection (Assessment of Site Contamination) Measure, 1999 as amended 2013, except where noted in this report.

Bryden Tiddy

Principal Environmental Scientist

Restriction on Disclosure and Use of Data

Statement of Limitations for the Contaminated Land and Acid Sulfate Soils Assessment of the Marinus Link project (Heybridge Converter Station) is provided in Appendix A.

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EXECUTIVE SUMMARY

Marinus Link Pty Ltd (MLPL) contracted Tetra Tech Coffey Pty Ltd (Tetra Tech Coffey) to conduct an environmental impact assessment for Marinus Link, the proposed construction of a high-voltage direct current electricity interconnector between Tasmania and Victoria. This report presents the assessment of the Tasmanian component of Marinus Link, covering the Heybridge converter station and shore crossing area (to a distance of 3 nautical miles).

The objective of this assessment was to identify the potential for contamination and/or acid sulfate soils (ASS) to be present at the study area and to assess the risks and residual impacts to the environment and human health posed by the potential contamination. This assessment included a review of previous site investigations and publicly available information, as well as sampling and analysis of soil and surface water within the study area for contaminants of potential concern that may potentially cause impacts to human health or the environment.

This contaminated land and ASS impact assessment identified four potential hazards with a low to high risk of causing impacts to the environment without the application of additional controls (including three potential hazards to the environment arising from contamination) including:

1. Management of excavated soils – including contaminated soils and asbestos (moderate risk),
2. ASS (moderate risk), and
3. Management of routine construction and operational impacts (low risk).

Management and mitigation measures have been developed for each of the identified potential environmental hazards, detailing the measures to be applied to manage potential impacts to the environment through construction and operation of Marinus Link. These management and mitigation measures are considered appropriate for the purposes of managing the potential risks to human health or the environment, in accordance with the environmental values to be protected for ambient air, land and water should they be implemented appropriately. With the implementation of the following areas for environmental management, the risk of impacts to human health and environment is reduced to Moderate to Very low:

- Manage excavated soils: Develop a contaminated land management plan that includes testing soils prior to excavation to confirm their contamination status and how to manage them (disposal, remediation etc) to mitigate potential impacts to environment (CL01. This also includes specific assessment for asbestos and ASS in soils and details how they will be managed. This reduces the risk of impact to the environment from moderate to low.
- ASS: Develop an ASS management controls (as a part of the contaminated land management plan) that includes requirements to test the soils at the site to confirm the extent of ASS to be disturbed, and how to manage potential impacts to the environment such as via acid neutralisation, avoidance or limiting groundwater dewatering (CL02). This reduces the risk of impact to the environment from moderate to low.
- Manage routine construction and operational impacts: Develop an environmental management plan for construction and operation phases to manage potential risks from construction activities (CL04). This reduces the risk of impact to the environment from low to very low.

The assessment of potential impacts to the environment proposed by the project have the potential to cause potentially unacceptable impacts to human health or the environment. However, the application of the management and mitigation measures, are considered to reduce the potential impacts to the environment to acceptable levels and would ensure that the site is acceptable for commercial or industrial land uses (as defined in the NEPM).

ACRONYMS AND ABBREVIATIONS

Acronyms/ Abbreviations	Definition	Acronyms/ Abbreviations	Definition
ACM	Asbestos Containing Material	HVAC	High Voltage Alternative Current
ADWG	Australian Drinking Water Guidelines	HVDC	High-Voltage Direct Current
AFFF	Aqueous Film-Forming Foam	LOR	Limit Of Reporting
AHD	Australian Height Datum	km	Kilometres
ANZG	Australian And New Zealand Guidelines for Fresh And Marine Water Quality	kV	Kilovolt
AS	Australian Standard	Lo	Oonah (Burnie) Formation
ASRIS	Australian Soil Resource Information System	Lob	Oonah Formation
ASS	Acid Sulfate Soils	MLPL	Marinus Link Pty Ltd
BTEXN	benzene, toluene, ethylbenzene, xylene and naphthalene	MW	Megawatt
CEC	Cation exchange capacity	NATA	National Association of Testing Authorities
CEMP	Construction Environmental Management Plan	NEM	National Electricity Market
COPC	Contaminants Of Potential Concern	NEMP	National Environmental Management Plan
CSM	Conceptual Site Model	NEPC	National Environment Protection Council
CrS	Chromium Reducible Suite	NEPM (ASC)	National Environment Protection (Assessment of Site Contamination) Measure 1999 (As Amended In 2013)
Cwlth	Commonwealth of Australia	NOA	Naturally occurring asbestos
DCCEEW	Department of Climate Change, Energy, Environment and Water	NZS	New Zealand Standard
DEWLP	Department of Environment, Water, Land and Planning	NHMRC	National Health and Medical Research Council
DGV	Default guideline value	nSv/hr	NanoSievert per hour
DPIPWE	Department of Primary Industries, Parks, Water and the Environment	NOA	Naturally Occurring Asbestos
DTP	Department of Transport and Planning	NWTD	North West Transmission Developments
EC	Electrical Conductivity	NORM	Naturally Occurring Radioactive Material

Acronyms/ Abbreviations	Definition	Acronyms/ Abbreviations	Definition
EPBC Act	Environment Protection and Biodiversity Conservation Act	OC	Organic Carbon
EIL	Ecological Investigation Level	OCP	Organochlorine Pesticides
EEA	Environment Effects Act	OPP	Organophosphate Pesticides
EES	Environment Effects Statement	PAH	polycyclic aromatic hydrocarbons
EIS	Environmental Impact Statement	PCB	Polychlorinated biphenyls
EMPCA	Environmental Management and Pollution Control Act	PEV	Protected Environmental Value
EP Act	Environment Protection Act	PFAS	Per- and Poly- fluoroalkyl Substances
EPA	Environmental Protection Authority	PPE	Personal Protective Equipment
ERS	Environment Reference Standard	QA	Quality Assurance
ESL	Ecological Screening Level	QC	Quality Control
FSANZ	Food Services Australia and New Zealand	Qhbd	Cenozoic Cover Sequences
GED	General Environmental Duty	Qhwr	Quaternary Deposits - Littoral
HDD	Horizontal Directional Drilling	Qpsa	Quaternary Deposits - Aeolian
GV-high	Guideline Value - high	SPOCAS	Suspension Peroxide Oxidation Combined Acidity Sulfur
HIL	Health Investigation Level	TRH	Total Recoverable Hydrocarbons
HSL	Health Screening Level	TDS	Total Dissolved Solids

1. INTRODUCTION

The proposed Marinus Link (the project) comprises a high voltage direct current (HVDC) electricity interconnector between Tasmania and Victoria, to allow for the continued trading and distribution of electricity within the National Electricity Market (NEM).

The project was referred to the Australian Minister for the Environment 5 October 2021. On 4 November 2021, a delegate of the Minister for the Environment determined that the proposed action is a controlled action as it has the potential to have a significant impact on the environment and requires assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) before it can proceed. The delegate determined that the appropriate level of assessment under the EPBC Act is an environmental impact statement (EIS).

In July 2022 a delegate of the Director of the Environment Protection Authority Tasmania determined that the project be subject to environmental impact assessment by the Board of the Environment Protection Authority (the Board) under the Environmental Management and Pollution Control Act 1994 (Tas) (EMPCA).

On 12 December 2021, the former Victorian Minister for Planning under the Environment Effects Act 1978 (Vic) (EE Act) determined that the project requires an environment effects statement (EES) under the EE Act, to describe the project's effects on the environment to inform statutory decision making.

As the project is proposed to be located within three jurisdictions, the Tasmanian Environment Protection Authority (Tasmanian EPA), Victorian Department of Transport and Planning (DTP), and Australian Department of Climate Change, Energy, Environment and Water (DCCEEW) have agreed to coordinate the administration and documentation of the three assessment processes. Two EISs are being prepared to address the Tasmanian EPA requirements for the Heybridge converter station and shore crossing. A separate EIS/EES is being prepared to address the requirements of DTP and DCCEEW.

This report has been prepared for the Tasmanian jurisdiction as part of the two EISs being prepared for the project.

1.1 PURPOSE OF THIS REPORT

This study presents the results of the investigation into the potential for contamination and acid sulfate soil (ASS) to be present within the Tasmanian component of the project area.

The purpose of the study was to:

- Address the evaluation objectives outlined in the separate EIS guidelines prepared by the Tasmanian EPA and DCCEEW
- Investigate the potential for contamination and ASS to be present within the study area;
- Where potential contamination or ASS was identified, complete an appraisal of the risks to human health or the environment that may be posed by the potential contamination or ASS for the construction, operation and decommissioning of project infrastructure;
- Develop mitigation measures for the project to avoid or manage project risks and impacts; and,
- Evaluate residual risks and impacts of the project once mitigation has been implemented.

1.2 PROJECT OVERVIEW

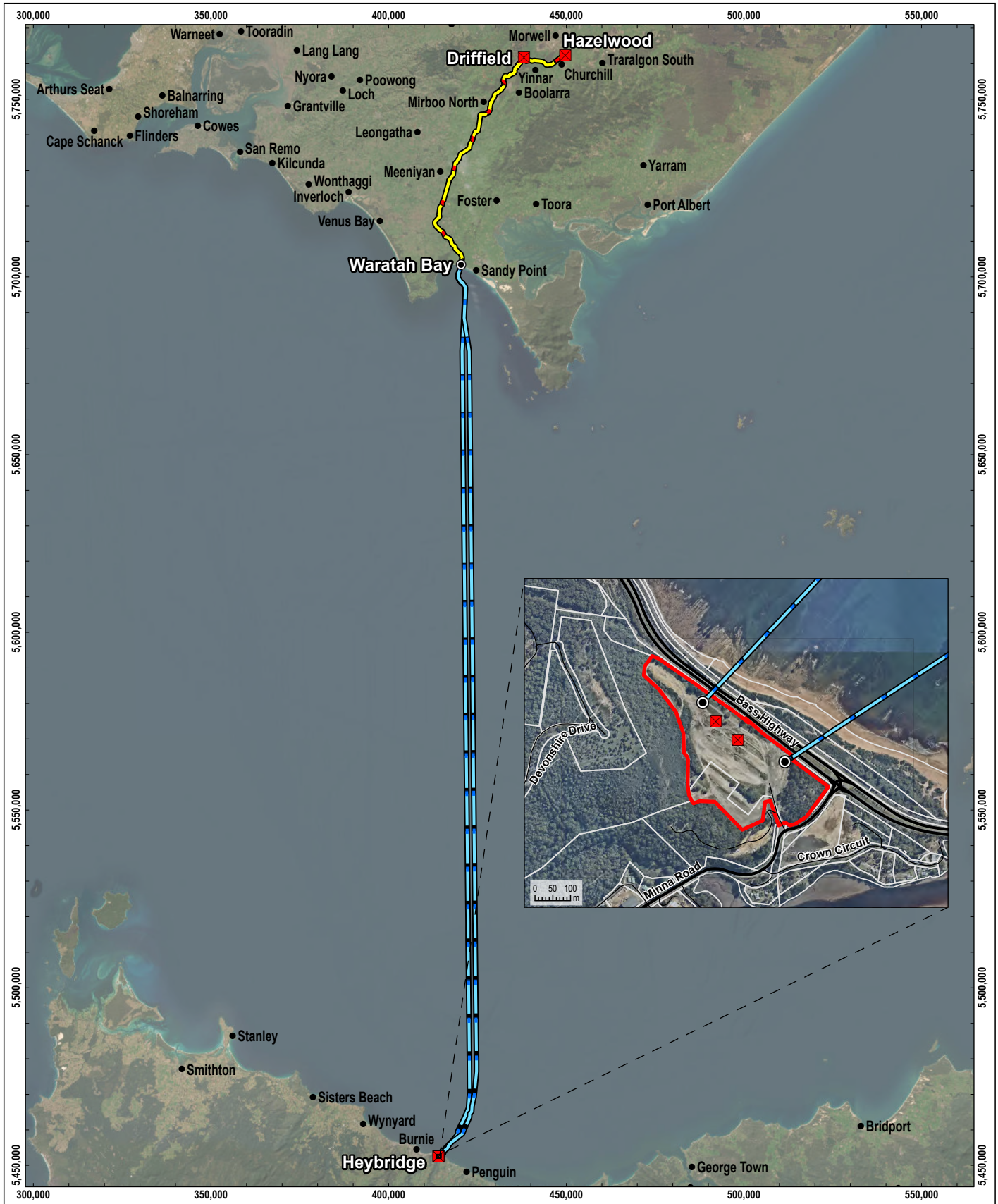
The project is a proposed 1500-megawatt (MW) HVDC electricity interconnector between Heybridge in northwest Tasmania and the Latrobe Valley in Victoria (Figure 1). The project is proposed to provide a second link between the Tasmanian renewable energy resources and the Victorian electricity grids enabling efficient energy trade, transmission and distribution from a diverse range of generation sources to where it is most needed and will increase energy capacity and security across the NEM.

Marinus Link Pty Ltd (MLPL) is the proponent for the project and is a wholly owned subsidiary of Tasmanian Networks Pty Ltd (TasNetworks). TasNetworks is owned by the State of Tasmania and owns, operates and maintains the electricity transmission and distribution network in Tasmania.

Tasmania has significant renewable energy resource potential, particularly hydroelectric power and wind energy. The potential size of the resource exceeds both the Tasmanian demand and the capacity of the existing Basslink interconnector between Tasmania and Victoria. The growth in renewable energy generation in mainland states and territories participating in the NEM, coupled with the retiring of baseload coal-fired generators, is reducing the availability of dispatchable generation that is available on demand.

Tasmania's existing and potential renewable resources are a valuable source of dispatchable generation that could benefit electricity supply in the NEM. The project will allow for the continued trading, transmission and distribution of electricity within the NEM. It will also manage the risk to Tasmania of a single interconnector across Bass Strait and complement existing and future interconnectors on mainland Australia. The project is expected to facilitate the reduction in greenhouse gas emissions at a state and national level.

Interconnectors are a key feature of the future energy landscape. They allow power to flow between different regions to enable the efficient transfer of electricity from renewable energy zones to where the electricity is needed. Interconnectors can increase the resilience of the NEM and make energy more secure, affordable and sustainable for customers. Interconnectors are common around the world including in Australia. They play a critical role in supporting Australia's transition to a clean energy future.



LEGEND

- Landfall
- Converter station

Proposed route

- HVDC subsea cable
- Underground HVDC cable
- Heybridge converter station site boundary

MARINUS LINK

N

0 15 30 km

SCALE **1:1,500,000**
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PROJECTION: **GDA2020 MGA Zone 55**

SOURCE
Proposed route from Tetra Tech Coffey.
Imagery from ESRI Online.

MARINUS LINK PTY LTD

MARINUS LINK
CSASS TASMANIA

FIGURE 1

General site figure

TETRA TECH COFFEY

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1.3 ASSESSMENT CONTEXT

Land can be contaminated from anthropogenic activities or naturally occurring due to potential ASS.

Disturbance of contaminated land due to project activities has the potential to pose risks to the environment and human health during construction/operational maintenance, or through unsuitable conditions for the proposed project land-use. Disturbance of existing contamination may lead to:

- Health risks to workers or site users/occupiers;
- Impacts to ecological receptors;
- Risk to the integrity of structures;
- Lead to pollution events if disturbance increases contamination runoff or leaching to groundwater.

ASS or acid sulfate rock are characterised as containing metal sulfide minerals that oxidise when exposed to air and can result in the release of sulfuric acid in runoff from the soil/rock or acidification of groundwater. The acidic conditions can cause corrosion of metal and concrete that is in direct contact with the acidic soil or water. The acid can also cause direct harm to terrestrial or aquatic flora or fauna via low pH and acid scalding, as well as contribute to the release of metals at concentrations that may be toxic to plants and aquatic animals. The generation of ASS can be attributed to development activities including excavation of large volumes of soil, extracting or lowering groundwater, coastal or inshore dredging and filling land over potential ASS.

This assessment provides an overview of the portions of the study area considered to have an increased risk of encountering contamination, wastes or potential ASS that may be disturbed by the project. The report discusses the risks and residual impacts to the project and relevant receptors to inform the development of management and mitigation measures to avoid or reduce or manage risks and impacts.

2. ASSESSMENT GUIDELINES

This section outlines the assessment guidelines relevant to contaminated land and ASS and the linkages to other technical assessments completed for the project. Two EISs are being prepared to address the EIS guidelines published by EPA Tasmania for the converter station and shore crossing.

2.1 EPA TASMANIA GUIDELINES

EPA Tasmania have published two sets of guidelines (September 2022) for the preparation of an EIS for the project converter station and shore crossing. A separate set of guidelines have been prepared for each of these project components.

- *Environmental Impact Statement Guidelines Marinus Link Pty Ltd Converter Station for Marinus Link*, September 2022, Environment Protection Authority Tasmania (Tas converter station EIS guidelines)
- *Environmental Impact Statement Guidelines Marinus Link Pty Ltd Shore Crossing for Marinus Link*, September 2022, Environment Protection Authority Tasmania (Tas shore crossing EIS guidelines)

Table 2-1 summarises the relevant sections of the EIS assessment guidelines being addressed as part of this assessment.

Table 2-1: Tasmanian EIS Assessment guidelines addressed

Converter station	Shore Crossing	Report Section
S 5.2 A description of the general physical characteristics of the site/route and surrounding area, including topography, local climate, geology, geomorphology, soils (including erodibility and acid sulfate soils), vegetation, fauna, groundwater and surface drainage (including waterways, lakes, wetlands, coastal areas etc).	S 9.2 A description of the general physical characteristics of the site/route and surrounding area, including topography, local climate, geology, geomorphology, soils (including erodibility, potential contamination, and acid sulfate soils), vegetation, fauna, groundwater and surface drainage (including waterways, lakes, wetlands, coastal areas etc), and seabed characteristics.	Section 6
S 6.1 Potentially contaminated material.	S 10.2 Potentially contaminated material and ASS.	Section 8
S 6.2 Terrestrial natural values.	S 10.1 Terrestrial natural values	Section 8
S 6.4 Water quality (surface and groundwater)	S 10.5 Water quality (surface and groundwater)	Section 8
-	S 10.3 Marine natural values	Section 8
-	S 10.4 Marine water quality	Section 8
S 6.5 Air Quality	-	Section 8
S 6.6 Waste Management	S 10.8 Waste Management	Section 8

2.2 LINKAGES TO OTHER TECHNICAL STUDIES

This report is informed by or informs other Tasmanian technical assessments outlined in Table 2-2.

Table 2-2: Technical studies

Technical study	Relevance to this assessment
Heybridge Groundwater impact assessment (Tetra Tech Coffey, 2024)	Provided the hydrogeological setting for baseline characterisation
Tasmania surface water impact assessment (Alluvium, 2024)	Provided the hydrology setting for baseline characterisation
Terrestrial geomorphology & soils (Environmental GeoSurveys, 2024)	Provided the geomorphology and geological setting for baseline characterisation
Marine Ecology and Resource Use Impact Assessment (EnviroGulf, 2024)	Assessed the potential impacts from contaminated seabed sediment disturbance and included controls for managing impacts.

3. LEGISLATION, POLICY AND GUIDELINES

3.1 ENVIRONMENTAL MANAGEMENT AND POLLUTION CONTROL ACT 1994

The responsibility for the management of contaminated land is shared by the Tasmanian EPA and local Councils under EMPCA.

If a site poses a known or potential unacceptable risk to human health and/or the environment, or environmental harm is likely to occur, the Director of EPA may issue a Part 5A Notice (an investigation notice, a remediation notice, a site management notice or an environment protection notice) on a person(s), which can include an individual or a company.

3.2 NATIONAL ENVIRONMENT PROTECTION (ASSESSMENT OF SITE CONTAMINATION) MEASURE

National Environment Protection Measures (NEPMs) are statutory instruments that specify national standards for a variety of environmental issues. In Tasmania, the *National Environment Protection Council (Tasmania) Act* 1995 references the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (amended 2013).

In Tasmania, NEPMs are State Policies in accordance with section 12A of the *State Policies and Projects Act 1993*.

3.3 STATE POLICY ON WATER QUALITY MANAGEMENT (1997)

The State Policy on Water Quality Management (1997) provides a framework to manage water quality for all Tasmanian surface waters. Section 7.1 of the policy states that *"Water quality objectives may be set for surface waters and groundwaters in Tasmania by determining which of the following protected environmental values (PEVs) should apply to each body of water"*:

- A – Protection of aquatic ecosystems
- B – Recreational water quality and aesthetics
- C – Raw water for town drinking water supply
- D – Raw water for homestead supply
- E – Agricultural water uses (including irrigation, stock watering)
- F – Industrial water supply

The policy requires that PEVs be set for all Tasmanian surface waters. The policy also sets PEVs for groundwater based on those values that are likely to be possible based on the reported level of total dissolved solids (TDS).

This study does not include the investigation of groundwater but considers the potential for contamination of the land (natural or anthropogenic) that may impact on surface water or groundwater quality at or near the study area.

The policy also includes guidance on the management of contamination in Tasmania. It states that:

> "*Where a point source of pollution might cause environmental nuisance or material or serious environmental harm, limits should be set on the permissible concentrations and/or loads of pollutants which may be present in discharges to waters from point sources of pollution, and these limits be implemented through permits, authorisations, economic measures, or other instruments as appropriate*." (Clause 16.1)

"*Emissions from diffuse sources of pollution should be reduced and managed through the development and implementation of best practice environmental management, and so as not to prejudice the achievement of water quality objectives*" (Clause 30.1)

3.4 ACID SULFATE SOILS AND ROCK

There is no specific acid sulfate legislation in Tasmania. However, control of related impacts may come under the "general environmental duty" section of EMPCA, where: "A person must take such steps as are practicable or reasonable to prevent or minimise environmental harm or environmental nuisance caused, or likely to be caused, by an activity conducted by that person."

The *State Coastal Policy 1996 (as amended 2009)* also may cover acid sulfate management, as it aims to protect the intrinsic value of coastal areas and support sustainable use of coastal areas.

The Department of Primary Industries, Parks, Water and the Environment (DPIPWE) *Tasmanian Acid Sulfate Soil Management Guidelines* (DPIPWE 2009) present the recommended approach to assessment and management for ASS in Tasmania.

4. PROJECT DESCRIPTION

4.1 OVERVIEW

The project is proposed to be implemented as two 750 MW circuits to meet transmission network operation requirements in Tasmania and Victoria. Each 750 MW circuit will comprise two power cables and a fibre-optic communications cable bundled together in Bass Strait and laid in a horizontal arrangement on land. The two 750MW circuits will be installed in two stages with the western circuit being laid first as part of stage one, and the easter cable in stage two.

The key project components for each 750 MW circuit are, from south to north are:

- HVAC switching station and HVAC-HVDC converter station at Heybridge in Tasmania. This is where the project will connect to the North West Tasmania transmission network being augmented and upgraded by the North West Transmission Developments (NWTD).
- Shore crossing in Tasmania adjacent to the converter station.
- Subsea cable across Bass Strait from Heybridge in Tasmania to Waratah Bay in Victoria.

In Tasmania, a converter station is proposed to be located at Heybridge near Burnie. The converter station will facilitate the connection of the project to the Tasmanian transmission network. There will be two subsea cable landfalls at Heybridge with the cables extending from the converter station across the Bass Strait to Waratah Bay in Victoria. The preferred option for shore crossings is horizontal directional drilling (HDD) to about 10 m water depth where the cables will then be trenched, where geotechnical conditions permit.

Approximately 255 kilometres (km) of subsea HVDC cable will be laid across Bass Strait. The preferred technology for the project is two 750 megawatt (MW) symmetrical monopoles using ±320 kV, cross-linked polyethylene insulated cables and voltage source converter technology. Each symmetrical monopole is proposed to comprise two identical size power cables and a fibre-optic communications cable bundled together. The cable bundles for each circuit will transition from approximately 300 m apart at the HDD exit to 2 km apart in nearshore (Tasmanian coastal waters).

This assessment is focused on the Tasmanian terrestrial and shore crossing section of the project. This report will inform the two EISs being prepared to assess the project's potential environmental effects in accordance with the legislative requirements of the Tasmanian government (Figure 2).

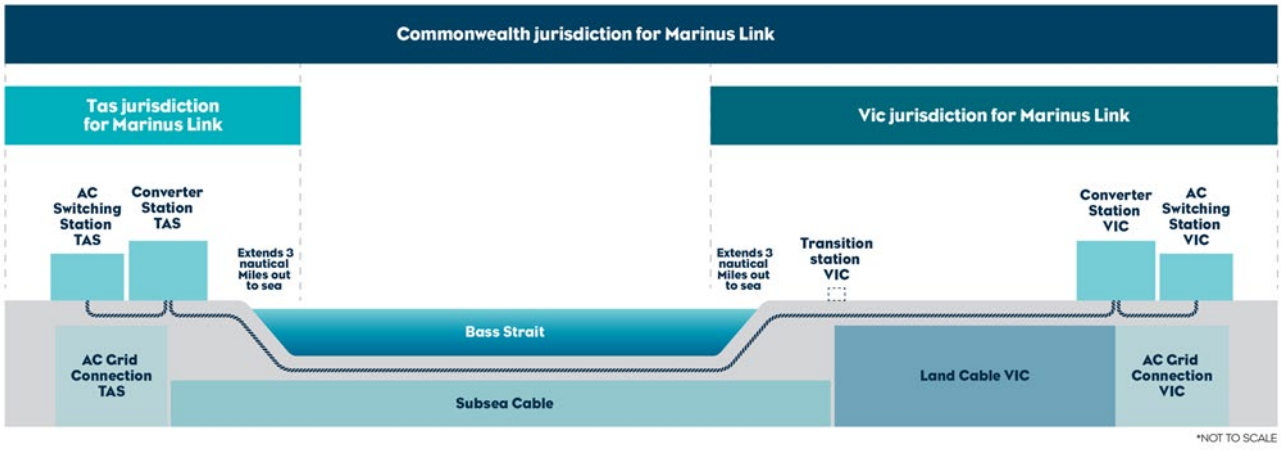


Figure 2: Project components considered under applicable jurisdictions (Marinus Link Pty Ltd 2022).

The project is proposed to be constructed in two stages over approximately five years following the award of works contracts to construct the project. On this basis, stage 1 of the project is expected to be operational by 2030, with Stage 2 to follow, with final timing to be determined by market demand. The project will be designed for an operational life of at least 40 years.

4.2 CONSTRUCTION

A description of elements of the project during the construction phase that have the potential to impact on environmental values considered within this impact assessment are summarised below.

- **Shore crossing** – horizontal directional drilling (HDD)
- **Converter station** – site preparation, earthworks and civil works

These activities can impact on environmental values through mechanisms such as:

- Localised leaks of oils, fuels and chemicals from plant and equipment on site such as containers, batteries, vehicles, underground services or tanks (i.e., fuel or septic) that may present a risk to human health, ecological receptors (terrestrial flora or fauna), or an aesthetic impairment, causing degradation of environment.
- Areas of contamination/ wastes (natural or anthropogenic) uncovered during project development that result in exposure to human or ecological receptors and result in health effects or ecological damage.
- Disturbance of potential ASS that may cause degradation to flora and/or fauna due to acidic runoff.
- Removal of contaminated infrastructure that results in impacts to ecological or human receptors.

4.3 OPERATION

Ground-disturbing works are not anticipated during the standard operation of the project infrastructure. The following operational project activities have been considered:

- Accidental spills and leaks of transformer oil, battery fluids, and diesel fuel stored in above ground tanks.
- Accidental spills of fuels, oils or chemicals onsite during maintenance activities.

4.4 DECOMISSIONING

The operational lifespan of the project is a minimum 40 years. At this time the project will be either decommissioned or upgraded to extend its operational lifespan.

Decommissioning will be planned and carried out in accordance with regulatory requirements at the time. A decommissioning plan in accordance with approvals conditions will be prepared prior to planned end of service and decommissioning of the project.

Requirements at the time will determine the scope of decommissioning activities and impacts. The key objective of decommissioning is to leave a safe, stable and non-polluting environment.

In the event that the project is decommissioned, all above-ground infrastructure will be removed, the site rehabilitated.

Decommissioning activities required to meet the objective will include, as a minimum, removal of above ground buildings and structures. Remediation of any contamination and reinstatement and rehabilitation of the site will be undertaken to provide a self-supporting landform suitable for the end land use, which is assumed to be industrial land.

Decommissioning and demolition of project infrastructure will implement the waste management hierarchy principles being avoid, minimise, reuse, recycle and appropriately dispose. Waste management will accord with applicable legislation at the time.

Decommissioning activities may include recovery of land and subsea cables. The conduits and shore crossing ducts will be left in-situ as removal may cause significant environmental impact. Subsea cables will be recovered by water jetting or removal of rock mattresses or armouring to free the cables from the seabed.

A decommissioning plan will be prepared to outline how activities will be undertaken, and potential impacts managed.

5. ASSESSMENT METHOD

5.1 STUDY AREA

The study area is located in Heybridge, Tasmania, (as displayed in Figure 3) and is the planned location of a converter station and switching station that will allow the connection of the project subsea cable to the Tasmanian transmission network. The study area also includes the shore-crossing and areas where cable conduits will be installed via HDD boring to a distance of 3 nautical miles off-shore.

The Heybridge converter station site is the former site of a Tioxide factory that ceased operation in 1996, with associated infrastructure being demolished in 1998. The history of the site is detailed in section 6.5.1.

5.2 ASSESSMENT OBJECTIVES

The objectives of the contaminated land and ASS study for the project in Tasmania are to:

- Identify areas of contaminated land or ASS within the study area (including offshore areas where contaminated sediments may be present).
- Assess potential impacts from construction, operation and decommissioning of the project related to contaminated land or ASS and identify management and mitigations measures and potential avoidance or management measures.
- Outline of future management plan requirements (e.g., CEMP or ASS management plan).
- Perform a preliminary waste classification.
- Address the contaminated land code of the Tasmanian Planning Scheme.

5.3 SCOPE OF WORK

To meet the objectives of the assessment, the following scope of works was completed to inform this assessment.

5.3.1 Desktop assessment

The desktop assessment included review of publicly available information (including aerial photographs, maps, plans, registers and other information) to establish the potential sources of contamination within the study area.

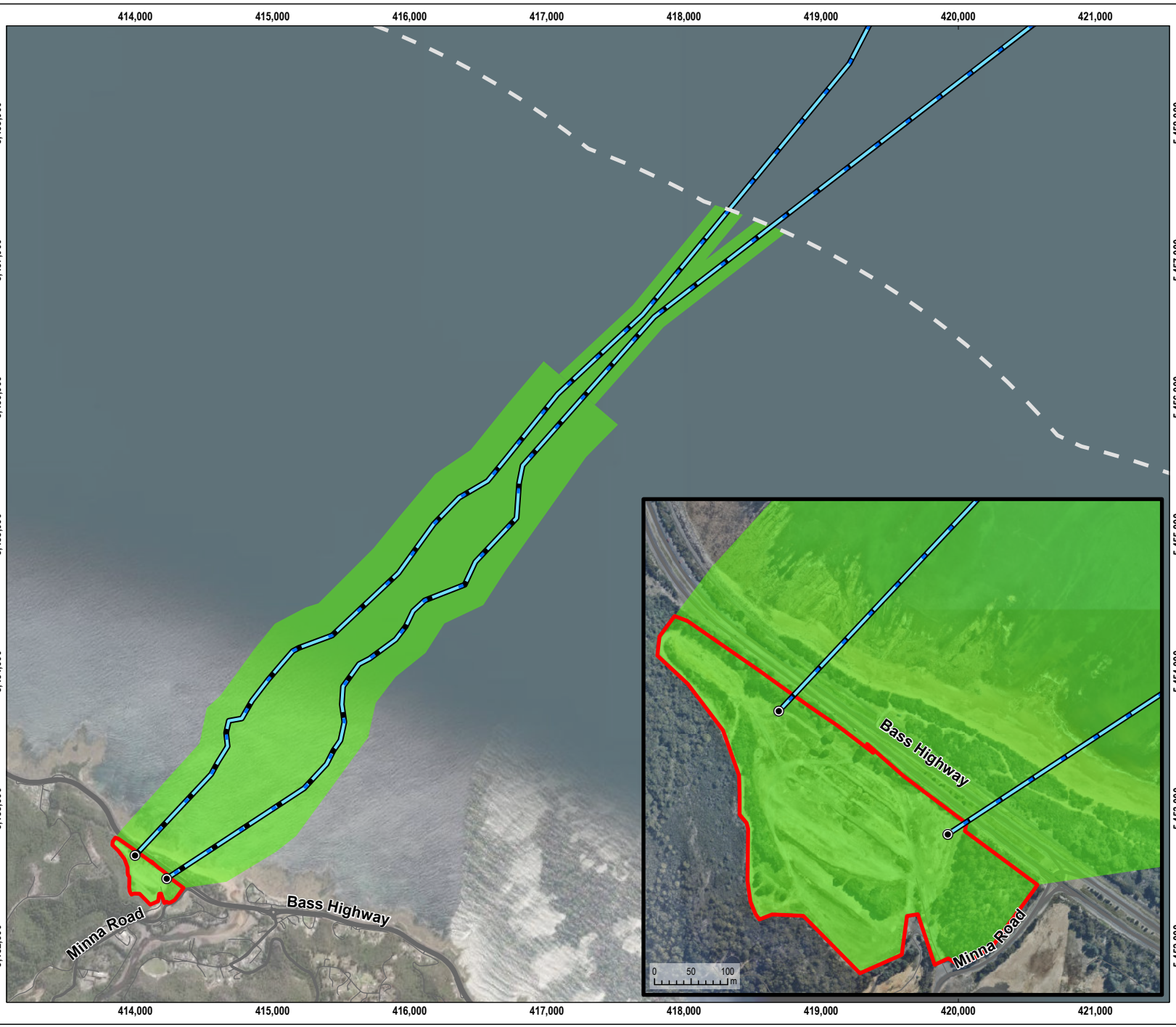
Identification of portions of the study area with a potential of either natural or anthropogenically sourced contamination to be present.

Several reports have been prepared for the study area that provide details as to the nature and extent of contamination and ASS and were reviewed in the preparation of this report. The reports reviewed included:

- WCC (2007a) Site Contamination Assessment, Former Tioxide Factory site, Heybridge (the “Front site”), William C. Cromer, 6 June 2007
- WCC (2007b) Follow-up Site Contamination Assessment, Bullant Ridge, at the former Tioxide Factory site, Heybridge, William C. Cromer, 14 July 2007
- ES&D (2020) Due Diligence, Former Tioxide factory site – Heybridge, V4, Environmental Service & Design, 30 October 2020

- pitt&sherry (2007a) Former Tioxide Australia Pty Ltd, Ocean Outfall Tunnel Assessment Report, pitt&sherry, August 2007
- Synnot & Wilkinson (1996a) Tioxide Australia Soil Contamination Assessment Report, Burnie, Tasmania, May 1996
- Synnot & Wilkinson (1996b) Tioxide Australia, Draft 2, Environmental Decommissioning and Rehabilitation Plan, May 1996
- Synnot & Wilkinson (1997) Tioxide Australia Pty Ltd, 1996 Marine Survey Report, September 1997
- pitt&sherry (2020) Heybridge Converter Station, Environmental Review of Due Diligence Report, Rev A, pitt&sherry, 16 November 2020
- SA Radiation (2020) Heybridge Tioxide Site Radiation Survey, SA Radiation, 1 December 2020
- GBG (2022) Project Marinus – Heybridge Land Remediation Geophysical Investigation, GBG Group, 15 March 2022
- Jacobs (2022a) Ground Conditions Factual Report, Project Marinus – Heybridge Converter Station Ground Investigation, Rev A, Jacobs, 1 April 2022
- Jacobs (2022b) Heybridge Converter Station – Geotechnical Interpretive Report, Project Marinus – Heybridge Converter Station Geotechnical Site Investigation, Rev A, Jacobs, 24 May 2022)
- Tetra Tech Coffey (2022) Marinus Link, Tioxide sediment analysis report, Rev A, Tetra Tech Coffey, 28 July 2022
- IPM (2022) Marinus Link, Marinus Link Development Site, Bass Highway, Heybridge, TAS 7316 Site Surface Asbestos Inspection Report, IPM Consulting Services, October 2022
- pitt&sherry (2022) Marinus Link – Contamination and Acid Sulfate Soils Desktop Review Findings for the Tasmanian Component, dated 19 December 2022
- Marine Solutions (2024) HVDC Cable Crossing of Tioxide Outfall, Summary of Works, August 2024.

The details of the review of these reports are provided in Appendix B, and the summary of the findings of the review provided in Section 6.5. The information from these reports was utilised to identify the potential sources (including the nature and extent) of contamination within the study area and identify areas where additional sampling and analysis was required in order to inform the risk assessment for the study.



MARINUS LINK

LEGEND

- Landfall

Proposed route

- HVDC subsea cable
- Heybridge converter station site boundary
- Survey area
- Major road
- Minor road
- Limit of State Coastal Waters (3nm)

Source:
Routes from Tetra Tech Coffey.
Roads and watercourses from DPIPWE.
Limit of Coastal Waters from Geoscience Australia.
Imagery from NearMap (8 March 2022) & ESRI Online.

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PROJECTION: **GDA2020 MGA Zone 55**

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MARINUS LINK HEYBRIDGE
GROUNDWATER IMPACT ASSESSMENT REPORT

FIGURE 3

Study Area

TETRA TECH COFFEY

DATE: **26.04.23** PROJECT: **754-MELEN215878ML** FILE: **215878ML_CSASS_TAS_F002_GIS**

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5.3.2 Targeted study area assessment

As several areas of potential contamination were identified that had not been assessed, targeted assessment of specific sources of contamination was undertaken within the Heybridge converter station site. The works included:

- Completion of a site walkover of the targeted areas to visually confirm the potential presence or absence of contamination or contaminating activities where access was available.
- Targeted soil assessment of areas that had not previously been investigated and had a potential to contain contamination or ASS that may either cause an impact if disturbed or may require additional management during construction including the collection and analysis of soil samples for contamination and ASS analysis.
- Targeted surface water sampling from onsite stormwater detention ponds and drains.

5.3.3 Risk assessment

On completion of the desktop and targeted study area assessments the following scope of works was completed:

- Review of the outcomes of the baseline assessment to verify appropriate interpretation of the desktop and field data and its alignment with regulatory guidance.
- Preparation of a conceptual site model (CSM) to identify the nature and extent of contamination and ASS within the study area (the sources of contamination), the potential receptors that may be exposed to or impacted by disturbance of the contamination/ASS, and the pathways by which receptors may be exposed. Where a pathway for exposure is not present, the potential for impacts to receptors does not exist. The CSM has been prepared in accordance with guidance in the NEPM and is an important step in characterising the potential for contamination/ASS to impact on receptors as it identifies the exposure pathways which are present and guides the development of potential management and mitigation measures that generally either:
  - interrupt or minimise the exposure pathway,
  - remove the source; or
  - remove the receptor (where this is practicable).

  Further discussion of the CSM is provided in Section 6.6.5.
- Assessment of potential risks to the environment values (human and ecological receptors) from existing contamination (natural or anthropogenic) identified within the study area, including potential risks that may arise during construction, operation and decommissioning of the project.
- Identification of management and mitigation measures to reduce the potential risks to the environment from any potential contamination identified by the assessment.

5.3.4 Cumulative impact assessment

The EIS guidelines includes requirements for the assessment of cumulative impacts. Cumulative impacts result from incremental impacts caused by multiple projects occurring at similar times and within proximity to each other.

To identify possible projects that could result in cumulative impacts, the International Finance Corporation (IFC) guidelines on cumulative impacts have been adopted. The IFC guidelines (IFC, 2013) define cumulative impacts as those that ‘result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones.’

The approach for identifying projects for assessment of cumulative impacts considers:

- Temporal boundary: the timing of the relative construction, operation and decommissioning of other existing developments and/or approved developments that coincides (partially or entirely) with Marinus Link.
- Spatial boundary: the location, scale and nature of the other approved or committed projects expected to occur in the same area of influence as Marinus Link. The area of influence is defined as the spatial extent of the impacts a project is expected to have.

Proposed and reasonably foreseeable projects were identified based on their potential to credibly contribute to cumulative impacts due to their temporal and spatial boundaries. Projects were identified based on publicly available information at the time of assessment. The projects considered for cumulative impact assessment across Tasmania and in Bass Strait are summarised in the below table.

Table 5-1: Summary of potential cumulative impact assessment projects

Project	Distance from site
North West Transmission Developments (NWTD)	Adjoins Heybridge site to the south and extends over 100 km to the southeast and southwest of the site.
Robbins Island Renewable Energy Park	Approximately 90 km to the west
Jim's Plain Renewable Energy Park	Approximately 85 km to the west
Robbins Island Road to Hampshire Transmission Line	Approximately 25 km to the south and west
Bass Highway upgrades between Deloraine and Devonport	Approximately 35km to the east
Bass Highway upgrades between Cooee and Wynard	Approximately 10 km to the west
Hellyer Windfarm	Approximately 50 km to the west
Table Cape Luxury Resort	Approximately 24 km to the west
Youngmans Road Quarry	Approximately 45 km to the south-east
Port Latta Windfarm	Approximately 55 km to the west
Port of Burnie Shiploader Upgrade	Approximately 6 km to the west
Quaylink – Devonport East Redevelopment.	Approximately 35 km to the east

Cumulative impacts from contamination or ASS associated with the above list of projects would be highly localised to the areas where the individual projects disturb potential contamination or ASS. It is unlikely that contamination or ASS that may be disturbed associated with the above projects would result in impacts that may overlap with the potential impacts from this project (due to the distances involved, and the generally localised areas that impact may occur) with the exception of parts of the NWTD project that interfaces with the Heybridge site. Cumulative impacts that may occur that are relevant to the study area may include local residential or commercial redevelopments of land surrounding the site, or upgrades to the Bass Highway or rail line in the vicinity of the site. However, the magnitude of impacts from these potential projects will be minor due to the limited footprints of these projects, and low potential of contamination being present, or ASS being disturbed.

The NWTD project will include the installation of several overhead transmission towers to the south of the study area in close proximity to several former landfills and potential ASS associated with the Blythe River estuary. However, the proposed siting of the overhead towers and any associated ground disturbance is a reasonable distance from potential landfills and no ASS is mapped as being present in the vicinity of the NWTD transmission corridor to the south of the study area. The proposed siting and elevation of the transmission towers (above the valley floor) is also such that they would be unlikely to interact with groundwater during drilling in any significant way that may result in impacts from contaminated land or ASS.

Any disturbance of potential contamination or ASS would be limited to the excavation of tower footprints (with any contaminated soils either re-used or disposed in accordance with EPA bulletin 105) and the scale of such disturbances are such that any potential impacts would be manageable and result in low to very low impacts to the environment.

The existing former offshore Tioxide pipeline and outfall tunnel that extend from the Converter Station site offshore have been considered in this study and whether disturbance of the pipeline or the outfall tunnel may result in potential impacts to the environment.

5.4 SOIL AND SURFACE WATER ASSESSMENT METHOD

Based on the outcome of the desktop assessment (refer to Section 6.5), sampling of soils (for ASS), stockpiles and surface water was undertaken within the study area to provide additional data to inform the risk assessment. This section describes the method applied for the soils and surface water sampling.

5.4.1 ASS sampling

The Tasmanian Acid Sulfate Soil Management Guidelines (DPIPWE, 2009) provides guidance on the approach to undertaking assessment and management of ASS in Tasmania. The guidelines describe a seven-step process for managing potential ASS on project sites. A summary of the steps, and their relevance to the methodology for assessing ASS within the study area is provided in Table 5-2.

Table 5-2: Summary of seven-step methodology for managing ASS impacts (DPIPWE, 2009)

Step	Criteria	Comments
1	Project is below 20 m above Australian Height Datum (m AHD) or will disturb ground below 20 m AHD	The majority of the study area is below 20 m AHD
2	Project likely to disturb >100 m^3 of material	The project will disturb more than 100 m^3 of soils
3	Check DPIPWE or Australian Soil Resource Information System (ASRIS) map	Project is within area mapped as having a low probability of ASS present (5-70% chance)
4	Project in area predicted to contain low or high amounts of ASS: Conduct desktop risk assessment	The project will likely disturb ASS (if present). Redesign of project may allow avoidance of, but still some ASS likely to be disturbed.
5	Undertake site investigation to determine presence, depth and extent of ASS materials	Due to meeting the triggers for steps 1 to 4, a site investigation is required including field sampling and laboratory analysis
6	Conduct field sampling and laboratory analysis	
7	Develop ASS Management Plan to minimise environmental harm	To be developed once full project disturbance has been quantified in detailed design.

The assessment of the potential for ASS to be present has been designed using previously collected data (Jacobs 2022a) and the guidance provided in the DPIPWE (2009) guidelines. The guidelines recommends that soils are sampled at a rate of two locations per hectare (ha) for sites with an area above 4 ha. The area of the site (where construction activities may result in disturbance of ASS if present) is approximately 5 ha, which the guidelines recommend sampling from at least 10 locations to identify the potential presence of ASS.

Jacobs (2022a) undertook soil sampling at five locations across the broader converter station site, with acid sulfate field testing, and laboratory analysis undertaken.

Soil sampling was completed at an additional eight test-pit locations along the northern boundary of the study area to assess for the presence of ASS, as displayed in Figure 4. The locations were spaced at 50-metre intervals along the northern boundary of the site as it was considered that this area was more likely to contain undisturbed soil profiles (as opposed to the other areas where factory demolition may have disturbed the deeper soil profile), and it was assumed that this area was more likely to have shallower groundwater (and containing submerged soils).

Given that the northern boundary was closer to the coastline, this was a factor in locating the samples at this location. The locations also allowed for appraising potential ASS in the areas where the HDD will occur.

Each sampling test-pit was excavated to a depth of 1.5 m below the ground surface. Whilst deeper sampling may have provided additional data as to the potential depth of ASS, soil instability and the potential for test-pit collapse limited sampling depths to 1.5 m.

5.4.1.1 Applicable guidelines

There is no specific acid sulfate legislation in Tasmania. However, control of related impacts may come under the "general environmental duty" section of EMPCA, where: "*A person must take such steps as are practicable or reasonable to prevent or minimise environmental harm or environmental nuisance caused, or likely to be caused, by an activity conducted by that person.*"

The State Coastal Policy 1996 (as amended 2009) also may cover acid sulfate management, as it aims to protect the intrinsic value of coastal areas and support sustainable use of coastal areas.

The Tasmanian Acid Sulfate Soil Management Guidelines (DPIPWE 2009) present the recommended approach to assessment and management for ASS in Tasmania.

Other guidelines and standards for sample collection and analysis include the following:

- ASC NEPM (1999) National Environment Protection (Assessment of Site Contamination) Measure (1999) as amended 2013 (NEPM (ASC)).
- ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines
- EPHC & NRMMC 2011, National guidance for the management of acid sulfate soils in inland aquatic ecosystems, Environment Protection and Heritage Council and the Natural Resource Management Ministerial Council, Canberra

5.4.1.2 Assessment criteria

Assessment criteria for the investigation of ASS within the study area had been adopted from the Tasmanian Acid Sulfate Soil Management Guidelines (DPIPWE 2009) which presents the recommended approach to assessment and management for ASS in Tasmania.

5.4.1.3 Sampling methodology

The field ASS assessment methodology is summarised in Table 5-4. Sampling locations are shown in Figure 4. Location details of the sampling points are provided in the table below.

Table 5-3: Summary of sampling locations

Test Pit Location	Easting*	Northing*	Depth (m bgs)
HEY1	413938	5452704	1.5
HEY2	413983	5452669	1.5
HEY3	414032	5452644	1.5
HEY4	414103	5452596	1.5
HEY5	414152	5452564	1.5
HEY6	414196	5452532	1.5
HEY7	414231	5452454	1.5
HEY8	414205	5452514	1.4

Notes
* - The accuracy of locations is approximately +/- 15m due to the limitations of the hand-held GPS used to measure locations.

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LEGEND

- ASS sample location

Proposed route

- HVDC subsea cable
- Heybridge converter station site boundary
- Major road
- Minor road
- Cadastre

SOURCE
Proposed route and sampling locations from Tetra Tech Coffey.
Roads and cadastre from DPIPWE.
Imagery from Nearmap (08/03/2022).

0 30 60 m

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FIGURE 4

Acid Sulfate Soil (ASS) Sample Locations

TETRA TECH COFFEY

DATE: **03.09.24** PROJECT: **754-MELEN215878ML** FILE: **215878ML_CSASS_TAS_F004_GIS**

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Table 5-4: ASS Sampling Methodology

Activity	Details
Soil Sampling	Soil samples were collected at depths of 0-0.1m (surface) and half-metre intervals or changes in lithology throughout the test-pits. An excavator was used to collect samples at the nominated depths at each location. Upon collection samples were immediately sealed within laboratory supplied snap lock bags and had the air squeezed out from each sample. Samples were then frozen to minimise potential effects of oxidation. Soil sampling locations were installed in the areas where ASS was most likely to occur, as well from locations spread across the converter station site. The adequacy was considered appropriate as it include coverage across the site. The sampling frequency included collecting and analysing samples from multiple depths throughout the sampling locations. The sampling locations provide a reasonable indication of the potential extent of ASS that may be encountered at the site to inform potential impacts to the environment.
Soil Screening	During sampling, soils were assessed for visual and olfactory indications of potential contamination, including observations of vegetation distress, water-logged soils and extraneous material. Details of these observations are recorded by samplers in field logs provided in Appendix D.
Decontamination	Soil samples were collected directly from the excavator bucket whilst wearing disposable nitrile gloves to avoid cross-contamination between samples. The method for sampling involved the excavator collecting a largely undisturbed 'chunk' of soil from the wall or base of the test-pit, and then splitting the soil sample open to collect soil that had not come into contact with the excavator bucket. As such, decontamination of sampling equipment was not required.
Sample Preservation	Samples were placed in laboratory supplied snap lock bags. Samples were stored on ice (<4°C) in an ice box while on site and were frozen (below -18°C) within six hours of collection. Samples were refrigerated while in transit to the selected laboratories.
Sample Analysis	Samples were submitted to National Association of Testing Authorities, Australia (NATA) accredited laboratories Eurofins and ALS (inter-laboratory duplicates only) for all specified analysis. A copy of the NATA Analytical reports is provided in Appendix F.

5.4.1.4 Analytical suite

Potential ASS samples were submitted for the following analysis:

- Chromium Reducible Suite (CrS) - 14 samples.
- ASS field test – 21 samples.

5.4.2 Soil stockpile sampling

In 2022, pitt&sherry (2022) undertook an inspection of the Converter Station site and identified up to nine soil stockpiles on the site. During the field inspections undertaken as a part of this study, the location of the pitt&sherry stockpiles and other potential soil stockpiles was undertaken.

Several soil mounds are present on the site and sampling of the soil mounds was undertaken to identify if the soils were potentially contaminated.

Some of the soil mounds area elongated, particularly along the northern boundary of the site and appear to have been installed as a visual barrier to the site. Several other larger soil mounds were observed at isolated locations on the site. Many small mounds of soils (generally less than 1 m^3) were present in areas to assist with water drainage, or from onsite road forming. These smaller soil mounds were not included in sampling and considered to be part of the site soil surface.

The larger soil mounds along the northern boundary and at isolated locations across the site were designated as 'stockpiles', to differentiate between the large and small soil mounds.

A summary of the approximate volumes of the stockpiles, and the sampling undertaken is provided in the table below.

Table 5-5: Stockpile sampling densities

Stockpile ID	Description	Volume (m3)	Samples (collected / suggested by Bulletin 105)
SP1	Soil stockpile SP1 from the pitt&sherry report was located on the south-western side of the site and did not appear to be present on site, and the location comprised a slightly elevated area of soil that appeared to have been cut into on its southern side for the former rail-siding and appeared to align approximately with the original site surface. Consequently, this area of soil was not sampled.	N/A	-
SP2	Located on the northern boundary, near the western side of the site. Dimensions were approximately 70 m long by 6 m wide, by up to 2.5 m high.	525	3 / 21
SP3	Located on the northern boundary, near the western side of the site. Dimensions were approximately 50 m long by 5 m wide, by up to 2 m high. Eastern portion not sampled due to being in a mapped former asbestos area.	250	1 / 10
SP4	Soil stockpile SP4 from the pitt&sherry report was located to the north of SP5 in the central western portion of the site. During inspection, the soil stockpile could not be differentiated from the surrounding soils and appeared to be a very slightly elevated (<0.2 m) soil mound. Consequently, this area of soil was not sampled.	N/A	-
SP5	Located in central eastern portion. Approx 16 m long, by 5 m wide, by 1 m high	40	3 / 2
SP6	Soil stockpile SP6 from the pitt&sherry report was located in the northern central portion of the site. During inspection, the soil stockpile could not be identified. Consequently, this area of soil was not sampled.	N/A	-
SP7	Soil stockpile SP7 from the pitt&sherry report was located to the south of the site and appeared to be a mound of soil that was representative of the original site surface and not a soil stockpile. Consequently, this area of soil was not sampled.	N/A	-
SP8	Located on northern boundary. Approx 15 m long, by 3 m wide, by 1.5 m high	34	2 / 2
SP9	Located on northern boundary – eastern end. Approx 55 m long, by 11 m wide, with the western end approximately 3 m high, and the eastern end approximately 2 m high.	770	4 / 31
SP10	Located adjacent the former rail siding in the southern portion of the site. Approximately 30 m long, by 3 m wide, by 2 m high.	90	3 / 4

The sampling densities for some stockpiles was below the 'general sampling density rule' of one sample per 25 m^3 for homogeneous soils included in EPA information bulletin No. 105. However, the bulletin notes that the number of samples required for adequate classification of soil is *dependent on the volume of material, the estimated standard deviation of contamination concentrations, and the estimated average concentration*. Consequently, additional sampling of some stockpiles will be required to inform the classification of the soils should they require offsite disposal. The sampling

undertaken provided a preliminary indication of the contamination status of the soils in the stockpiles to assess the potential risks to the environment.

5.4.2.1 Applicable guidelines

Applicable guidelines and standards for sample collection and analysis include the following:

- ASC NEPM (1999) National Environment Protection (Assessment of Site Contamination) Measure (1999) as amended 2013 (NEPM (ASC)).
- ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines
- Tasmanian Government (2020) Environmental Management and Pollution Control (Waste Management) Regulations 2020.
- EPA Tasmania (2018) Information Bulletin No. 105, Classification and Management of Contaminated Soil for Disposal.

5.4.2.2 Assessment criteria

Based on the current land use and proposed use of the study area, contaminant screening criteria is sourced from:

Preliminary Waste Classification

- EPA Tasmania (2018) Information Bulletin No. 105, Classification and Management of Contaminated Soil for Disposal.

On-site Retention

- NEPM (ASC) for human health for soils and sediment:
  - Health Investigation Guidelines (HIL) D – Commercial/Industrial use for human health impact for soils and sediments
  - Health Screening Levels (HSL) D for Vapour Intrusion – Commercial/Industrial use for human health impact (sand – 0-1 m)
  - Ecological Investigation Guidelines (EIL) for terrestrial ecological impact for soils and sediments in terrestrial settings
  - Ecological Screening Levels (ESLs) for terrestrial ecological impact for soils and sediments in terrestrial settings
  - Table 1B(7) TRH Management Limits for Commercial/Industrial use (coarse soil)

In the absence of site-specific data, the following values have been conservatively adopted to calculate EILs for copper, nickel, chromium (III) and zinc:

- Cation exchange capacity (CEC): 5 cmol/kg dwt
- Organic carbon (OC) content: 1%
- Clay: 10%

The lowest pH value reported as part of this investigation (4.4 for sample HEY7_0.9-1.1) has also been used to calculate EILs.

5.4.2.3 Stockpile sampling methodology

The stockpile sampling methodology is summarised in Table 5-6. Sampling locations are shown in Figure 5.

Table 5-6: Stockpile Sampling Methodology

Activity	Details
Stockpile Sampling	Samples were collected from six soil stockpiles. Samples were collected at depths of approximately 0.2m below the surface of the stockpile. Samples from stockpiles along the northern boundary of the site (stockpiles 2, 3, 8 and 9) were collected using an excavator. Samples from stockpiles 5 and 10 were collected by hand directly into laboratory supplied containers.
Soil Screening	During sampling, soils were assessed for visual and olfactory indications of potential contamination, including observations of extraneous material. Details of these observations are recorded by samplers in field logs provided in Appendix E.
Decontamination Procedure	Soil samples were collected directly from the excavator bucket whilst wearing disposable nitrile gloves to avoid cross-contamination between samples. As such, decontamination of sampling equipment was not required.
Sample Preservation	Samples were placed in laboratory supplied jars. Samples were stored on ice (<4°C) in an ice box while on site and were frozen (below -8°C) within six hours of collection. Samples were refrigerated while in transit to the selected laboratories.
Sample Analysis	Samples were submitted to National Association of Testing Authorities, Australia (NATA) accredited laboratories Eurofins and ALS (inter-laboratory duplicates only) for all specified analysis. A copy of the NATA analytical reports is provided in Appendix F.

5.4.2.4 Analytical suite

Stockpile samples were submitted to NATA accredited laboratories for the following analysis:

- Total Recoverable Hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAH) and metals (As, Cd, Cr, Cu, Ni, Pb, Hg) – 12 samples.
- Tas EPA 105 Screen – 4 samples.

MARINUS LINK

LEGEND

- Soil stockpile sample
- Stockpile

Proposed route

- HVDC subsea cable
- Major road
- Minor road
- Cadastre

SOURCE
Proposed route and sampling locations from Tetra Tech Coffey.
Roads and cadastre from DPIPWE.
Imagery from Nearmap (08/03/2022).

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FIGURE 5

Soil Stockpile Locations

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5.4.3 Surface water sampling

Surface water runoff was observed to flow north off the Heybridge converter station site to Tioxide Beach via subsurface stormwater drains and into Bass Strait. The contamination status of surface water at the converter station site has not been previously assessed as there has been no surface water present during previous investigation. It was considered that sampling the current surface water drainage system will provide an indication of the current baseline condition of surface water on the site. It is likely that excavation proposed during the construction of the site may result in contamination to surface water, and the baseline condition of surface water was established to allow comparison.

Surface water sampling was completed from the stormwater drain within the converter station site and at the stormwater drain outlet on Tioxide Beach. The effluent tunnel that emerges on the eastern end of Tioxide was blocked and did not appear to be flowing.

5.4.3.1 Applicable guidelines

Applicable guidelines and standards for sample collection and analysis include the following:

- ASC NEPM (1999) National Environment Protection (Assessment of Site Contamination) Measure (1999) as amended 2013 (NEPM (ASC)).
- ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines

5.4.3.2 Assessment criteria

Based on the current land use and proposed use of the study area, contaminant screening criteria is sourced from:

- ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines

5.4.3.3 Surface water sampling methodology

The surface water sampling methodology is summarised in **Table 5-7**. Sampling locations are shown in Figure 6.

Table 5-7: Surface Water Sampling Methodology

Activity	Details
Surface Water Sampling	Samples were collected from two surface water locations (HEY-SW1 and HEY-SW2-Alt). Both samples were collected using dedicated sterilized sampling bottles or syringes, avoiding collection of any surface material.
Surface Water Screening	During sampling, surface waters were assessed for visual and olfactory indications of potential contamination. Details of these observations are recorded by samplers in field logs provided in Appendix E.
Decontamination Procedure	Surface water samples were collected using dedicated sterilized sampling bottles or syringes whilst wearing disposable nitrile gloves to avoid cross-contamination between samples. As such, decontamination of sampling equipment was not required.
Sample Preservation	Samples were collected in laboratory supplied bottles. Samples were stored on ice (<4°C) in an ice box while on site and were frozen (below -8°C) within six hours of collection. Samples were refrigerated while in transit to the selected laboratories.

Activity	Details
Sample Analysis	Samples were submitted to National Association of Testing Authorities, Australia (NATA) accredited laboratories Eurofins and ALS (inter-laboratory duplicates only) for all specified analysis. A copy of the NATA analytical reports is provided in Appendix F.

5.4.3.4 Analytical suite

Surface water samples were submitted to NATA accredited laboratories for the following analysis:

- Metals (As, Cd, Cr, Cu, Ni, Pb, Hg, Ag, Sn, Mo, Se, Zn) Cr^{6+}
- Total recoverable hydrocarbons (TRH)
- PAH
- Phenols
- OCP
- PCB
- VOCs
- Vinyl chloride

MARINUS LINK

LEGEND

- Surface water sample

Proposed route

- HVDC subsea cable
- Heybridge converter station site boundary
- Major road
- Minor road
- Cadastre

SOURCE
Proposed route and sampling locations from Tetra Tech Coffey.
Roads and cadastre from DPIPWE.
Imagery from Nearmap (08/03/2022).

0 30 60 m

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FIGURE 6

Surface Water Sample Locations

TETRA TECH COFFEY

DATE: **03.09.24** PROJECT: **754-MELEN215878ML** FILE: **215878ML_CSASS_TAS_F006_GIS**

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5.5 RISK ASSESSMENT METHOD

A qualitative environmental risk analysis has been conducted for the study area to assist in identifying the controls required to avoid and if this is not possible, reduce risks and to identify issues of concern for other technical studies to consider both during the impact assessment stage, and for future design phases.

The risk assessment was focussed on potential risks to environmental receptors including construction and maintenance workers at the site, potential ecological receptors including flora and fauna and potential risks to groundwater or surface water from contamination disturbance that may occur during construction.

The risk analysis has been based on the risk-based approach from the Australian/New Zealand Standard for risk management (AS/NZS IS0 31000:2018).

The assessment of potential risks was based on the likelihood of the impact to the environment (health or ecological) occurring and the potential consequences (i.e., measure of severity should this occur). The descriptors used to classify the likelihood and consequence are detailed in Table 5-8. Assessment specific consequences have been developed that allow for comparison of analytical results and exceedances of screening criteria and are included in Table 5-8.

The level of risk was then determined by combining the likelihood and consequence to rank the potential risk as very high, high, moderate, low or very low according to the risk evaluation matrix in Table 5-9.

Table 5-8: Descriptors used to classify likelihood and consequence

Descriptor	Description
Likelihood	
Almost certain	A hazard, event and pathway exist, and harm has occurred in similar environments and circumstances elsewhere and is expected to occur more than once over the duration of the project activity, project phase or project life.
Likely	A hazard, event and pathway exist, and harm has occurred in similar environments and circumstances elsewhere and is likely to occur at least once over the duration of the project activity, project phase or project life.
Possible	A hazard, event and pathway exist, and harm has occurred in similar environments and circumstances elsewhere and may occur over the duration of the project activity, project phase or project life.
Unlikely	A hazard, event and pathway exist, and harm has occurred in similar environments and circumstances elsewhere but is unlikely to occur over the duration of the project activity, project phase or project life.
Rare	A hazard, event and pathway are theoretically possible on this project and has occurred once elsewhere, but not anticipated over the duration of the project activity, project phase or project life.
Consequence	
Severe	In-situ concentrations of contaminants in soils exceeds NEPM Health Investigation Levels (HILs) / Health Screening Levels (HSLs) and presents an immediate risk to the health of persons accessing the project site. Mitigation measures to manage major impacts are likely to be extensive or complex, requiring a high level of resources and may involve regulatory intervention.
Major	The disturbance of in-situ contamination with concentrations that exceed NEPM HILs / HSLs; Ecological Investigation Levels (EILs) / Ecological Screening Levels (ESLs); or ANZG (2018) sediment upper guideline values (GV-high) and potentially present an acute risk to the health of persons accessing the project site, or which result in the mobilisation of the contaminants within the immediate environment and is sufficient to cause adverse impacts to the local environment and long-term impacts in the receiving environment. Careful management or avoidance can mitigate adverse effects.

Descriptor	Description
Moderate	The disturbance of soil containing environmentally significant levels of one or more contaminants with concentrations that exceed screening criteria for ecological receptors (NEPM ESL / EIL and/or ANZG GV-high); human health (HSLs / HILs), which results in the mobilisation of the contaminants within the immediate environment, which is sufficient to cause adverse impacts to the local environment and long-term impacts in the receiving environment. Appropriate management measures can mitigate the potential impacts.
Minor	The disturbance of soil containing environmentally significant levels of one or more contaminants with concentrations exceeding screening criteria for ecological receptors (NEPM ESL / EIL and/or ANZG default guideline values - DGV) and highly sensitive human receptors (nominally HIL / HSL A), but are below screening criteria for commercial / industrial land uses (nominally HIL / HSL D), which is sufficient to cause adverse impacts to the local environment and impacts in the receiving environment. Appropriate management measures can mitigate the potential impacts.
Negligible	The disturbance of soil containing isolated occurrences of environmentally significant levels of a contaminant (i.e. exceeding EIL / ESL and/or ANZG DGV, but not HSL / HIL), which may result in mobilisation of small amounts of contaminants within the immediate receiving environment. Degradation of the greater receiving environment (being areas outside of the study area) is unlikely with no measurable degradation to the local receiving environment. Monitoring of potential impact may be an appropriate response rather than implementation of mitigation measures.

Table 5-9: Risk evaluation matrix

		Likelihood				
		Rare	Unlikely	Possible	Likely	Almost certain
Consequence	Negligible	Very low	Very low	Very low	Low	Moderate
	Minor	Very low	Low	Low	Moderate	Moderate
	Moderate	Low	Low	Moderate	High	High
	Major	Low	Moderate	High	Very high	Very high
	Severe	Moderate	High	Very high	Very high	Very high

5.6 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations have been made during the assessment:

- As a conservative measure, we have assumed that any potential source of contamination within the investigation area may be disturbed by the project regardless of the construction methodology or proximity to final disturbance areas.
- The demolition of factory buildings on the site was undertaken in the mid-1990s, however remnants of footings (such as concrete blocks and bricks) are present in some areas of the site which have limited the sampling of soils in some isolated locations. Generally the footings have comprised pier or rim footings that are not continuous, and previous sampling locations may have had to be moved from design grids to allow sampling of soils from some of the factory areas. Sampling undertaken across the site as a part of Cromer (2007a), Synnot & Wilkinson (1996), Tioxide (1997, & 1998) and ES&D (2020) has been completed across the former factory areas and identified the contamination as detailed in this report. However, there is a possibility that some soil sampling locations met with refusal on concrete blocks or bricks in the former factory area and were not able to be sampled below the concrete/bricks. As locations which were met with refusal were not documented within any of the reports as data gaps, we have assumed that alternative adjacent locations were sampled. Any potential data gaps from refusal on concrete blocks or bricks are considered to represent only a very small portion of the site that may not have been sampled. A site inspection and sampling program of soil disturbance areas is required during the pre-construction phase to confirm the nature and extent of contamination in these locations (if any). The exact location of concrete blocks or bricks that have not been able to be

assessed is not directly noted in any report other than the reports noting that “footings have made it difficult to sample soils in some areas”.

- We have assumed that potential ASS is present beneath the shore area to the low-tide line based on the results of on-shore and off-shore testing, that there are limited sediments overlying the rocky seabed in the near shore area, and the inability to undertake soil/sediment testing in the intertidal zone and near-offshore areas.
- We have assumed that the effluent tunnel was decommissioned in-situ, with the effluent pipeline and all tunnel materials retained in the approximate location of the effluent tunnel alignment. We have also assumed that any contamination that may have been present either in the tunnel or pipeline are still present on the site.
- The converter station site is a former factory site and covered with varying thickness of fill. As detailed in the *Heybridge Foundations and Construction – Technical Memo* (Jacobs 2024), the majority of the fill soils will be geotechnically unsuitable for constructing foundations for the proposed converter station site. On the basis that the filling on the site was unsuitable for construction, the memo made a conservative assumption that the entire thickness of filling from the development area on the site will require excavation and removal from the site. This was because the fill soils were unlikely to be suitable for geotechnical fill if reused. The thickness of fill ranged between approximately 1 to 2.5 m and equated to approximately 62,200 m^3 across the site. For the purposes of this assessment, we have assumed that all filling will be required to be managed, and how it will be managed will be documented in a waste management plan.

6. EXISTING CONDITIONS

This section describes the existing conditions and values within the study area based on the information obtained from the intrusive site works and review of previous site investigation reports (listed in Table 2-2).

The objective is to document all values that could be affected by the project and to provide context to explain what the baseline conditions mean and why they are important.

The assessment of contaminated land and ASS existing conditions considered the following features:

- Land use (Section 6.1)
- Topography (Section 6.2)
- Regional geology (including ASS and naturally occurring asbestos (NOA)) (Section 6.3)
- Hydrogeology (Section 6.4)
- Site history and previous reports (Section 6.5)
- Summary of previous contamination assessment report findings (Section 6.5.2
- Results of targeted sampling (Section 6.6)

6.1 LAND USE

According to the NRE Tasmania ListMap, the land tenure of the proposed converter station site is listed as Private Freehold and is classified as a Rural Living (zone 20) under the Burnie Local Provisions Schedule. The site is currently vacant, largely undeveloped, with sparse grasses and gravel hardstands occupying the majority of the site. Minimal vegetation currently exists on the site.

Historically, the Heybridge converter station site was used as a paint pigment factory by Tioxide Australia. The factory commenced operation in 1949 the factory was demolished by 1998.

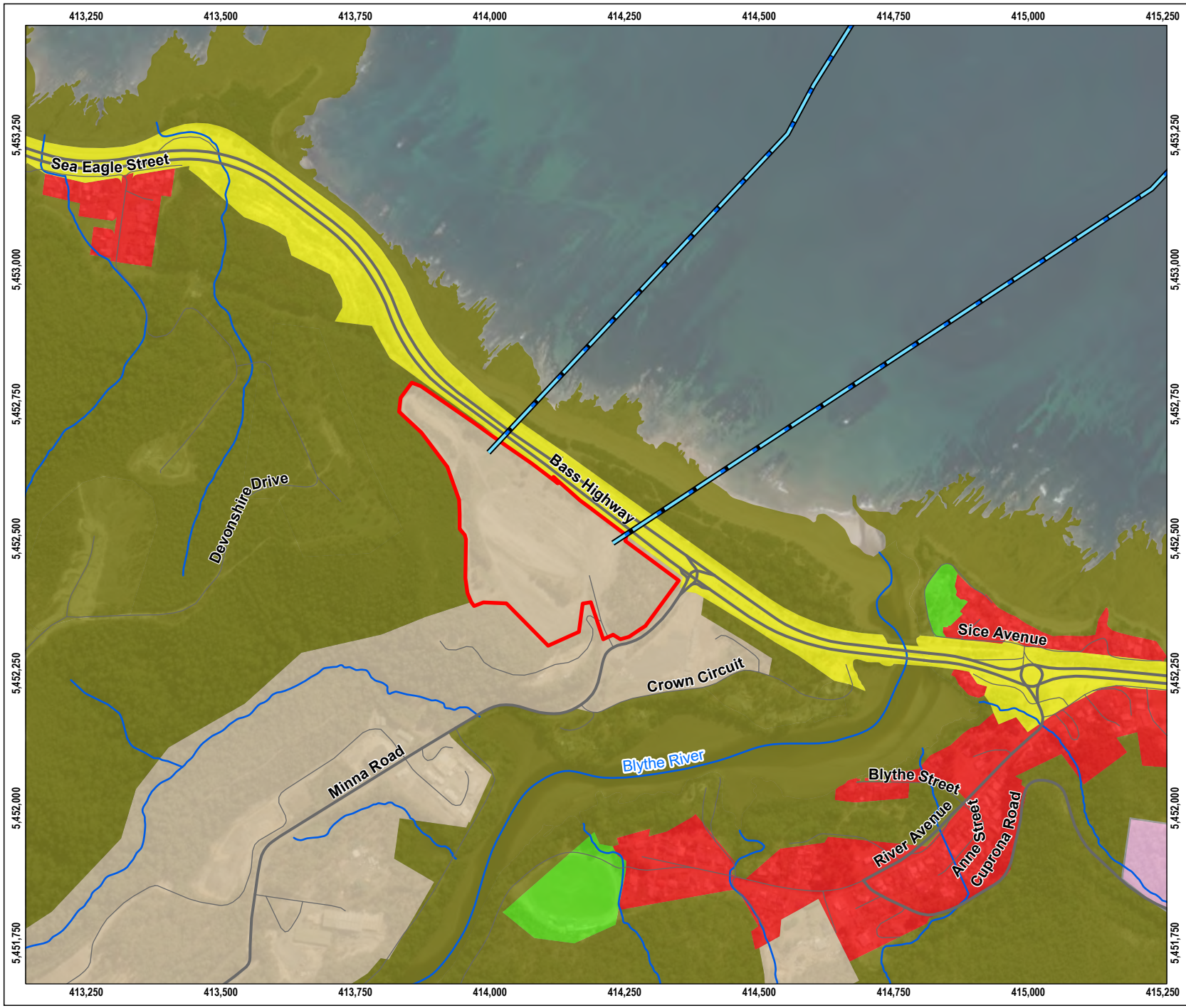
Rehabilitation activities were reported to have commenced immediately following the site's closure in 1996; the details of the remediation completed, and the current contamination status of the site is unknown.

The land surrounding the proposed development site is largely unsealed, vacant and comprises of native forest, bushlands and habitats associated with the Blythe River located approximately 240 m to the southeast (Figure 6). The north of the study area is bordered by a sealed highway (Bass Highway) which separates the proposed redevelopment site from the Bass Strait shore front (approximately 100 m north). A small number of residential properties are located to the west and south, with a small rural town located along Blythe River to the southeast.

Surrounding land within the study area is zoned for the following uses (shown on Figure 7):

- Further areas of Rural Living (zone 20) to the south with an associated Priority Vegetation Area overlay,
- Landscape Conservation (Zone 22), Environmental Management (Zone 23) to the north, south and west.
- Areas of General Residential (Zone 8) and Recreation (Zone 28) follow the right bank of Blythe River estuary and are mostly positioned outside of the study area.

No agricultural land exists within the study area.



MARINUS LINK

LEGEND

Proposed route
- HVDC subsea cable
- Heybridge converter station site boundary

Planning zones
- General Residential
- Rural Living
- Rural
- Landscape Conservation
- Environmental Management
- Utilities
- Recreation

Watercourse

Major road

Minor road

Source:
Routes from Tetra Tech Coffey.
Roads, watercourses and planning zones from DPIPWE.
Imagery from NearMap (8 March 2022).

0 100 200 m

SCALE **1:10,000**
PAGE SIZE: **A4**
PROJECTION: **GDA2020 MGA Zone 55**

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FIGURE 7

Surrounding land use and topography

TETRA TECH COFFEY

DATE: **03.09.24** PROJECT: **754-MELEN215878ML** FILE: **215878ML_CSASS_TAS_F007_GIS**

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6.2 TOPOGRAPHY

The surface elevation of the land-based study area ranges from 0 to approximately 25 m above Australian height datum (AHD) with the land sloping from the southern portion of the converter station site down towards the shore. Higher topographic elevations are present on the larger land parcel at the eastern and western ends (up to 40 m AHD); however these areas are outside of the project disturbance footprint associated with potential contaminated land or ASS impacts.

6.3 REGIONAL GEOLOGY

6.3.1 Geological units

The site is located within the Sheffield Element, which is one of several Precambrian aged geological blocks in the north of Tasmania. The site is mapped as being underlain by more modern Quaternary deposits of aeolian sand, and river and marine gravels, sand and clays, which are expected to overly the Precambrian aged Burnie and Oonah Formation (Po, Lo) bedrock of the Sheffield Element. This formation is comprised of pale grey coloured interbedded mudstone, sandstone and siltstone, and is expected to include an upper weathered horizon.

The more recent Quaternary sands, gravels and clays are deposited in the lower elevation embayment of the outcropping Burnie and Oonah Formation bedrock, which extends across the Bass Highway to the coastal landside landfall zone. The bedrock outcrops where the topography rises steeply around the site to the west, south and east. Interbedded Tertiary basalts are present in the region but expected to be absent from the study area.

Figure 8 shows the regional geology.

MARINUS LINK

LEGEND

Proposed route

- HVDC subsea cable
- Heybridge converter station site boundary
- Watercourse
- Major road
- Minor road
- Elevation contours (5m interval)

Source:
Routes from Tetra Tech Coffey.
Geology from MRT.
Roads and watercourses from DPIPWE.
Imagery from NearMap (8 March 2022).

N

0 100 200 m

SCALE **1:10,000**
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PROJECTION: **GDA2020 MGA Zone 55**

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GROUNDWATER IMPACT ASSESSMENT REPORT

FIGURE 8

Regional geology

TETRA TECH COFFEY

DATE: **03.09.24** PROJECT: **754-MELEN215878ML** FILE: **215878ML_CSASS_TAS_F008_GIS**

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The Mineral Resources Tasmania (2012) digital geological atlas map (sheet 4045) Burnie and the Tasmanian Government Department of State Growth (2017) geological map of Northwest Tasmania (1:25,000) indicate that the study area is underlain by the geological units listed below in Table 6-1.

Table 6-1: Geological units

Geological Unit	Symbol	Age	Description	Location
Quaternary Deposits - Aeolian	Qpsa	Quaternary (Pleistocene)	Older aeolian sand of coastal plain.	Covers the majority of the study area.
Quaternary Deposits - Littoral	Qhwr	Quaternary (Holocene)	Sand of stabilised longitudinal beach ridges.	North of study area along sand dunes.
Cenozoic Cover Sequences	Qhbd	Quaternary (Holocene)	Beach sand, sand dunes and beach gravel.	North of study area along beach.
Oonah (Burnie) Formation	Lo	Neo-Proterozoic	Quartzwacke turbidite sequence of sandstone, siltstone and well bedded black slaty mudstone.	South and west of study area as well as north of Tioxide beach.
Oonah Formation	Lob	Proterozoic	Albite dolerite, metabasalt.	North of Tioxide beach.

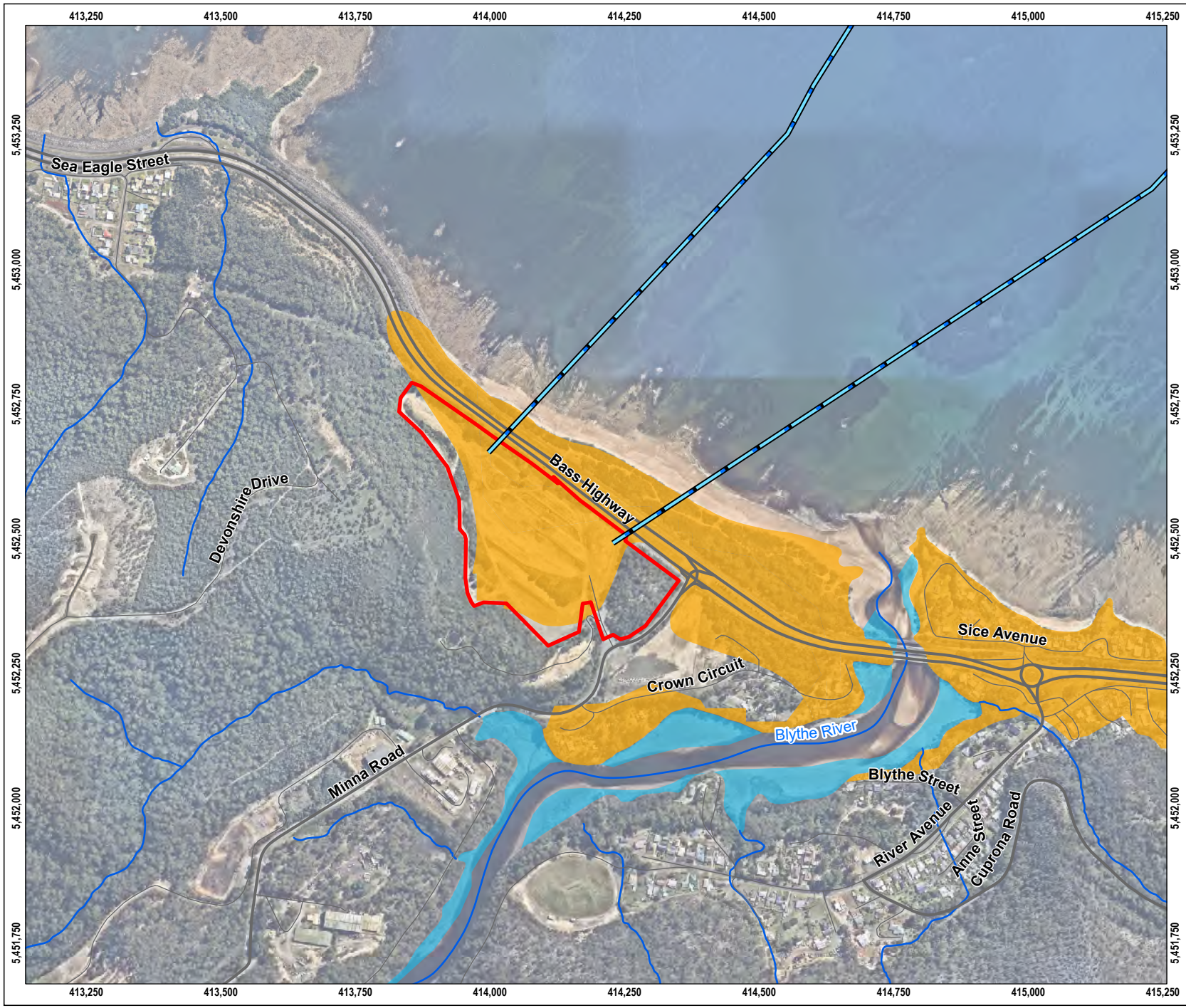
6.3.2 Acid sulfate soils

ASS containing metal sulphides can be present within highly mineralised areas of Tasmania, particularly where oxidation of these metal sulphides takes place. This can be through:

- Hydrothermal alteration of metal sulphide-containing rocks and soils; and,
- Microbial decomposition of organic matter in water-logged soils and sediments containing metal sulphides (usually pyrite).

According to the National Acid Sulfate Soils Atlas there is a low probability (6-70%) that ASS exist within the study area. Given the proximity to areas of high probability (greater than 70%) of ASS being present and proximity to the coast, intrusive ASS testing works were completed at the site and detailed in Section 5.4.1.

Figure 9 shows the probability of ASS.



MARINUS LINK

LEGEND

Proposed route

- HVDC subsea cable
- Heybridge converter station site boundary
- Watercourse
- Major road
- Minor road

Coastal Acid Sulfate Soils (0 - 20 m AHD)

- Low probability (5-70%)

Marine acid sulfate soils

- High (>70%) Intertidal

Source:
Routes from Tetra Tech Coffey.
ASS from Resource Management and Conservation.
Roads and watercourses from DPIPWE.
Imagery from NearMap (8 March 2022).

0 100 200 m

SCALE **1:10,000**
PAGE SIZE: **A4**
PROJECTION: **GDA2020 MGA Zone 55**

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GROUNDWATER IMPACT ASSESSMENT REPORT

FIGURE 9

ASS Probability

TETRA TECH COFFEY

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6.3.3 Naturally occurring asbestos

NOA is generally encountered within basement rocks and ultramafic (such as serpentinites) volcanic rocks. As there are no known ultramafic rocks intersecting the site it is considered that the likelihood of encountering NOA within the study area is very low.

6.4 HYDROGEOLOGY

The Oonah Formation fractured rock (sandstone and siltstone) aquifer is the primary aquifer at the study area with groundwater previously encountered at depths of 1 to 3 mbgl (Jacobs, 2022a).

TDS values recorded for groundwater samples historically collected at the study area ranged from 700 to 1,300 mg/L (Cromer, 2007) while Jacobs (2022a) reported electrical conductivity (EC) between 213 and 615 µS/cm in groundwater sampled from test pits at the site. Groundwater was inferred to flow to the north (Bass Straight) as shown in Figure 10.

Further details of the hydrogeology are provided in the Groundwater Impact Assessment report (Tetra Tech Coffey 2024).

MARINUS LINK

LEGEND

- Boreholes
- Directional flow
- Groundwater contours (m AHD)
- Major road
- Minor road
- Elevation contours (5m interval)

Proposed route

- HVDC subsea cable
- Heybridge converter station site boundary

Source:
Routes from Tetra Tech Coffey.
Roads from DPIPWE.
Imagery from NearMap (8 March 2022).

0 30 60 m

SCALE **1:3,000**
PAGE SIZE: **A4**
PROJECTION: **GDA2020 MGA Zone 55**

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GROUNDWATER IMPACT ASSESSMENT REPORT

FIGURE 10

Inferred groundwater contour plan

TETRA TECH COFFEY

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6.5 SITE HISTORY AND PREVIOUS REPORTS

6.5.1 Historical site use

Historically, the proposed converter site was used as a paint pigment factory by Tioxide Australia (formerly known as Australian Titan Products [pre-1972]), which is a subsidiary of British Titan Products Ltd England. The factory commenced operation in 1949 and produced up to 35,000 tons of paint pigment (titanium dioxide) per year. Economic factors caused closure of the plant in 1996, and the factory was subsequently demolished by 1998. Titanium dioxide pigments were produced at the factory from ilmenite mined in the Capel area in Western Australia.

Titanium dioxide is a non-toxic white pigment used in products ranging from paint, plastics, printing ink, paper, flooring, cement products, wall coverings, cosmetics, ceramics, rubber and textiles. The Heybridge site was chosen because of the availability of sulfuric acid, cheap electricity, local coal, water and access to the deep-water port of Burnie. The location of the site also facilitated the direct discharge of effluent into Bass Strait. While it is unknown what volume or types of waste were discharged, the Heybridge factory was subjected to criticism for the discolouration of the ocean and coast. It is understood that iron salts effluent (ferro sulfates) generated during operations were responsible for causing significant discolouration (red) of the sea water and beach sands, which extended more than a kilometre along the coast. Following the 1973 State Government Environmental Protection Act, Tioxide Australia invested in reducing the volume of waste being discharged to Bass Strait.

Demolition of the factory was completed in 1998 however concrete footings and reinforcement, as well as deleterious materials (building rubble), were noted as still being present by Jacobs (2022b).

There is known contamination present within the study area that is associated with the former Tioxide factory, including naturally occurring radioactive materials (NORM). NORM, consisting of uranium (U238), thorium (Th232) and their decay products, occur at various concentrations in the titanium ore used at the site. U238 and Th232 become concentrated as titanium ore is processed, resulting in levels that can exceed regulatory exemption levels in waste materials such as mineral sludges, dusts and sands (Jacobs, 2022a). Radiation investigation completed at the site is summarised in section 6.5.2.5.

Most recently the site was used as a lumber yard between 2015 and 2022.

A review of EPA Tasmania's list of regulated premises shows that the converter station site is not the subject of any EPA issued notices.

One regulated premise is located within 500m of the converter station comprising the Ixom Operations – Minna Road Chemical Plant. This site is approximately 300m to the south of the converter station site and is listed as having a 1A2 Chemical works – manufacture Permit, which also include an Environment Protection Notice (EPN).

6.5.2 Summary of previous investigations

This section provides a summary of the findings of the review of the previous environment assessments undertaken at the site and separated into the relevant contaminated media or contamination type. The details of the reviews are provided in Appendix B.

6.5.2.1 Soil Contamination

The key findings regarding the contamination status of the soil within the study area reported by previous investigations include the following:

- A grid-based soil investigation was completed by WCC (2007a) and identified concentrations of lead at one test pit and hydrocarbons in shallow groundwater at two separate test pits. However, these locations were further investigated by ES&D (2020) and determined to be very localised, and the contaminant concentrations were below commercial/industrial screening criteria (NEPM HIL/HSL D). Hydrocarbons were also reported in a similar area by Jacobs (2022a).
- Jacobs (2022a) excavated nine test pits to a maximum depth of 3 m bgs and submitted a total of 13 primary samples for laboratory analysis.
- No visual or olfactory indicators of contamination were observed at the sample locations completed by Jacobs (2022a).
- Natural soils (weathered clays and siltstone) were encountered at depths ranging from 0.3 – 1.5 mbgl (Jacobs, 2022a).
- Results reported for samples collected by Jacobs (2022a) were all below adopted health, ecological and management limit guideline values for commercial/industrial use.
- The majority of results reported for the samples collected by Jacobs (2022a) were below EPA Tasmania IB105, Table 2, Fill Material (Level 1) Max Total Concentrations with the exception of arsenic (23 mg/kg – one sample only), manganese (1,640 mg/kg – one sample only), nickel (84 mg/kg – one sample only), zinc (230 mg/kg – one sample only) and TPH fraction C_{10}-C_{36} sum of total (1,050 mg/kg – one sample only).
- ES&D noted that surface soil that built up during the use of the site as a lumber yard was scraped and stockpiled along the northern site boundary, adjacent to the Bass Highway.
- WC (2007a) and GBG (2022) noted that there are concrete slabs, footings and piles remaining across a significant amount of the site which made the investigation of these areas difficult.

The reported findings from previous site investigations indicate that levels of contamination within the soil on the converter station site are unlikely to present an unacceptable risk to human health or ecological receptors based on the proposed commercial/industrial site use. However, it is noted that the contamination status of soil underlying the remaining foundations of the former Tioxide factory have not been assessed. Previous investigations also suggest that, should shallow fill soils within the study area require excavation and offsite disposal, there are potential for contaminants (metals and hydrocarbons) to be at concentrations that exceed EPA Tasmania IB105 Level 1 (fill material) criteria but are below the Level 2 (low level contaminated soil) criteria.

6.5.2.2 Effluent Tunnel and Pipeline

The eastern portion of the converter station site formerly contained an effluent tunnel that ran from the factory area, beneath the Bass Highway, the railway line and the dune areas before emerging on Tioxide Beach. The tunnel is understood to have comprised a concrete structure approximately 200 m long, 1.2 m wide and 2.2 m high, and was covered with approximately 2 m of cover soils. Where the tunnel passed beneath the Bass Highway, it comprised a 600 mm diameter concrete pipe.

To the north of the Bass Highway, the tunnel comprised a similar box-like structure to the onsite tunnel and passed beneath the rail line and the dune systems. The northern-most 29 m of the tunnel had been more recently been replaced (i.e. recent in 2007) with a box-culvert type of structure (pitt&sherry, 2007).

The southern end of the tunnel was installed into competent rock. During tunnel inspections (*ibid*), water approximately 600 mm deep was present in the tunnel and was assumed to be from groundwater or surface water infiltration.

A 300 mm diameter stainless steel pipe was laid within the tunnel to transport effluent, and that at the northern end of the tunnel (where it emerged on the beach) the pipeline continued, buried beneath the sand of the beach and shore crossing for approximately 250 m. The pipeline extended approximately 3 km offshore and ended in a diffuser to distribute the effluent (*ibid*). Whilst all historic reports only note a single pipeline that is buried from the Beach entrance of the effluent tunnel to some distance offshore, later reports (CEE, 2022), notes that two pipelines extend offshore approximately 3 km.

It is inferred that the tunnel portion that is on the converter station was decommissioned in 2008. This is based on the preferred approach recommended to manage the integrity of the tunnel in the pitt&sherry (2007) tunnel inspection report. This report recommended removing the overburden, removing the concrete top to the tunnel, removing the existing pipe (if possible) or crushing the pipeline within the tunnel on the site, crushing the walls of the tunnel into the tunnel floor, placing the roof of the tunnel into the tunnel void, backfilling the remaining tunnel void with self-compacting crushed rock, and then reinstating the overburden (if uncontaminated). The report also recommended filling the 600 mm diameter culvert under Bass highway with concrete, and also filling the older section of the tunnel under the railway line and dunes (up to the newer box-culvert section) with concrete. The plan in the report did not indicate if the pipeline where it left the converter station site was to be removed or retained within the tunnel.

No reports or records regarding the completion of the tunnel works were available for review (from either the EPA or other sources) which documented the remediation and/or validation of the tunnel or pipeline. However, an aerial photograph from January 2008 appears to show that the tunnel had been uncovered, with two stockpiles of overburden either side of the tunnel alignment (Figure 11).

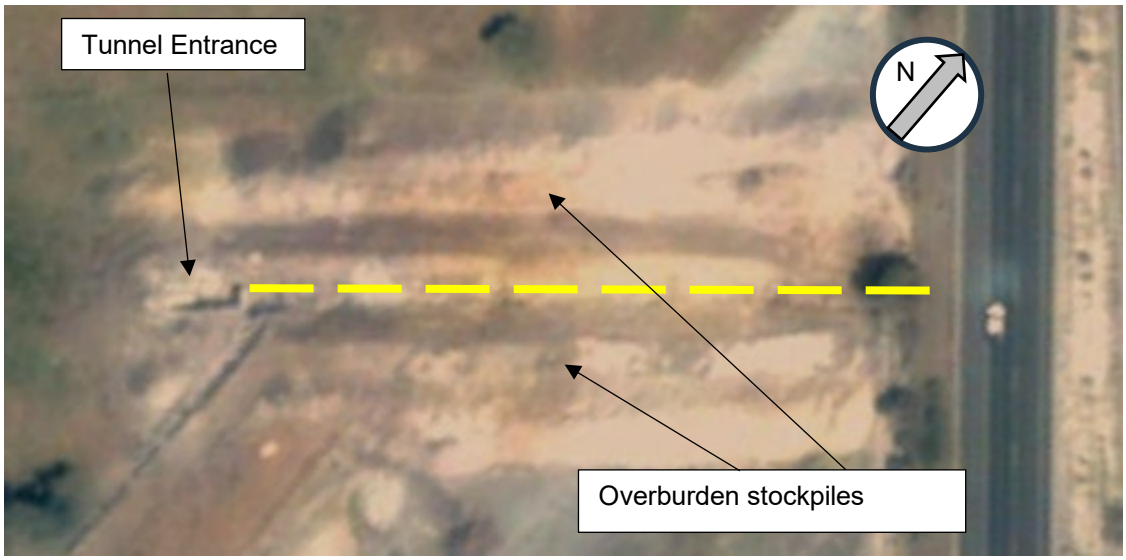

Figure 11: Aerial photograph from 2008 showing tunnel exposure (tunnel in yellow)

Subsequent aerial photographs in 2011 show a disturbed area where the tunnel was, and the former entrance shaft was no longer visible on the site.

As there are no reports available for review of the removal and/or testing of contamination around the tunnel, as a conservative measure it is assumed (based on the reviews of the reports provided and consistent with the absence of remediation or validation reports or approvals) that the tunnel was decommissioned and retained in-situ as crushed concrete and/or crushed rock backfill, and the condition of any residual sediments or scale within the tunnel or pipeline are unknown, but still present in the inferred tunnel alignment.

The offshore effluent pipelines were inferred to be buried at the shore crossing to a distance of approximately 250 m offshore (based on CEE, 2022), and they currently extend approximately 3 km offshore. The condition of the connection between the effluent tunnel beach entrance and the offshore portion of the pipelines is unknown.

The HVDC cable crossing study (Marine Solutions, 2024) identified that in the area where the proposed sub-sea cable will cross the pipelines that the pipelines:

- Were in good condition with no observable holes.
- Were constructed from lengths of pipe that were bolted together and anchored to the seabed via steel banding bolted to rock outcrops, or via concrete collars at regular intervals.
- No asbestos or asbestos fibres were present in samples collected from flange gaskets used to seal the pipe joins.
- The concentrations of potential contaminants from sediment inside and outside the pipeline were all below the sediment default guideline values (DGVs), or below the laboratory reporting limits (LOR). The sediment concentrations inside the pipeline were generally lower than those outside from the seabed, with the exception of titanium and manganese, which were marginally higher from sediments within the pipeline.

Consequently, based on the results of the Marine Solutions (2024) study, the pipeline, if disturbed during cable crossing works (in the area planned for the cable crossing), is unlikely to result in disturbance of contaminated sediment that may impact on the environment.

6.5.2.3 Acid Sulfate Soils

Limited investigation into the potential presence of ASS has previously been conducted at the study area. Relevant findings include:

- Swamp deposits and a hydrogen sulfide odour (potentially indicative of ASS) were identified by WCC (2007a) in 35 of 62 test pits completed at depths of up to 1.5 mbgl from across the converter station site, noting that no deeper samples were collected.
- ASS field testing was conducted by Jacobs (2022a) on soil samples from five locations on the converter station site. Results of the ASS field testing demonstrated strong evidence that ASS is present at the site with large pH reductions reported for each sample during field testing.
- Samples from five locations from the converter station site were submitted by Jacobs (2022a) for laboratory SPOCAS analysis to confirm the potential for ASS to be present in the study area. Two samples reported minor exceedances of the net acidity action criteria (0.03 %S / 15 mol.H^+/tonne). However, Jacobs noted that the values that exceeded the criteria may have been overestimated due to the reporting method extracting organic sulfur, leading to potential interference to some of the analytical methods.
- The soil profile on the site comprised fill or disturbed natural soils to depths of between 1 and 2.5 min the ASS sampling locations, with potential ASS identified at two locations:
    - TP01-0.5m, with a net acidity of 0.096 %S in gravelly sand fill in the former factory area, and
    - BH04-2.0, with a net acidity of 0.035 %S in wet clayey gravels in the former factory area.
- ASS testing of 26 sediment sampling from the sea bed at 14 locations confirmed that there were no actual ASS within the sediments, and whilst the analysis indicated that there was a potential for acid to be generated if the sediments were oxidised, the acid-neutralising capacity exceeded the acid generation by several orders of magnitude, and the net acidity was below the adopted screening criteria and laboratory reporting limits (<0.02 %S / <10 mole H^+/tonne). This indicated that the offshore sediments were unlikely to be acid generating and will not require specific management.

The reported results of ASS sampling and analysis completed by Jacobs (2022a) indicate that ASS is potentially present within the study area. However, due to the potential interference of some analytical methods, the results presented by Jacobs (2022a) are not considered sufficient for the purposes of assessing the possible impacts that may arise during construction, operation or decommissioning works planned for the study area. Consequently, additional targeted ASS assessment was required, and the details of the additional assessment are provided in Section 6.6.

6.5.2.4 Soil stockpiles

No investigations into the contamination status of soil stockpiles at the study area have previously been conducted. Consequently, additional targeted assessment of soil stockpiles within the Heybridge Converter station site was warranted and the details of the additional assessment are provided in Section 6.6.

6.5.2.5 Naturally Occurring Radioactive Material (NORM)

NORM assessment has previously been completed at the site by SA Radiation (2020), pitt&sherry (2020) and Jacobs (2022a). In order to assess for NORM, radiation readings were recorded across the site and during test pit excavation and borehole advancement across the converter station site. The measured results ranged from 43 to 115 nSv/hr. The adopted screening level for NORM was two times the background radiation levels. Background locations comprised three sites: one at a sports oval in Burnie (approximately 4km to the west), one at the eastern end of Tioxide beach (approximately 400 m from the site), and one site upstream and to the east of the Blyth River. Background readings were in the range 41 and 73 nSv/hr, and were used to establish a background screening level of 146 nSv/hr.
The highest recording of 115 nSv/hr was measured within a test pit at a depth of 1.0 mbgl.

Based on the reported results of the assessment completed by previous consultants, it is considered unlikely that NORM is present within the study area at levels that will impact on the proposed development of the site.

6.5.2.6 Groundwater quality

The investigation of groundwater quality underlying the study area has been limited, with samples collected from test pits where groundwater has been encountered during previous soil assessments, and from the previous installation of 5 groundwater wells across the converter station site. A summary of the findings of the groundwater assessment include:

- Groundwater was encountered by Jacobs (2022a) at approximately 1 to 3 mbgl across the converter station site.
- A total of five groundwater samples were collected by Jacobs (2022a) and submitted for laboratory analysis.
- Analytes for the groundwater samples collected by Jacobs (2022a) were reported to be below adopted criteria with the exception of cobalt (all samples), copper (three samples) and zinc (all samples). PFAS concentrations were reported in three wells but were below the adopted screening criteria for marine ecosystems (95% species protection) and also for other water uses.
- Field parameters recorded by Jacobs (2022a) indicated that the groundwater was mildly acidic with an oxidising potential.
- WCC (2007a) reported that shallow groundwater encountered during test pit excavation was locally contaminated with TPH (>C_{10}) and traces of volatiles at two locations.

The groundwater results reported by Jacobs (2022a) and WCC (2007a) indicate that there are minor concentrations of metals in groundwater that exceed the adopted marine water screening criteria but

that there is unlikely to be groundwater contamination at the study area that impacts on the proposed development.

6.5.2.7 Surface water

No investigations into the contamination status of surface water within the converter station site, including runoff and water contained in the onsite stormwater pond, have previously been undertaken. Consequently, additional targeted surface water assessment was required, and the details of the additional assessment are provided in Section 6.6.

6.5.2.8 Sediment

Sampling of offshore sediment was completed in 2022 as part of the marine geotechnical and geophysical surveys. Sediment samples were compared against the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZ, 2018) for sediment guidelines. Two levels of screening criteria were applied (Tetra Tech Coffey, 2022) including:

- Default guideline values (DGVs), which indicate the concentrations below which there is a low risk of biological effects occurring.
- Upper guideline values (GV-high), which provide an indication of concentrations at which toxicity related effects will be expected.

The results of the metals analysis showed that some samples contained concentrations of metals that exceeded the Default Guideline Values for sediment quality, but the majority did not exceed the upper guideline values at which point benthic toxicity effects are likely to be observed.

Concentrations of arsenic exceed the DGV at most locations, with a median value of 24.5 mg/kg and a 95% upper confidence limit of 39.7 mg/kg across the entire dataset. This indicates that the arsenic may be naturally elevated in sediments in the area. Elevated concentrations of arsenic above the upper-guideline (GV-high) value were detected at SED-E5 at depths of 0.4-0.6m and 0.8-1.0m with concentrations of 103 and 108 mg/kg, respectively. The arsenic at depth at this location may represent a potential risk to benthic species if disturbed in this area and will require management in accordance with the requirements included in the Marine ecology and resource use report.

Concentrations of chromium were also elevated at locations SED-E5 and SED-W5 above the DGV for sediments. However, as the concentrations were below the adopted upper-guideline values, it is considered that localised effects on benthic biota may potentially be observed, but more investigation will be needed to confirm the relevance. The elevated concentrations of chromium were observed at the 0.4-0.6m depth, with shallower samples reporting lower concentrations.

Concentrations of nickel were observed in some locations above the DGV sediment criteria, with two locations (SED-E5 and SED-W5) reporting concentrations above the upper-guideline values. Given the location of these samples coincides with the elevated arsenic and chromium concentrations, the sediments in this area may potentially result in observable toxic effects on benthic biota if disturbed.

In general, the shallow sediment samples reported lower concentrations of metals, which likely represents fresh sediments that have been deposited over the last 20 years. Patterns in metals concentrations with depth were generally not observed in the sampling locations closer to the shore (i.e., sites E1, E2, E3, and W1), with no clear pattern in metals concentration changes with depth. This may partially be attributable to the shallow rock depth at some of these locations meaning that an aged sediment profile was not present to be sampled.

At the furthest location from shore (the E5/W5 sampling points) a marked change in metals concentrations with depth was observed, with concentrations of most metals (aluminium, arsenic, chromium, iron, nickel, vanadium and titanium) all increasing in concentration with depth.

This location, based on the increased metals (in particular iron and titanium) may represent an area where former effluent from the processing of titanium oxides has increased metals concentrations, but has more recently been covered by sediments more representative of natural sediments from the area.

It will typically be expected that metals concentrations in the <63µm fraction will be higher than in the whole <2,000 µm due to the higher surface area for metal binding per unit weight. The appraisal of fine (<63 µm) versus coarse (<2,000 µm) sediment metals concentrations did not show significant differences between the fractions indicating no significant preference for metals adsorption to the sediments.

The Marine Ecology and Resource Use Impact Assessment (EnviroGulf, 2024) assessed the potential impacts to the environment that may arise from the disturbance of contaminated sediments in the nearshore area and concluded that the risks to marine ecosystems were low, and that application of management and mitigation measures (as documented in the EnviroGulf, 2024 report) would reduce the potential risks to very low. The potential impacts from the metals contamination in offshore sediments has not been considered further in this report.

6.6 TARGETED SOIL AND SURFACE WATER SAMPLING

Based on the results of the review of previous reports prepared for the study area, a data gap in terms of characterising surface water quality on the site, soil stockpile contamination status and the potential for ASS to be present at the site was identified.

Additional targeted sampling of site surface water, soil stockpiles, and soils for ASS testing was conducted on 8 March 2023 to assess the impact of potentially contaminating activities on stockpiled soil and surface water runoff at the study area, as well as the presence of ASS. The results of the sampling works are detailed in the following sections.

6.6.1 ASS sampling results

Sampling for ASS was undertaken at eight locations along the northern boundary of the Heybridge converter station site. The results of the sampling are summarised below.

6.6.1.1 Field observations

As part of the sampling works conducted, field observations were made to identify indicators of potential soil impacts or contamination such as vegetation distress, water-logged soils or disturbed earth. A summary of these observations is provided in Table 6-2.

Table 6-2: Field Observations – soil sampling

Test Pit Location	mBGL	Observations
HEY1	0.0- 0.4	Fill: Brown-grey sandy clay with gravels and debris (brick and wood pieces)
	0.4-0.9	Natural: Dark grey clayey sand with black and white mottling with gravels
	0.9-1.4	Natural: Dark grey clayey gravels with sand
	1.4-1.5+	Natural: Pale grey gravelly clay with coarse sand and quartz pebbles. A sulfur-like odour was noted at 1.4 mbgl.

Test Pit Location	mBGL	Observations
HEY2	0-0.2	Fill: Sandy clay fill with gravels
	0.2-0.4	Fill: Clay fill with rootlets and charcoal fragments
	0.4-1.5+	Natural: Dark brown clay.
HEY3	0-0.3	Fill: Dark brown sandy clay fill with gravels and brick fragments
	0.3-1.45	Natural: Grey sand
	1.45-1.5	Natural: Oxidised red-brown cemented sand
HEY4	0-0.8	Fill: Sandy clay fill with boulders and debris (bricks, wood and concrete)
	0.8-1.5+	Natural: Dark grey sand with shell fragments.
HEY5	0-0.5	Fill: Yellow sandy clay fill with gravels, with concrete pieces, wire and plastic fragments
	0.5-1.5+	Fill: Yellow sandy clay fill with gravels
HEY6	0-0.1	Fill: Shallow dark brown sandy clay
	0.1-1.5+	Natural: Sandy clay with mudstone and quartz gravels.
HEY7	0-0.9	FILL: Yellow-grey clayey sand with gravels and boulders.
	0.9-1.5+	FILL: Pale grey clay with boulders, gravels and wood fragments.
HEY8	0-0.16	Fill: Clayey sand
	0.16-0.9	Natural: Clayey sand with boulders, gravels and pebbles,
	0.9-1.3	Natural: Yellow sandy clay with orange mottling and boulders
	1.4	Refusal on boulders

Field notes recorded during sampling are presented in Appendix E.

6.6.1.2 Analytical results

A total of 21 soil samples were analysed using the ASS field test methodology (by the NATA accredited laboratory). The ASS field testing is a quick method for appraising the potential for soils to be ASS containing and is used to guide furthermore specific ASS testing at the laboratory. The Method involved mixing two 5-gram sub-samples of soil in de-ionised water (pH-F) and 30% hydrogen peroxide (pH-Fox) and recording the reaction rates and the pH of each sample. The reaction rates range between no reaction (1) to vigorous reaction with heat or gas generation (4).

In order to evaluate the potential ASS impacts, the analytical results have been compared against the below screening criteria (based on Vic EPA Publication 655.1- Acid Sulfate Soil and Rock).

Table 6-3: Summary of ASS field test screening criteria

Hazard	pHF	pHFOX	Change in pH
None	>5	>5	< 2
Low	>5	>5	>2
Moderate		3 – 5	>2
High		<3	>2

Notes:
pH_F – indicates the existing pH of the soil in the field.
pH_{FOX} - measure of soil pH after rapid oxidation with hydrogen peroxide

Screening criteria for reaction rates have not been included in the above table as reaction rates can be affected by other compounds or materials within the sample (such as levels of organic carbon).

The results of the field pH test (conducted before and after oxidation using pHF and pHFOX respectively) and reaction rates (as compared with the screening criteria in Table 6-3 above) is presented in Table 6-5 below (and in Appendix C). Where field test results indicated an elevated risk of ASS (potential or actual) to be present, additional analysis of the samples via CrS testing was undertaken. The results of the CrS testing have also been included in the table below with 18 mol.H^+/t being the adopted screening criteria.

Table 6-4: Results of acid sulfate soil testing

Soil Sample ID	pH_F	pH_{FOX}	Change in pH	Reaction Rate	Actual Acidity (mol H+/t)	Net Acidity (mol H+/t)
HEY1_0.0-0.2	5.8	3.1	2.7	3.0	-	-
HEY1_0.4-0.7	6.4	4.2	2.2	4.0	-	-
HEY1_0.9-1.0	-	-	-	-	7.2	11
HEY1_1.4-1.5	-	-	-	-	7.8	15
HEY2_0.0-0.2	5.6	4.1	1.5	4.0	-	-
HEY2_0.6-0.7	5.6	3.1	2.5	4.0	-	-
HEY2_1.4-1.5	-	-		-	41	46
HEY3_0.0-0.2	7.5	4.8	2.7	4.0	-	-
HEY3_0.9-1.0	-	-	-	-	4.8	<10
HEY3_1.4-1.5	-	-	-	-	3.2	<10
HEY4_0.0-0.2	8.3	5.3	3	4.0	-	-
HEY4_0.4-0.5 (A)	7.9	4.8	3.1	4.0	-	-
HEY4_0.9-1.0	-	-	-	-	<2	<10
HEY4_1.4-1.5	-	-	-	-	<2	<10
HEY5_0.0-0.2	9.1	6.9	2.2	4.0	-	-
HEY5_0.4-0.5	8.0	5.8	2.2	3.0	-	-
HEY5_0.9-1.0	7.2	5.2	2	3.0	-	-
HEY5_1.4-1.5	6.3	4.9	1.4	3.0	-	-
HEY6_0.0-0.3	6.5	4.0	2.5	3.0	-	-
HEY6_0.4-0.5	5.5	2.5	3	3.0	22	27
HEY6_0.9-1.0	5.5	3.1	2.4	3.0	-	-
HEY6_1.4-1.5	-	-	-	-	11	11
HEY7_0.0-0.2	6.1	2.8	3.3	3.0	-	-
HEY7_0.5-0.6	6.1	3.0	3.1	3.0	-	-
HEY7_0.9-1.0	4.4	3.0	1.4	3.0	48	85
HEY7_1.4-1.5	-	-	-	-	42	67
HEY8_0.0-0.3	6.1	2.8	3.3	4.0	-	-
HEY8_0.4-0.5	5.1	2.9	2.2	3.0	2.7	<10
HEY8_0.6-0.7	5.3	2.9	2.4	3.0	-	-
HEY8_0.9-1.0	4.8	2.9	1.9	3.0	6.0	13
HEY8_1.3-1.4	-	-	-	-	24	30

The measured pH_F (or acidity) and pH_{FOX} of both the fill and natural soil samples collected from the site do not suggest the presence of actual ASS. However, the change in pH and the reaction rate suggest that potential ASS may be present in both the fill and natural soils.

Based on field observations and initial ASS field test results, fourteen selected samples were submitted for laboratory analysis using the chromium reducible sulfur (CrS) suite analytical method to assess acid production potential and net acidity for comparison to the texture-based action criteria in the Tasmanian Acid Sulfate Soil Management Guidelines (DPIPWE 2009). Relevant criteria are also dependent on the volume of material to be disturbed and are grouped as disturbances between 100 to 1000 tonnes, and greater than 1000 tonnes. Given that the scale of the soil disturbance is not yet known, we have adopted the more conservative screening criteria (disturbances greater than 1000t) to appraise potential risks. The net acidity result was determined according to acid base accounting for both the sulfur and acid trails which takes into account existing acidity, potential acidity and the acid neutralising capacity of the soil (as appropriate).

The reported analytical results for the ASS samples collected as part of this assessment are displayed in Table 1, Appendix C, and are summarised below in Table 6-5. Laboratory documentation is presented in Appendix F.

Table 6-5: Summary of ASS analysis – samples exceeding action criteria

Location / Depth (m)	Soil type	Net Acidity	
		Acid Trail (moles H^+ / tonne)	Sulfur Trail (% S w/w)
HEY2_1.4-1.5	Clay	46	0.07
HEY6_0.4-0.5	FILL: Sandy Clay	27	0.04
HEY7_0.9-1.0	FILL: Clay	85	0.14
HEY7_1.4-1.5	FILL: Clay	67	0.11
HEY8_1.3-1.4	Sandy Clay	30	0.05

The reported analytical results confirm that potential ASS are present at the northwest and southeast ends of the site in the vicinity of the planned HVDC subsea cable end points, as depicted in Figure 4. At location HEY2 in the northwest part of the site potential ASS was encountered at a depth of 1.4 mbgs while at the southeast end of the site it was encountered at depths ranging from 0.4 mbgs at location HEY6 to the maximum excavation depth of 1.5 mbgs at location HEY7.

The extent of ASS is not consistent across the site, and some units have neutralising capacity to mitigate potential acid generation. However, the analysis for ASS in the Jacobs (2022a) and this report identified that the grey to black clays, with or without gravels, were associated with potential ASS, and were likely to be encountered at a depth of 1 to 1.5 m below the ground surface, although up to 0.5 m deeper on the southern side of the converter station site due to higher elevations in this area. The centre of the former factory area may also contain acidic conditions in soils from either ASS or former acid leaks from the factory processes.

6.6.2 Stockpile sampling results

Sampling of the stockpiles on the Heybridge converter station site was undertaken and the results of the sampling are summarised below.

6.6.2.1 Field observations

As part of the sampling works conducted, field observations were made to identify indicators of potential soil impacts or contamination such as odours, staining or the presence of extraneous material. A summary of these observations is provided in Table 6-6.

Table 6-6: Field Observations – stockpile sampling

Stockpile Location	Samples Collected	Observations
SP2	3 *(SP2_01-03)*	Sandy clay with gravels and some extraneous material (plastic, clay pipe, concrete pieces, glass fragments). Organic odour noted.
SP3	1 *(SP3_01)*	Dark brown sandy clay with brick fragments. Eastern part of stockpile not sampled as it was considered to be within a designated asbestos area.
SP5	3 *(SP5_01-03)*	Sandy clay with gravels and wood fragments.
SP8	2 *(SP8_01-02)*	Sandy clay with gravels. No extraneous material observed.
SP9	4 *(SP9_01-04)*	Sandy clay with gravels. Organic odour and white staining noted at sample location SP9_01. Eastern part of stockpile (includes sample locations SP9_01 and SP9_02) was observed to be dark brown and contained a significant amount of wood chips – suspected to be more recently placed than western part of stockpile.
SP10	3 *(SP10_01-03)*	Sandy clay with wood, brick and concrete fragments.

It is noted that other stockpiles were present onsite (as shown in Figure 5) however, due to their small size and volume, sampling of these stockpiles was not completed. Field notes recorded during sampling are presented in Appendix E.

6.6.3 Surface water sampling results

Sampling of surface water at the Heybridge converter station site and foreshore was undertaken. The results of the sampling are summarised below.

6.6.3.1 Field observations

Surface water was observed onsite in man-made drainage channels adjacent to tracks running south-east to north-west, with culverts feeding the water under the tracks and ultimately under the Bass Highway to the drainage outlet (HEY-SW2-Alt) at Tioxide beach. Little to no vegetation was present along the tracks, while low scrubby vegetation was observed around the drains.

The surface water displayed no visual or olfactory evidence of chemical contamination at the time of sampling.

The observations noted at each surface water sample location are summarised below in Table 6-7.

Table 6-7: Field Observations – surface water sampling

Sample Location	Location Type	Observations
HEY-SW1	Stormwater drain outlet to Tioxide Beach	No apparent odour. Clear with green algae.
HEY-SW2-Alt	Onsite drainage channel alongside site tracks	Slightly cloudy – brown. No odour.

Field notes recorded during sampling are presented in Appendix E.

6.6.3.2 Analytical results

The reported analytical results for the surface water samples collected as part of this assessment are displayed in Table 4, Appendix C. Laboratory documentation is presented in Appendix F.

The copper concentrations reported for both surface water samples collected as part of the assessment (HEY_SW1 and HEY_SW2) exceed the adopted marine and freshwater assessment criteria. The reported concentrations of zinc in both samples are above the adopted freshwater assessment criteria. The adopted marine assessment criteria is also exceeded by the zinc concentration reported for sample HEY_SW2.

Concentrations of arsenic (sample HEY_SW2), nickel (both samples) and some petroleum hydrocarbons (sample HEY_SW1) were also reported above the laboratory limit of reporting (LOR), but below the adopted screening criteria. All other analytes were reported at concentrations below the laboratory LOR.

The surface water criteria exceedances are summarised below in Table 6-8.

Table 6-8: Surface Water criteria exceedances

Analyte	Reported Concentration Range (mg/L)	ANZECC 2000 Recreational water quality and aesthetics	ANZG (2018) Freshwater 95% toxicant DGVs	ANZG (2018) Marine water 95% toxicant DGVs	Locations Exceeding Criteria
Copper	0.003	1	0.0014	0.0013	HEY_SW1 & HEY_SW2
Zinc	0.012 – 0.067	5	0.008	0.015	HEY_SW1 & HEY_SW2

Shading denotes analytical results that exceeded the adopted site criteria.

6.6.4 Data quality assessment

Tetra Tech Coffey has completed a review of the Quality Assurance (QA) steps and Quality Control (QC) results, according to the following documents.

- NEPC, National Environment Protection (Assessment of Site Contamination) Measure, National Environment Protection Council (1999).
- US EPA Guidance on Environmental Data Verification and Data Validation (2002).
- US EPA Contract Laboratory Program for Organic (1999) and Inorganic (2002) Data Review.

This included examining holding times, laboratory accreditation, sample preservation methods, a review of field QC sample results and a review of laboratory QC sample results. To validate the accuracy and validity of primary soil sampling results, a range of field and laboratory QC samples were collected and assessed during the assessment.

A summary of the reported QC analytical results and data validation report is provided in Appendix G.

NATA certified laboratory certificates of analysis are provided in Appendix F.

Overall, it was considered that the field and laboratory quality procedures and results are acceptable for the purposes of interpreting and verifying the findings of the assessment.

6.6.5 Stockpile classification

A comparison of the reported analytical results for the stockpile samples collected as part of this assessment against the waste classification criteria listed in EPA Tasmania Information Bulletin No. 105 is displayed in Table 2, Appendix C. Laboratory documentation is presented in Appendix F.

Several stockpile samples reported concentrations of some metals exceeding 'fill material (level 1)' criteria. The elevated analyte concentrations reported for each stockpile sampled as part of the assessment and the subsequent preliminary classification are summarised below in Table 6-9.

The concentrations reported for all other analytes were below detectable limits, with the exception of some hydrocarbon fractions which were reported above the laboratory limit of reporting (LOR) in several samples.

Table 6-9: Preliminary stockpile classification

Stockpile	Analyte Exceeding Fill Material Criteria	Samples	Maximum Concentration (mg/kg)	Preliminary Classification
Stockpile 2	Chromium (III+VI)	SP2_01 - 03	280	Low Level Contaminated Soil (Level 2)
	Copper	SP2_02	170	
	Mercury	SP2_02	6.7	
	Nickel	SP2_01 - 03	110	
Stockpile 3	Chromium (III+VI)	SP3_01	87	Low Level Contaminated Soil (Level 2)
	Mercury	SP3_01	9.8	
Stockpile 5	Lead	SP5_02	380	Low Level Contaminated Soil (Level 2)
Stockpile 8	Chromium (III+VI)	SP8_02	63	Low Level Contaminated Soil (Level 2)
	Nickel	SP8_02	94	
Stockpile 9	Chromium (III+VI)	SP9_01 & SP9_02	67	Low Level Contaminated Soil (Level 2)
Stockpile 10	Chromium (III+VI)	SP10_01 & SP10_03	84	Low Level Contaminated Soil (Level 2)
	Nickel	SP10_03	73	
	Zinc	SP10_03	400	

On-site retention

The reported stockpile sample results have been compared against the adopted human health and ecological assessment criteria to indicate if the stockpiled material is appropriate to be retained onsite for reuse. The reported analytical results are compared against the adopted criteria in Table 3, Appendix C.

Concentrations of copper (sample SP2_02), nickel (SP2_01-03, SP8_02, SP10_03) and zinc (SP10_03) were reported above the adopted Ecological Investigation Levels (EILs). It is noted that the EILs for copper, nickel and zinc were calculated using conservative criteria in the absence of site-specific data.

All other analytes were reported to be below the adopted assessment criteria. It is noted that some TPH/TRH fractions were reported to be above the laboratory LOR in several stockpile samples.

The stockpile human health and ecological criteria exceedances are summarised below in Table 6-10.

Table 6-10: Stockpile human health and ecological criteria exceedances

Analyte	Reported Concentration Range (mg/kg)	NEPM (2013) Table 1B(5) EILs - Comm/Ind	Locations Exceeding Criteria	Stockpiles Impacted
Copper	<5 - 170	90	SP2_02	Stockpile 2
Nickel	<5 - 110	65	SP2_01-03, SP8_02, SP10_03	Stockpiles 2, 8 and 10
Zinc	8.6 - 400	190	SP10_03	Stockpile 10

The reported stockpile results indicate that, should the stockpiled material be retained and reused onsite, it is unlikely to present an unacceptable health risk to maintenance and construction workers who are exposed to the soil. The reuse of the soils withing stockpiles 2, 8 and 10 may result in impacts to sensitive ecological receptors and any retention of these stockpiles will require additional investigation to determine likely effects to receptors in their final re-use location.

7. CONCEPTUAL SITE MODEL

This section provides a summary of the conceptual site model (including the nature and extent of contamination within the study area) and appraises the potential risks to receptors from contamination.

Based on the review of previous environmental site investigations and publicly available relevant environmental and historical information, and targeted sampling undertaken as a part of this assessment, potential sources of contamination and their associated contaminants of concern which may have impacted the soil, sediments, surface water and groundwater within the study area have been summarised in Table 7-1.

Table 7-1: Summary of potential sources of contamination

Sources of Contamination	Associated Contaminants of Potential Concern
Former Tioxide factory	Metals, petroleum hydrocarbons, asbestos, low pH, NORM
Lumber yard	Petroleum hydrocarbons
Potential ASS	Acid generation (low pH), metals

7.1 NATURE AND EXTENT OF CONTAMINATION (SOURCES)

The primary sources of contamination (as summarised in Table 7-1) are no longer present on the converter station site (with the exception of potential ASS), however, secondary sources of contamination remain on the converter station site, and within the study area.

7.1.1 Soil impacts

Soil contamination associated with the former Tioxide factory have largely been remediated to levels commensurate with the industrial land use. However, isolated locations of contamination still remain within the converter station site including metals in fill soils across the site, with concentrations of copper, nickel, lead and zinc above the adopted NEPM EILs calculated for the site, as well as one location with lead above the adopted NEPM HIL-D.

There is also the potential that hydrocarbon contamination may be present in soils at the converter station site above NEPM management limits or health screening levels based on the historic impacts identified in soils. Recent testing has not identified any locations on the converter station site with concentrations of hydrocarbons above the adopted screening criteria.

Asbestos containing materials are also present within fill soils and soil stockpiles on the converter station site with several areas reporting ACM presence that will potentially present an unacceptable hazard to human health via the inhalation of fibres. A plan showing the areas where asbestos containing materials have previously been identified and removed is presented as Figure 12. The asbestos materials (where identified) were visually removed, however no validation sampling of the residual soils (in accordance with the NEPM) has been undertaken and there is a potential that fragments of asbestos containing materials remain within fill soils on the site.

Low pH soils (less than 4 pH units) are also present beneath some areas of the converter station site, where acid leakages from the plant have resulted in reduced pH. The low pH soils are generally contained to the central section of the converter station site.

The converter station site is underlain by a varying thickness of fill soils, ranging from approximately 0.3 to greater than 2 m in some locations. The average fill thickness across the converter station site was approximately 0.7 m, based on test-pitting undertaken since the demolition and rehabilitation of

the factory. The extent of fill has also not been well characterised in the former factory areas where buried concrete blocks and bricks / rubble have limited the ability to extend boreholes to depth.

Given the highly heterogeneous nature of the fill soils on the converter station site, there is a potential that areas of contamination are present in soils at depth, including hydrocarbon contamination, metal contamination, acidic soils and asbestos containing materials at concentrations that could pose a potential impact to the health of site users or environmental receptors both on the converter station site, and in within the greater study area where contamination may be mobilised (such as via airborne or surface water transport) if disturbed.

The condition of the former effluent tunnel is also unknown, and contaminated soils may be present in and around this structure. The condition of the materials around the tunnel (whether still present or decommissioned) is unknown. However, based on the proposed decommissioning plan (pitt&sherry 2007), it is possible that the former tunnel could act as a preferential pathway for contaminant migration from the site to Bass Straight, or saline intrusion onto the site during any dewatering activities.

Soil stockpiles are also present on various areas of the converter station site and whilst the soils in the stockpiles are unlikely to present an unacceptable risk to human health or environmental receptors, should they require offsite disposal they may be classified as low-level contaminated soils (Level 2) in accordance with Tasmanian EPA Bulletin 105.

Radioactivity testing undertaken across the converter station site and within test pits indicated that the measured radioactivity was within background levels for the area.

PFAS testing for soils did not report any concentrations above the adopted screening criteria or laboratory limits of reporting.

Areas of soils at the site potentially contain hydrocarbon odours. The majority of hydrocarbon impacts were removed during the factory decommissioning and remediation works undertaken and validated as being below the adopted industrial land-use screening criteria. However, some residual hydrocarbons may remain in soils (either around former remediation areas or in unidentified areas on the converter station site) that may be odorous and present an aesthetic impact to receptors if disturbed.

The conservative assumption that all fill soils will require removing from the site as a part of the project will remove the majority of any potential contamination remaining within the fill soils at the site. Review of the previous data (WWC, 2007a) noted that soil sampling was undertaken on an approximate 30 m grid across the entire former factory site at 62 locations and identified elevated concentrations of arsenic, cobalt, chromium, mercury, manganese, nickel, lead and zinc above the Level 1 (fill material) screening criteria. The locations of the Level 1 (fill material) exceedances were across the centre and south of the converter station site (where fill has been assumed to require removal) and within the top 0.5 m of soils. One location in the centre of the former factory area also contained a concentration of manganese (6,469 mg/kg) that exceeded the Level 2 (low level contaminated soils) criteria.
A statistical appraisal of the soil manganese results indicated the following:

- The shallow fill soils reported a 95% UCL of 1,911 mg/kg, and
- The entire soil data set reported a 95% UCL of 611 mg/kg.

The statistical evaluation would classify the soils (from a manganese perspective) as Level 2 (low level contaminated soils)

The distribution of impacts throughout the soil profile indicates that whilst the top 0.5 m of soils contains the majority of Level 2 (low level contaminated soil) with deeper soils generally comprising Level 1, isolated locations – particularly in the factory areas - contain deeper contamination (up to 1 m

below ground levels) that would classify these isolated locations as Level 2 (low level contaminated soil).

On the basis that the upper 0.5 m of soils on the converter station site are predominantly Level 2 (low level contaminated soils), with some deeper areas, the following estimate of the approximate volumes of waste soils in the fill soils to be disturbed has been provided. The estimates in the table are based on the assumption of the top 0.5 m of fill soils are Level 2 (low level contaminated soil), and a further 25% of deeper fills soils are also Level 2 (low level contaminated soil). The table also assumes that the remaining deeper fill soils would be classified as Level 1 (fill material) for the purposes of off-site disposal.

Table 7-2: Estimates of waste soil categories for disposal

Soil category	Estimated volume (m^3)
Level 1 (fill material)	37,200
Level 2 (low level contaminated soil)	34,300
Level 3 (contaminated soil)	0
Level 4 (contaminated soil for remediation)	0
Totals	**62,200**

MARINUS LINK

LEGEND

- Landfall

Proposed route

- HVDC subsea cable
- Heybridge converter station site boundary
- Major road
- Minor road
- Areas where ACM debris was identified and removed from site (approx. locations only)

Source:
Routes from Tetra Tech Coffey.
Asbestos areas digitised from IPM Consulting and Pitt & Sherry reports.
Roads from DPIPWE.
Imagery from NearMap (8 March 2022).

N

0 30 60 m

SCALE **1:3,000**
PAGE SIZE: **A4**
PROJECTION: **GDA2020 MGA Zone 55**

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MARINUS LINK HEYBRIDGE
GROUNDWATER IMPACT ASSESSMENT REPORT

FIGURE 12

Plan of known asbestos contamination

TETRA TECH COFFEY

DATE: **03.09.24** PROJECT: **754-MELEN215878ML** FILE: **215878ML_CSASS_TAS_F012_GIS**

DOC REFERENCE: \\TT-LOCAL\COP\S772\SI\GIS\215878_MELEN_TAS\NETWORKS_PROJECT\MARINUS\TAS\NETWORKS\PROJECT\MARINUS\GIS\MXD_A\PRX\215878ML_CSASS_TAS\215878ML_CSASS_TAS.APRX LAYOUT:215878ML_CSASS_TAS_F012_GIS_1 SAVED BY: MATTHEW.GOLJANIN 03.09.24 3:50 PM

7.1.2 Surface water impacts

Surface water testing from the drain and pond on the converter station site indicated that the surface water contained concentrations of copper and zinc above the adopted screening criteria for protection of fresh and marine water (ANZG 2018 – DGVs for 95% species protection). Given that the converter station site drains and ponds are man-made structures, a lower level of protection of freshwater species could be adopted – as these will be classified as highly-disturbed systems (or may not even qualify as surface water requiring protection given that it is in a pipeline and storage detention basin). However, as the surface water from the converter station site discharges directly to the marine environment, the 95% marine criteria have been adopted for appraising potential impacts to water quality.

The concentrations of copper and zinc are marginally above the adopted screening criteria and could present a potential risk to marine receptors. However, as the surface water flowing from the converter station site is ephemeral (in that it only flows during rainfall events), the impacts to marine receptors are likely to be minimal, as the exposure duration for assessing impacts to aquatic biota is based on continual exposure, and not periodic exposure. Consequently, the surface water quality within the study area is not considered to impact on ecological receptors within the marine environment.

The concentrations of potential contaminants at the converter station site were all below the screening criteria for protection of human health (primary contact recreation and potable water supply).

7.1.3 Groundwater impacts

Groundwater at the converter station site is present at depths ranging between approximately 0.5 m to 3 m below the ground surface (based on recent studies). Groundwater contaminant testing has shown that groundwater is generally not impacted by contamination originating from the converter station site.
The groundwater is mildly acidic (pH approximately 6.5), and contains concentrations of cobalt, copper and zinc in excess of the adopted marine water ecosystem protection criteria. The metals concentrations in groundwater are widespread across the converter station site, do not appear to be associated with any particular point source, and maybe reflective of background water quality in the area. No background water testing has been undertaken to confirm if the concentration of metals are naturally occurring, however given the widespread nature of the impacts, and that zinc and cobalt are not associated with any anthropogenic activities on the converter station site, it is likely that the concentrations are naturally occurring.

Localised areas of hydrocarbon impacts in groundwater were reported during test pit sampling (WCC 2007a). However, the concentrations are likely to be limited to the areas where they were previously identified and not widespread across the converter station site.

The groundwater from the converter station site discharges to the ocean at Tioxide beach and there is a potential that the concentrations of metals in groundwater may impact on marine receptors.

Testing of groundwater for PFAS identified concentrations of PFOS, PFOA and PFHxS above the laboratory reporting limits, although all concentrations were below the adopted screening criteria for protection of human health and marine aquatic ecosystems.

7.1.4 Sediment and offshore impacts

Offshore sediment sampling indicated that whilst metals in sediments were present, they were generally below the adopted default guideline value (DGV) levels and likely to be naturally occurring across the majority of the sampling areas. However, concentrations of arsenic, nickel and chromium were elevated at the furthest sampling points from the shore (SED-W5 and SED-E5), with concentrations above the DGV (As, Cr, Ni and Ag), and also above the Upper guideline value (As and Ni). The increased concentrations of metals in sediments at these locations is potentially a result of metal rich effluent discharged to this area from the Tioxide factory (via the effluent pipeline). These locations also show higher concentrations of iron, aluminium and titanium compared to locations closer to the shore, which also suggests that the metals may be from the former factory.

The effluent pipeline (in the area where the cable is proposed to cross the pipeline) is not considered to be a potential source of contamination, with sediments in and around the pipeline containing concentrations of potential contaminants below the sediment DGVs.

For the majority of the pipeline length, the sediments surrounding the pipeline are not considered to be contaminated. However, based on sediment sampling near the outlet of the effluent pipe, it is likely that sediments in the vicinity of the pipe outlets are contaminated with metals.

7.1.5 Potential ASS

ASS testing undertaken at the converter station site has shown that potential ASS are present at the converter station site at depths from approximately 0.5 m below the ground surface, but that it is not continuous across the converter station site. The lack of continuity across the converter station site is likely due to historic disturbance of the soil profile during factory construction and demolition.

The conservative assumption that all fill soils will require removing from the site as a part of the project will result in disturbance of large volumes of potential ASS. The extent of ASS or PASS at the site is not well characterised as the distribution is not contiguous across the site. The ASS sampling undertaken across the centre and south of the converter station site identified potential ASS presence in grey to black clays (with or without gravels) at depths of 1 to 1.5 m below the ground surface (up to 2 m on the southern side of the converter station site). The centre of the former factory area may also contain acidic conditions in soils from either ASS or former acid leaks from the factory processes. These soils and the associated potential ASS are likely to be disturbed where fill soils are removed (as assumed in Section 5.6). The potential oxidation and generation of acid from these soils will require management and/or treatment to mitigation potential impacts to the environment.

On the basis that a thickness of 0.5 m of soils (generally at depths of between 1 and 1.5 m below the ground) on the converter station site are potential ASS, the following estimate of the approximate volumes of potential ASS that may be disturbed has been provided. It is noted that the extent of ASS across the site is not contiguous, but that thicknesses may be greater than 0.5 m in some areas. Consequently, we have conservatively adopted a thickness of potential ASS of 0.5 m extends across the entire disturbance area for the purposes of assessing potential impacts.

On this basis, approximately 37,200 m^3 of ASS may be disturbed. The actual acidity of the potential ASS ranged from < 2 to 48 mol H^+/tonne, and reported liming rates ranged between < 1 to 5.6 kg per tonne.

Whilst sampling for ASS between the converter station site and the shoreline has not been undertaken, it has been assumed that a layer of potential ASS is present in this area. Depending on the depth that the HDD conduits are drilled, potential ASS may be intercepted in this area. However, it is likely that if the conduits are drilled deeper (i.e., within the basement rock), potential ASS is less likely to be intercepted. Off-shore ASS testing indicated that the sediments were not potential ASS as they had sufficient acid-neutralising capacity to limit the generation of acid.

The extent of potential ASS likely extends across the converter station site, across the beach to the low tide line. The transition between potential ASS soils and offshore non-ASS sediments is not well defined. However, rock platforms with limited sediments extend to at least 200 m offshore and it has been assumed that the rock platforms do not contain any potential ASS. Consequently, we have assumed that the potential ASS soils extend to the low-tide line at Tioxide Beach.

The disturbance of ASS may also result in generation of localised sulfidic odours.

7.2 POTENTIAL EXPOSURE PATHWAYS

The main exposure pathways that could be considered likely during the construction, operation and decommissioning phases include:

- Human Health Exposure Pathways
  - Dermal contact with contaminated soil/sediments
  - Incidental ingestion of soil/sediments
  - Inhalation of soil derived dusts (including asbestos fibres)
  - Volatilisation of contaminants leading to inhalation
  - Incidental ingestion or dermal contact with contaminated surface water (including marine surface water) or groundwater
- Ecological Exposure Pathways
  - Ingestion of soil by, or direct toxicity to, soil invertebrates
  - Uptake and accumulation by, or direct toxicity to terrestrial plants
  - Incidental ingestion of soil by fauna foraging
  - Ingestion of sediment by, or direct toxicity to benthic biota
  - Uptake and accumulation by, or direct toxicity to contaminated sediment by benthic biota
  - Migration of contamination via surface run-off resulting in direct contact with contaminated water and/or sediment by aquatic organisms in receiving surface waters
  - Leaching of contamination in soil to groundwater resulting in impacts to groundwater dependent ecosystems

7.2.1 Potential receptors

The following key current site-specific receptors have been identified in vicinity of the study area:

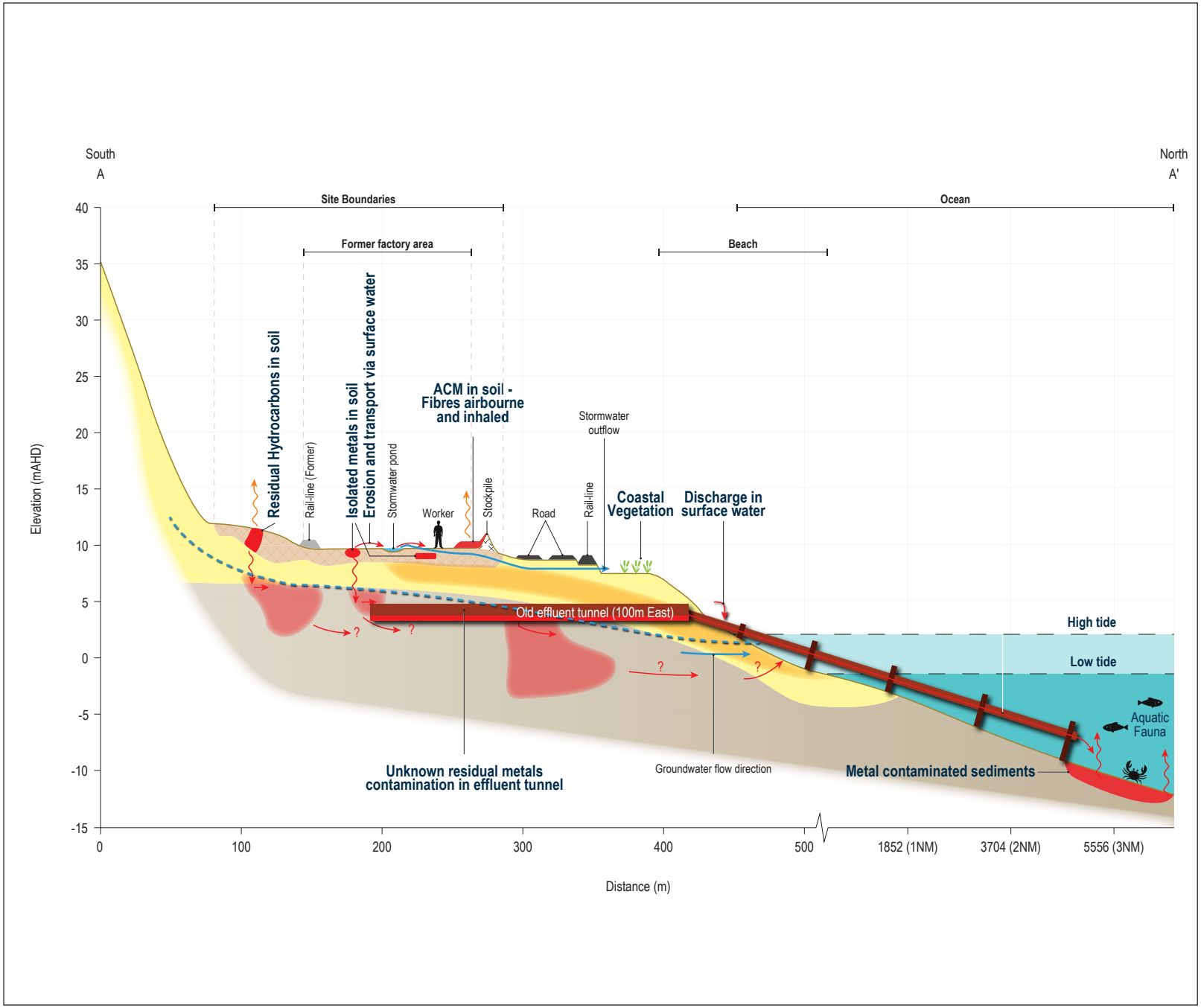
- Human Health Receptors
  - Persons using the facility currently or in the future that may come into contact with contaminated soil and/or groundwater or be exposed to airborne contamination, or vapours that emit into indoor or outdoor areas; and
  - Construction and maintenance workers conducting works at the site in the event they come into contact with contaminated soil and/or groundwater or are exposed to airborne contamination, or vapours that emit into indoor or outdoor areas.
  - Construction or maintenance workers that may come into contact with contaminated sediments when working offshore
  - Recreational users of impacted surface waterbodies.
- Ecological Receptors
  - Terrestrial fauna that may come into contact with onsite surface water bodies
  - Terrestrial flora that may update contaminated groundwater or surface water

- Terrestrial flora and fauna that may come into contact with contaminated or low pH soils
- Marine biota that is exposed to contaminated groundwater or surface that has discharged from the site
- Marine biota that is exposed to contaminated sediments on the seabed that are disturbed by construction, maintenance or decommissioning.

7.2.2 Summary of conceptual site model

Based on the review of previous environmental site investigations and publicly available relevant environmental and historical information, potential sources of contamination within the study area that may impact on receptors were identified. A plan of the site conceptual model is presented as Figure 13. The key contamination issues within the study area include:

- Fill soils on the Heybridge converter station site with heterogeneously distributed contamination including metals (lead, copper, nickel, chromium and zinc), petroleum hydrocarbons and ACM that potentially cause an impact to human health or ecological receptors. Where these soils are disturbed or surplus to requirements, they have the potential to impact on receptors. If the soils are removed from the site, they have the potential to cause environmental or health impacts if not managed appropriately.
- Based on the long history of mineral processing, the demolition undertaken at the site and the highly heterogeneous distribution of contamination in soils at the Heybridge converter station site, contamination may be encountered outside of areas previously identified or remediated (i.e. former effluent tunnel).
- Contaminated groundwater discharging to surface water (onsite and the offsite marine environment) that may result in impacts to sensitive ecological receptors.
- Potential ASS within soils at the converter station site and between the converter station and the low-tide line that if disturbed or dewatered may result in generation of acid that impacts on human health, built structures, terrestrial or aquatic biota, or cultural heritage artefacts.
- Contaminated sediments approximately 5km offshore that may impact on benthic biota if disturbed (addressed in the Marine Ecology and Resource Use Impact Assessment (EnviroGulf, 2024)).



MARINUS LINK

LEGEND

- Fill
- Sand
- Potential acid sulfate soils
- Quartz-wacke
- Effluent piping
- Leaching/groundwater transport plume
- Volatilisation
- Leaching
- Potential Migration
- Groundwater

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CSASS TASMANIA

FIGURE 13

Conceptual site model

TETRA TECH COFFEY

DATE: 19.04.24 PROJECT: 754-MELEN215878ML FILE: 215878ML_CSASS_TAS_F013_GRA

8. RISK ASSESSMENT

The following sections present the contaminated land and ASS risk assessment for the construction, operation and decommissioning of the project.

Based on the outcomes of the conceptual site model and contamination assessment (Section 7), five potential hazards have been identified as having a risk of causing impacts to the environment without the application of additional controls:

1. Management of excavated soils,
2. ASS,
3. ACM debris, and
4.
5. Management of routine construction and operational impacts.

These four hazards and the associated risks are detailed below. The contaminated sediments in the offshore area have been considered in the Marine Ecology and Resource Use Impact Assessment (EnviroGulf, 2024) report.

Each potential impact is discussed with an assessment of risk likelihood and consequence provided. A summary table of risk to human health and ecological receptors have been provided (Table 8-4).

8.1 MANAGEMENT OF EXCAVATED AND SURPLUS SOIL

The assessment of the study area has identified that, shallow fill soils within the converter station portion of the study area that require excavation and/or offsite disposal, there are potential for contaminants (metals and hydrocarbons) to be at concentrations that may cause impact to human health or the environment if not managed appropriately.

These potential impacts are associated with disturbance of contamination that leads to either impacts to human health of site construction and maintenance workers via inhalation, dermal contact or incidental ingestion of contaminated soils. The likelihood of adverse effects to human health from disturbance of contaminated soils at the site is low as there are only limited and isolated occurrences of contaminants that exceed the adopted health screening criteria (NEPM HIL-D), and the known impacts are generally outside of the planned areas of disturbance. Generally, disturbance of soils at the converter station site is unlikely to result in impacts to human health and the soils are not considered to be contaminated (such that they require remediation or offsite disposal) – noting the presence of asbestos that requires specific remediation and management.

Residual soil stockpiles on the converter station site are unlikely to result in an adverse impact to human health as the potential contaminants within the stockpiles are below the adopted health screening criteria. Some of the fill and stockpiles soils at the converter station may also contain asbestos containing materials that could impact on human health. The risks from asbestos are considered separately in Section 8.3.

Metals contamination (primarily arsenic, copper, nickel and zinc) in soils and soil stockpiles on the converter station site may potentially impact on ecological receptors on the converter station site, however the extent of contaminated soil that exceeds the adopted NEPM EILs is limited, and it is likely that the majority of the areas of the converter station site will be maintained as a hardstand, which is unlikely to support ecological receptors. Removing fill soils from the site that are contaminated with metals that exceed the NEPM EILs, or retention of contaminated soils beneath areas of hardstand or pavement could reduce the potential impacts to ecological receptors. Additional testing of natural surface soils in the area of the site may also provide relevant background data that

can be utilised to better characterise the potential risks to native ecological receptors (flora and fauna).

The former effluent tunnel that is under the eastern part of the site has not been assessed for potential contamination (including contaminated sediments). The tunnel is considered to have been decommissioned in the converter station site, but what was used to backfill the tunnel void is unknown, and if any material (sediment, contaminated construction materials etc.,) is to be removed from the tunnel area, it is to be tested for contamination and managed accordingly.

The construction phase will generate soils from the construction of footings for site infrastructure and from horizontal boring that will require management. Based on the current design estimates, it is likely that approximately 62,200 m^3 of fill will be required to be excavated and managed. Where any excavated fill is geotechnically suitable for reuse and if the spoil is contaminated and retained on the converter station site to address the principles of the EMPCA waste hierarchy, then the operation and decommissioning phase of the project has the potential to generate contaminated soils that will require management.

Improper handling and stockpiling of excavated soils can result in impacts to air quality from dust emanation or surface water quality via stormwater run-off and sedimentation. Any stockpiles of 'contaminated' material must be contained to limit the potential for migration of contamination through dust dispersion, leaching, or stormwater run-off. Controls for all stockpiles should be documented within the project contaminated land management plan to be prepared as part of the project's Construction Environmental Management Plan (CL-01).

Where localised impacts from contamination or ASS are identified (CL-01) soils excavated from these areas will require separate management. Contaminated soil may present a risk to human health or the environment via leaching of contamination to groundwater or surface water, or ingestion/inhalation from dust or volatile contamination.

Surplus soils generated during site works that require offsite disposal must be classified and managed in accordance with EPA Tasmania (2018) Information Bulletin No. 105, *Classification and Management of Contaminated Soil for Disposal*.

Where soils are classified as *'contaminated soil'* (level 3) or '*contaminated soil for remediation*' (level 4), these soils are to be managed in accordance with the EP Regulations and only transported to a premises authorised by EPA to accept such wastes. No soils to date on the Converter Station site have reported concentrations of contaminants that would classify them as Level 3 or Level 4 wastes.

Should the soils be classified as '*low level contaminated soil'* (Level 2), the project may apply to EPA for a permit to retain the soils within the project site. It is estimated that approximately 34,400 m^3 of the estimated 62,200 m^3 of fill soils that may require removing from the site may be classified as Level 2 (low level contaminated soil).

Given the historical use of the site, there is a potential that ground disturbance in the study area may uncover areas of waste, stained or odorous soil, asbestos containing materials or other potential areas of contamination. Such finds could impact on the health of site users (construction and maintenance workers) or environmental receptors (including terrestrial flora and fauna, as well as surface water ecosystems should contamination disturbance at the location result in discharge to surface water bodies – including the marine environment).

In order to address the potential risks to the environment from unexpected contamination finds an unexpected finds protocol is to be incorporated into the contaminated land management plan.

Soils on the site may also contain hydrocarbon or sulfidic odours which may pose an aesthetic risk to site users or surrounding receptors. Soils that are odorous must be managed to minimise odour via the design of odour controls relevant to the potential impacts identified (if any). Controls may take the

form of odour suppressants, odour capture and treatment, avoidance or other relevant measures to mitigate impacts.

The application of the suggested management and mitigation measures for managing contaminated soils will reduce the potential risks to human health and the environment from Moderate to Low.

Table 8-1: Management and mitigation measures: management of soil

ID	Management and mitigation measure
CL01	Manage excavated soil, contaminated soils and potential risks to the environment due to contamination during construction.

8.2 ACID SULFATE SOILS CAUSING DEGRADATION TO FLORA AND/OR FAUNA IF DISTURBED

The disturbance of ASS has the potential to result in oxidation of sulfidic minerals within the soils and create acid, which can leach metals, degrade constructed project elements or cause degradation to the environment including terrestrial and aquatic flora and fauna, or result in generation of sulfidic odours. The generation of sulfidic odours from exposed ASS are typically highly localised to the areas where ASS are stored, and given the distance to the neared sensitive receptor, impacts are expected to be negligible. Mitigation measures for managing any generation of potential sulfidic odours from any ASS that may be disturbed are included in management and mitigations measures CL01 and CL02.

Soil sampling and analysis completed during this (and prior) assessments confirmed the presence of ASS within the study area that may be disturbed if all fill soils are removed from the site (as assumed in Section 5.6).

Any ASS disturbed during the planned site works should be managed in accordance with the *Tasmanian Acid Sulfate Soil Management Guidelines* (DPIPWE 2009).

The disturbance of potential ASS during the construction, operation or decommissioning phases has the potential to result in a Moderate impact to the environment.

Management measures (for example but not limited to): minimising length of time soils are exposed, covering stockpiles to prevent infiltration of water, bunding of stockpiles to prevent runoff should be implemented for the project to reduce the risk of environmental impact occurring as a result of disturbance of ASS on the project, will reduce the risks of environmental impact from ‘moderate’ to ‘low’. These measures should also include:

- Managing dewatering to limit the generation of acid from oxidation of submerged potential ASS
- Managing drilling cuttings during the HDD drilling through potential ASS.
- Designing settlement loading to manage the submerging of potential oxidised ASS above the water table.

Further ASS testing and assessment is required to inform detailed design and prior to construction so that it can be managed during the construction phase. The approach should be addressed within the contaminated land management plan (appended to the construction environmental management plan (CEMP)) and implemented prior to and during construction.

Management of ASS during operation and decommissioning is limited to managing excavated soils (as per CL-01).

The application of the suggested environmental performance requirements for managing potential ASS within the study area will reduce the potential risks to human health and the environment from Moderate to Low.

The following management and mitigation measure is proposed to minimise the risk of potential impacts.

Table 8-2: Management and mitigation measures: ASS causing degradation to flora and/or fauna if disturbed.

ID	Management and mitigation measure
CL02	Develop and implement acid sulfate soils (ASS) management controls during construction

8.3 EXPOSURE TO ASBESTOS FIBRES

ACM debris has been identified on the ground surface (and visually removed from the surface where observed) at the converter station site and is also likely contained within fill material. A plan of the locations of known asbestos contamination is presented in Figure 12. This figure shows the known contamination; however it is likely that it is present in fill soils across the site. The condition of the ACM is such that it is susceptible to degradation and fibre release and has the potential to impact on human health (site construction and maintenance workers) and terrestrial fauna should the asbestos fibres become airborne and respirable.

The extent of ACM contaminated fill is not known at the site, although several areas where it is present have been identified. It is recommended that additional testing of the extent of asbestos within the fill soils at the site is undertaken (in accordance with the methodologies included in the NEPM), to characterise the nature and extent of ACM within soils (CL-01).

Following completion of the characterisation of the extent of ACM in soils, a remediation design is to be developed and included in the CEMP to manage disturbance of soils and the associated potential impacts to human health. All areas of the site where disturbance of soils are planned and have the potential to contain ACM, these should be remediated to mitigate the potential impacts to the health of site construction and maintenance workers.

The potential exposure to asbestos fibres by human receptors is to be managed during the construction, operational and decommissioning phases of the project through the development and implementation of asbestos management controls within the CEMP.

The application of the suggested management and mitigation measures for managing asbestos and ACM within the study area (as required by mitigation measure CL01) will reduce the potential risks to human health and the environment from Moderate to Low.

8.4 MANAGEMENT OF ROUTINE CONSTRUCTION AND OPERATIONAL IMPACTS

There are a range of potential impacts to the environment or human health that are common to most construction sites, and which are routinely addressed by well-established standard operating procedures or guidelines in the construction industry. Examples of these potential impacts considered to be low to very low risk where managed during construction and operation include (but are not limited to):

- Contamination of near surface soils from storage, transportation, and use of small volumes of chemicals, fuels, and other materials
- Impacts associated with use of subsurface construction materials (sealants, grouts, adhesives etc.)
- Impacts associated with infrastructure construction including roads, drainage areas, concreting, drilling etc.

- Impacts from contaminated drilling fluids
- Impacts from spills or leaks from vehicles, storage tanks, and underground infrastructure.
- Impacts from removal of historic infrastructure (including old pipelines, footings etc).

These impacts are to be managed during the construction, operational and decommissioning phases of the project via the development and implementation of project Construction Environmental Management Plans for the Construction, Operation and Decommissioning phases. Management and mitigation measure CL01 includes requirements for managing these potential impacts during construction, and the proposed management and mitigation measure CL03) is specific for managing these potential impacts during operation.

The application of the suggested management and mitigation measures for managing routine construction and operational impacts will reduce the potential risks to human health and the environment from Low to Very Low.

Table 8-3: Management and mitigation measures: management of routine construction and operational impacts

ID	Management and mitigation measure
CL03	Develop and implement measures to manage potential contamination impacts in operation

8.5 RISK ASSESSMENT SUMMARY

Table 8-4 presents a summary of the risk assessment evaluation undertaken for the project.

Table 8-4: Risk assessment summary

Affected value	Potential risk of harm	Project phase	Standard controls	Initial risk assessment			Environmental performance requirement	Residual risk assessment		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Human health/ ecological receptors	Excavated soils (including contaminated soils) may present a risk to human health or ecological receptors if not contained causing degradation of environment or hazards to health	Construction, operation and decommissioning	Excavated soils are managed to limit erosion via wind or surface water via wetting, stormwater controls, bunding and/or covering.	Unlikely	Major	Moderate	A contaminated land management plan is to be developed and implemented to ensure contaminated soils are managed to reduce impacts to the environment (CL01).	Rare	Moderate	Low
Human health/ ecological receptors	Construction/ operational activities lead to generation of contaminated wastes, spills or leaks that may cause a risk to human health or ecological receptors if not contained causing degradation of environment or hazards to health	Construction & Operation	Standard industry practice for managing hazards associated with handling chemicals, wastes, and undertaking underground excavations	Possible	Minor	Low	Implement an environmental management plan during construction and operation that includes controls for managing such hazards (CL01 & CL03).	Rare	Minor	Very Low
Ecological receptors	ASS may cause degradation to flora and/or fauna if disturbed	Construction, operation and decommissioning	Prior to ground disturbance, confirm the location and extent of ASS in relation to the planned locations of site infrastructure	Possible	Moderate	Moderate	ASS management controls are to be developed (as a part of the contaminated land management plan) to characterise the extent of ASS to be disturbed by the project and include measures to prevent oxidation or treatment of ASS (CL02).	Rare	Moderate	Low
Human health	Exposure of asbestos fibres from ACM in soil to human receptors during construction, operation or decommissioning	Construction, operation and decommissioning	Inspection and removal of ACM debris from site surface by appropriately qualified contractors prior to the commencement of construction works	Possible	Moderate	Moderate	Undertake ACM in soil assessment and remediate areas that will be disturbed. Asbestos management controls are to be developed (as a part of the contaminated land management plan) to characterise the extent of asbestos in soils prior to excavations commencing, and include the required controls, and management measures to remediate or manage any asbestos during construction, operation and decommissioning (CL01).	Rare	Moderate	Low

9. INSPECTION AND MONITORING

As detailed above, the risk assessment has identified five key hazards that present potential risks to human health or the environment. Of those four, three will require ongoing management to reduce the risk of potential impacts during construction, operation and/or decommissioning.

To demonstrate that the recommended management and mitigation measures are effective, monitoring is often implemented. The details of an inspection and monitoring program should be documented in the environmental management plan. Inspection or monitoring requirements for standard construction and waste management practices have not been prepared, such as testing spoil for onsite retention/offsite disposal, testing if treated ASS prior to reuse or offsite disposal, reporting of waste disposal as required for contaminated soils/asbestos containing materials, reporting associated with implementing a management plan, periodic monitoring of stormwater/sediment controls etc. No specific monitoring (beyond normal construction monitoring) has been recommended.

10. MANAGEMENT AND MITIGATION MEASURES

The recommended management and mitigation measures to reduce the risks to very low to low (as detailed in Section 8), are summarised in Table 10-1.

A decommissioning plan will be prepared to outline how activities will be undertaken, and potential impacts managed, including due to contamination, addressing the items outlined in the below mitigation measures. The requirements for the decommissioning management plan are outlined in the EIS.

The management and mitigation measures have also been developed with consideration of industry standards and relevant legislation, guidelines and policies. Management and mitigation measures from the groundwater assessment are also relevant to the management of ASS at the Heybridge converter station site.

Table 10-1: Management and mitigation measures

ID	Management and mitigation measures
CL01	**Manage excavated soil, contaminated soils and potential risks to the environment due to contamination during construction.**
CL01-1	Undertake a detailed site investigation for the site (in accordance with guidance from the NEPM(ASC) - including as a minimum schedules B1 and B2) to define the nature and extent of potential contamination in soils (including asbestos and ASS).
CL01-2	Identify options to manage surplus soils in accordance with the waste hierarchy.
CL01-3	Sample and classify all soils surplus to project requirements in accordance with EPA Tasmania's *Information Bulletin 105 – Classification and Management of Contaminated Soil for Disposal,* Australian Standards AS4482.1 (2005) and AS4482.2 (1999), and *Tasmanian Acid Sulfate Soil Management Guidelines* (DPIPWE 2009) to identify the waste classification of the soils.
CL01-4	Any waste soils that are classified as Level 1 (fill material), must be responsibly managed and disposed to a site where the soils do not result in impacts to the environment, or result in pollution (as defined in the EMPCA), which may include disposal to a Solid Inert (Category A) Landfill. Level 1 soils may be reused on the site.
CL01-5	Any waste soils that are classified as Level 2 (low level contaminated soil) and surplus to project requirements are likely to be Controlled Wastes (depending on contaminants) and require disposal to a Category B (Putrescible Landfill). There are opportunities for Level 2 soils to be reused on the site, depending on the nature of the contamination and how they are proposed to be used. The reuse of Level 2 soils on the site will be assessed on a case-by-case basis in consultation with EPA.
CL01-6	Testing to date has not identified any Level 3 or Level 4 Contaminated Soils. If any are identified during redevelopment, they are to be managed in accordance with the EMPCA and *Information Bulletin 105*.
CL01-7	All transport of contaminated soils must be undertaken only by a waste transport business holding a current relevant approval for the particular waste type (issued under the EMPCA).
CL01-8	Any temporary storage of soils (including material produced via trenchless construction methods) must: • Be stored in appropriately sited stockpiles away from surface drainage lines • With bunding • Depending on the nature of the contamination in the material to be stockpiled, on a lined or impermeable surface • Have surface covering if odourous • Be sprayed during periods of dry weather with water or suitable dust suppressant
CL01-9	Any asbestos containing materials identified must be removed from the site by an appropriately qualified and licensed removalist.
CL01-10	Develop an unexpected finds protocol for contamination, asbestos and odour management of excavated soils.
CL01-11	Develop and implement contingency and emergency response procedures to manage fuel, chemical or contamination spills

ID	Management and mitigation measures
CL01-12	Manage all contaminated materials, chemicals, fuels and hazardous materials to mitigate potential environmental harm via: • All dangerous goods or environmentally hazardous materials will be stored in appropriately bunded containers within the construction compound, in accordance with relevant Australian Standards and state regulations. • Fuel storage on site during construction will be via tankers (between 20,000 L and 50,000 L in size) that will be parked in bunded hardstands within the construction compound, or temporary containerised, self-bunded, above-ground fuel storage systems. Machinery and equipment will then either be refuelled within the compound or in situ via a refuelling truck, which will have on board spill kits and temporary bunding equipment. • Hydrocarbon and chemical spill kits will be stored within the construction compound(s) and wherever dangerous goods and environmentally hazardous materials are used throughout the project area.
CL01-13	The construction contractor will maintain records of waste soil volumes generated, disposal locations, including disposal facility receipts.
CL02	**Develop and implement acid sulfate soils (ASS) management controls during construction**
CL02-1	Design excavation and soil disturbance works (including HDD conduits between the site and shoreline) to avoid ASS where practicable.
CL02-2	ASS risk and management will be addressed through the development of an ASS Management Plan in accordance with the *Tasmanian Acid Sulfate Soil Management Guidelines 2015* (DPIPWE, 2015c). The ASS Management Plan will form part of the CEMP for the Project and will be submitted to the EPA for approval prior to construction.
CL02-3	Where disturbance of ASS cannot be avoided, develop management measures to reduce the potential impact from ASS in accordance with the *Tasmanian Acid Sulfate Soil Management Guidelines* (DPIPWE 2009) and the *National Acid Sulfate Soils Guidance* (DAWR 2018) as follows: • Design excavations or site loadings to ensure that changes in groundwater levels (from dewatering or displacement of soils) do not result in acid generation. Where changes to groundwater levels cannot be avoided, design ASS treatment methods to limit generation or neutralise acid. • Design HDD cutting and drilling fluid retention systems to allow testing for potential acidic or ASS conditions in HDD returns and allow diversion for treatment. • Design and appropriately locate ASS stockpile areas to avoid and otherwise minimise impacts from acid generation including lining, covering and runoff collection to prevent release of acid. • Where ASS is identified and disturbed, it must be treated to ensure neutralisation of potential acid generation. Treatment (via liming) is to be at the rates identified during the further ASS assessment to be undertaken in the proposed DSI for mitigation measure CL01-1. Any treatment must be designed with consideration of Tasmanian regulations and guidance and include sufficient neutralising capacity to mitigate acid generation. • Manage any odours that may be generated during handling of potential ASS via covering, application of odour suppressant or other appropriate measure. • Prevent oxidation of disturbed ASS so far as reasonably practicable via: ○ Scheduling works to limit exposure of ASS to oxidising conditions ○ Ensure ASS or acid sulfate rock is not retained in on-site stockpiles for long periods (i.e. greater than 48 hours) without treatment ○ Designing and implement ASS treatment to neutralise ASS prior to other management measures applied. • Identify suitable sites for re-use, management or disposal of ASS and acid sulfate rock that may be generated by the project
CL03	**Develop and implement measures to manage potential contamination impacts in operation**
CL03-1	Fuel storage on site during operation will be in above-ground fuel storage tanks on an impermeable concrete surface (with bunding) designed in accordance with Australian Standard AS1940 *The storage and handling of flammable and combustible liquids*. Fuel deliveries will be via tankers will be parked in designated refuelling areas which will be designed to contain any potential spills. The fuel storage areas and refuelling areas will contain spill kits and temporary bunding equipment.
CL03-2	Develop and implement contingency and emergency response procedures to manage fuel, chemical or contamination spills.

ID	Management and mitigation measures
CL03-3	Manage all contaminated materials, chemicals, fuels and hazardous materials to mitigate potential environmental harm via: • All dangerous goods, environmentally hazardous materials or fuels will be stored in appropriately bunded containers at the site, in accordance with relevant Australian Standards and state regulations. • Fuel and chemical spill kits will be maintained within close proximity to dangerous goods, hazardous materials or fuel storage areas.

11. CONCLUSION

The contaminated land and ASS impact assessment undertaken for the Heybridge converter station and nearshore area identified four potential hazards with a low to high risk of causing impacts to the environment without the application of additional controls including:

1. Management of excavated soils (including contaminated soils and asbestos contamination)
2. ASS, and
3. Management of routine construction and operational impacts.

The potential management measures that may be applied to ensure compliance with the nominated management and mitigation measures include:

Manage contaminated soils – Undertake testing of soils prior to commencing excavation works to confirm the contamination status of soils (including the nature and extent of asbestos and ASS) prior to disturbance, so that appropriate management controls can be applied to ensure impacts to the environment are mitigated. Management measures may include offsite disposal of contaminated soils or remediation and reuse. Odour management may also be required to be implemented depending on whether odorous soils are encountered. Application of an odour suppressant may be suitable for managing risks to air quality from contamination related odours. The asbestos testing to be undertaken across the Heybridge converter station site should confirm the nature and extent of asbestos in soils. Management of asbestos containing materials in soils at the converter station site may include excavation and disposal from site, abatement (physical removal of asbestos containing materials from soils) and reuse or capping with a barrier.

ASS - Undertake testing of proposed excavation areas for potential ASS to confirm the extent of ASS to be disturbed, and how impacts from any identified ASS may be managed to limit impacts to the environment. Management measures include ASS neutralisation on site, avoiding disturbing ASS, managing groundwater dewatering to reduce ASS generation. Excavated ASS may generate sulfidic odours that can be managed via the application of standard ASS management measures (e.g. neutralisation, odour suppressant application).

The assessment of potential impacts to the environment proposed by the project have the potential to cause potentially unacceptable impacts to human health or the environment. However the application of the management and mitigation measures are considered to reduce the potential impacts to the environment to acceptable levels and would ensure that the site is acceptable for commercial or industrial land uses (as defined in the NEPM).

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APPENDIX A: STATEMENT OF LIMITATIONS

IMPORTANT INFORMATION ABOUT YOUR TETRA TECH COFFEY ENVIRONMENTAL REPORT

Introduction

This report has been prepared by Tetra Tech Coffey for you, as Tetra Tech Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice.

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Tetra Tech Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Tetra Tech Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Tetra Tech Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Tetra Tech Coffey should be kept appraised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Tetra Tech Coffey would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Tetra Tech Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Tetra Tech Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Tetra Tech Coffey prepared the report and has familiarity with the site, Tetra Tech Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Tetra Tech Coffey disowns any responsibility for such misinterpretation.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. 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.

Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

APPENDIX B: SUMMARY OF HISTORIC REPORTS

APPENDIX B: REVIEW OF PREVIOUS INVESTIGATIONS

This appendix provides a summary of the review of the previously prepared environmental assessments undertaken within the study area.

In the mid-1990s, Tioxide Australia undertook several environmental assessments of the Heybridge processing site, both prior to and following site demolition and rehabilitation. A summary of the investigations is provided below. Copies of the reports prior to WCC (2007) were not available for review, however summaries were provided in WCC (2007a).

The reports reviewed included:

- WCC (2007a) Site Contamination Assessment, Former Tioxide Factory site, Heybridge (the "Front site"), William C. Cromer, 6 June 2007
- WCC (2007b) Follow-up Site Contamination Assessment, Bullant Ridge, at the former Tioxide Factory site, Heybridge, William C. Cromer, 14 July 2007
- ES&D (2020) Due Diligence, Former Tioxide factory site – Heybridge, V4, Environmental Service & Design, 30 October 2020
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- Jacobs (2022a) Ground Conditions Factual Report, Project Marinus – Heybridge Converter Station Ground Investigation, Rev A, Jacobs, 1 April 2022
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- pitt&sherry (2022) Marinus Link – Contamination and Acid Sulfate Soils Desktop Review Findings for the Tasmanian Component, dated 19 December 2022

A summary of these and previous reports are provide below.

Dames & Moore - 1992

30 handauger holes and 3 test pits were installed across the factory site. Shallow groundwater was encountered in four of the test pits. 46 samples were analysed for metals and hydrocarbons, and concentrations exceeded the industrial land use criteria (available at the time) at three locations.

Synnot and Wilkinson (1996a)

103 boreholes were installed at 52 locations across the site and 202 soil samples and 12 groundwater samples collected. Concentrations of copper, lead, zinc, chromium, nickel, cadmium and mercury were elevated, and petroleum hydrocarbons were found where fuels had been stored or used. The report indicated that generally contamination was isolated to several hotspots and mainly contained within the fill soils.

Shallow groundwater had a low pH and high concentrations of metals, but deeper groundwater was reported to not contain concentrations of contaminants under the plant.

Lane Consulting (1996)

Two groundwater wells were installed and sampled. GW17 was installed to a depth of 8m into the basement bedrock, and GW 19 was installed to 2.1m into the shallow groundwater. Samples were analysed for cation and anions, as well as a limited metals suite. The results are summarised below.

Table B1: Summary of Lane Consulting (1996) groundwater results

	GW17	GW19	Comments
pH	4.5	6.7	Regional groundwater was acidic and potentially presents risk to buildings and structures, shallow groundwater mildly acidic, but within screening criteria.
TDS (mg/L)	700	1,300	Indicates potable water present at depth, but shallower water more saline and not suitable for drinking
Chromium (µg/l)	3	<0.05	Below screening criteria for protection of marine water quality (ANZG 2018) for 95% protection (27 µg/L)
Copper (µg/l)	3	2	Above screening criteria for protection of marine water quality (ANZG 2018) for 95% protection (1.3 µg/L)
Iron (µg/l)	9,500	230	No criteria for protection of marine water quality, not considered to present unacceptable risk. May cause fouling of irrigation equipment if used for irrigation purposes.
Lead (µg/l)	4	4	Below screening criteria for protection of marine water quality (ANZG 2018) for 95% protection (4.4 µg/L)
Zinc (µg/l)	86	38	Above screening criteria for protection of marine water quality (ANZG 2018) for 95% protection (8 µg/L)

Synnot and Wilkinson (1996b)

This report was the environmental decommissioning and rehabilitation plan (EDRP) prepared for the site. Some key aspects were that the plan included:

- Objective was to remove contaminated soil and shallow groundwater to allow industrial uses.
- Contaminated soil was to be excavated and placed in a landfill cell to the south of the study area (assumed to be metals contaminated soils and/or radioactive materials)
- Soil contaminated with hydrocarbons was to be excavated and bioremediated and aerated and likely reused onsite
- Contaminated shallow groundwater was to be dewatered using a system of shallow bores and discharged via the outfall to Bass Strait.
- The EDRP was approved by the Director of the Department of Environment, Land and Water (DELM).

Tioxide Australia (1998a)

This report documented the remediation of soil contamination associated with the demolition and removal of the factory. Several rounds of targeted excavation on various areas of the factory was undertaken. The key contamination areas included:

- Bullant Ridge – Two areas of buried sludge and rubbish (comprising approx.. 7,800 m3) was excavated and removed to the Minna Road landfill (outside of the study area). Radioactivity testing in this area was undertaken as historically radioactive lead was cut up and encased in concrete in this area. The results of the lead and radioactivity testing indicated results were “not measurable”.

- Western Stores Compound – Elevated concentrations of metals (copper, lead, mercury and zinc) were reported above the industrial criteria. Several rounds of excavations in this area were undertaken and final validation results were reported to be below the adopted site criteria.
- Underground diesel tank – A small spill during removal was cleaned up and all results for hydrocarbons were below the laboratory limits of reporting.
- Lead burning workshop – Several rounds of excavation and validation (including shallow groundwater removal) was undertaken in this area and reportedly "generally" free from lead contamination. The area was backfilled with reported 'clean fill'. The Ph of water seeping into the excavation was reportedly 2.3.
- Contractors area – Several rounds of soil removal to remove both hydrocarbon and metals (lead) was undertaken and validation sampling reported concentrations below site criteria.

Grid sampling on a 30m grid spacing across the site was undertaken, and an estimated total of 155 validation samples (in addition to the grid sampling) was undertaken.

Tioxide Australia (1998b)

This report included addendum remediation and testing activities on two areas including the Fitters workshop and the Thompson Boiler – both of which were originally impacted by mercury. The soils removed from these areas were disposed offsite to the Dulverton landfill. Validation sampling beneath these areas reportedly confirmed that the remediation was successful.

Cromer (2000)

This report included the testing of soils and groundwater (including installation of three groundwater bores) adjacent to the original effluent tunnel. The tunnel had reportedly been constructed via traditional below ground mining techniques via horizontal tunnelling and brick lining. Testing of the soils and groundwater in the vicinity of the tunnel did not identify any contaminants above screening criteria (NEPM 1999). Groundwater in the underlying Precambrian siltstone/sandstone was encountered at depths of 4 to 5m below the ground.

Cromer (2004)

This report involved the excavation and testing of soils from 13 testpits to inform the fill profile present on the site. Fill was encountered at depths ranging from 0.2 to 1.3m across the site, and soil results were generally below the NEPM HIL-A screening criteria, with the exception of lead in one sample (AB1 – 1,090 mg/kg) which corresponded to the approximate location of the TiCl4 drum burial area.

WCC (2007a)

This reported included a summary of all previous environmental sampling and remediation works undertaken, and also included the sampling of soils from 62 new test-pits installed on a nominal 30m grid across the site. Up to 164 samples were tested for a variety of contaminants including pH, metals, sulfate, total petroleum hydrocarbons (TPH), benzene, toluene, ethyl benzene, xylenes (BTEX), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). Groundwater samples were collected from three test-pits where water flowed in during excavation and analysed for pH, metals, sulfate, TPH, BTEX, VOC, PAH, electrical conductivity (EC) and total dissolved solids (TDS).

The testing of soils indicated that the site was underlain by a varying thickness of fill with various isolated wastes including fragments of concrete, bricks, pipework, steel, wiring, plastic sheeting, timber, and minor areas of cinders, ash, sludge, ilmenite ore, and (only on Bullant ridge) crushed spent titanium tetrachloride drums and suspected asbestos fragments.

The analytical results of the testing indicated that the majority of the site soils contained concentrations of contaminants below the adopted industrial criteria. However isolated locations contained concentrations of lead (location E12 in the western storage area up to 4,900 mg/kg), manganese (near the Thomson boiler area up to 6,400 mg/kg), and areas of the subsurface contained hydrocarbon odours (two locations E32 and E45). Metals concentrations in soils also exceed the adopted waste disposal criteria for fill material across the site. Sulfate (as SO_4) was identified at several locations ranging up to 2,000 mg/kg and areas of low pH (down to 2.8 mmol.H^+).

Soil results were generally also below the site specific NEPM EILs for the site, with the exception of nickel (21 samples from shallow surface soils exceeded calculated EIL – 65 mg/kg), and zinc (12 samples from fill soils across the site exceeded the NEPM EIL – 190 mg/kg).

Groundwater testing noted the presence hydrocarbon sheens and elevated concentrations of hydrocarbons (TPH C10-C36), but no volatile contamination was identified at location E32 (near the lead burning workshop remediation area) and E45 (near the former diesel bund area).

WCC (2007b)

This report included follow up assessment of the Bullant Ridge area where WCC (2007a) identified crushed titanium tetrachloride drums and potential asbestos fragments. A trench approximately 15m long was dug where the drums were originally identified, and an estimated volume of between 150 and 200 m^3 of waste drums were present in this area. Asbestos in the form of ACM and gaskets were observed at several locations on the site as well.

A radiation survey conducted in this area by the Tasmanian Health Physics Branch noted that average background radiation was 300 nSv/hr (Bass Highway intersection with Minna Road), and measurements across the Bullant Ridge site ranged from <50 to 500 nSv/hr, with any locations where results were above the background range of 300 nSv/hr, re-tested using a different survey direction, and all results were considered to be representative of background radiation conditions.

This area is outside of the study area, and unlikely to be disturbed during the project.

ES&D (2020)

This report collates data from a number of different sources to provide a due-diligence summary for TasNetworks during considerations for acquisition of the Heybridge converter station site. The report collated historic data, but also undertook additional sampling of soils in areas where WCC (2007a) identified elevated concentrations of metals. The results indicated that elevated concentrations of metals were present, but generally below commercial/industrial land use screening criteria and unlikely to present a potential risk to site users under the proposed use.

The concentrations measured were also below the NEPM EILs calculated for the site.

pitt&sherry (2020)

This report included a summary of the prior environmental due diligence report prepared by ES&D for the Converter station site. No new information was included in the report.

SA Radiation (2020)

This report detailed a radiation survey undertaken on the Converter Station site and involved establishment of background radiation ranges from three sites (one in Burnie, and two approximately 500m east and south of the site). A local background range of 55 nSv/hr was adopted, and a screening criteria of 85 nSv/hr adopted as the trigger to undertake further testing at any particular location. Of the 203 measurements taken at the site, only one (in the centre of the converter station site) was reported above the screening level with a

measured result of 107 nSv/hr. This location was where bedrock was present at the surface, and corresponded to other bedrock results at the far east and west of the site. Additional testing around the 107nSV/hr location showed it was an anomaly, with all other readings within 5m below 80 nSv/hr.
The report concluded that the top 30 cm of soil at the site did not identify any areas of NORM at the site and that elevated dose rates of up to 107 nSv/hr at areas where basement rocks are located are possible, but are within the local natural background ranges (106 nSv/hr measured at Knoll Crest to the east of the site).

The report recommended that additional testing is undertaken during deeper footing excavations and from any scale or sediments that may be within the effluent pipeline if it is recovered to check for the presence of NORM.

GBG (2022)

This report detailed the findings of a geophysical survey of the site. They survey did not identify any potential underground storage tanks, but did identify several areas of footings, potential drainage pipelines, and the effluent tunnel.

pitt&sherry (2022)

This report included a desktop review of previously collected information to identify potential sources of contamination that may be on the site. The report noted the presence of ACM at two locations on the site, and also included a radiation survey of the site. The results of the survey were similar to previous studies with readings ranging from 20 to 123 nSV/hr, all within background ranges.

Jacobs (2022a/b)

This report detailed the geotechnical investigation undertaken at the Converter station site. The assessment included the collection and analysis of soil samples from six boreholes and nine testpits from across the site. Soil samples were collected at approximately 0.5m intervals throughout each sampling location, and samples submitted for a wide range of potential contaminants including metals, TPH, BTEX, PAH, pH, chloride, sulfate, cyanide, VOCs, semi-VOCs, perf-fluoroalkylated substances (PFAS), organochlorine pesticides (OCPs), PCBs, phenols, pH, asbestos, and leachable metals (as well as some leachable hydrocarbons). Some samples were also tested in-field for ASS, and also sent to the laboratory for ASS testing.

Five of the soil bores were converted to groundwater wells and tested for a similar range of potential contaminants (including nitrate, nitrate and ammonia). Groundwater was encountered at depths ranging from 1 to 3m below the site surface.

NORM testing was also undertaken during test-pitting to measure radioactivity at depth. Local background ranges were reported at 41 to 73 nSv/hr, and the highest measurement was 115 nSv/hr at a depth of 1m in the centre of the site (near the SA Radiation previously identified elevated reading).

Soil analysis reported concentrations of nickel (84 mg/kg), lead (1640 mg/kg) and zinc (230 mg/kg) at three locations above the NEPM EILs calculated for the site, with lead also above the adopted industrial screening criteria.

Acid sulfate testing undertaken at the site identified large pH oxidation responses in the five samples tested (pH change of between 1.7-3 pH units). The natural pH of the soils ranged from 3.7 to 7.1 indicating actual ASS may be present at some locations, and potential ASS may be present throughout the soil profile. Additional SPOCAS testing on the five samples by the laboratory indicated that two samples from the centre to south of the site reported net acidity of between 0.035 to 0.096 %S, above the adopted 0.03 %S screening criteria indicating potential ASS may be present.

Groundwater analysis reported concentrations of cobalt, copper and zinc above the ANZG Marine Water 95% toxicant DGV criteria uniformly across the site.

Concentrations of PFAS were not reported in soil at the site above the laboratory reporting limits. Concentrations of PFOS (ranging between <0.01 to 0.11 µg/L), PFOA (<0.01 to 0.02 µg/L) and PFHxS + PFOS (<0.01 to 0.32 µg/L) were reported in three groundwater wells on the site. The concentrations of PFOS were below the Ecological marine criteria (0.13µg/L – PFAS NEMP), and concentrations of PFHxS and PFOA were below all other groundwater quality criteria.

Tetra Tech Coffey (2022)

This report detailed the offshore sediment sampling undertaken in the area where the sub-sea cable will run. 26 sediment samples were collected from the seabed at 14 locations at depths of up to 1m below the seabed and analysed for metals and ASS.

ASS results for net acidity were all below the laboratory reporting limits and adopted screening criteria. Concentrations of metals (arsenic, chromium, nickel and silver) were reported to be above the adopted Sediment quality guidelines (DGVs) although the concentrations of nickel, chromium, nickel and silver were generally considered to be naturally occurring. Location SED E5 (approximately 5km offshore) reported elevated concentrations of arsenic, chromium and nickel that were much higher than other results, indicating that this area may be impacted by the effluent pipe output from the site. Elevated concentrations of iron and titanium were also identified in deeper samples (greater than 1km offshore), which may also be associated with the effluent outfall pipe. However, generally, the concentrations of metals were below the upper guideline values, indicating toxic affects to benthic organisms would be unlikely.

IPM (2022)

This report detailed the results of an asbestos surface survey undertaken across the Converter Station site. The study comprised visual observations of the surface and identified fragments of asbestos containing materials in the form of bonded cement sheeting at several locations at the north of the converter station site. The fragments in poor condition and were removed during the works, however the presence of heterogenous fill across this area of the site (and that some were identified on a soil stockpile), there is a high likelihood that additional ACM is present in fill soils at the site.

APPENDIX C: TABLES

TABLE 1
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Analytical Results - Acid Sulfate Soils

			ASS Field Test			pH	Actual Acidity		Potential Acidity		Acid Neutralising Capacity*		Net Acidity	
			pH fox	pH (F)	Reaction Rate	pH (KCl)	Acid Trail : Total Sulfidic Acidity	Sulfur Trail: % Sulfur	Acid Trail : Total Sulfidic Acidity	Sulfur Trail: % Sulfur	Acid Trail : Total Sulfidic Acidity	Sulfur Trail: % Sulfur	Acid Trail : Total Sulfidic Acidity	Sulfur Trail: % Oxidisable Sulfur
			pH Unit	pH Unit	-	-	mole H+/t	%S	mole H+/t	%S	mole H+/t	%S	MOL H+/T	% S
EQL			0.1	0.1	0	0.1	2	0.003	3	0.005	2	0.02	10	0.02
TAS ASS Management Guidelines Action Criteria (Med. Texture) (100 - 1000 t)													**36**	**0.06**
TAS ASS Management Guidelines Action Criteria (Med. Texture) (> 1000 t)													**18**	**0.03**
Location	**Field ID**	**Geology**												
HEY1	HEY1_0.0-0.2	FILL: Sandy Clay	**3.1**	**5.8**	**3.0**	-	-	-	-	-	-	-	-	-
	HEY1_0.4-0.7	FILL: Clayey Sand	**4.2**	**6.4**	**4.0**	-	-	-	-	-	-	-	-	-
	HEY1_0.9-1.0	Clayey Gravel	-	-	-	**5.9**	**7.2**	**0.012**	**4.2**	**0.007**	NA	NA	**11**	<0.02
	HEY1_1.4-1.5	Gravelly Clay	-	-	-	**5.1**	**7.8**	**0.013**	**6.9**	**0.011**	NA	NA	**15**	**0.02**
HEY2	HEY2_0.0-0.2	FILL: Sandy Clay	**4.1**	**5.6**	**4.0**	-	-	-	-	-	-	-	-	-
	HEY2_0.6-0.7	Clay	**3.1**	**5.6**	**4.0**	-	-	-	-	-	-	-	-	-
	HEY2_1.4-1.5	Clay	-	-	-	**4.6**	**41**	**0.065**	**5.2**	**0.008**	NA	NA	**46**	**0.07**
HEY3	HEY3_0.0-0.2	FILL: Sandy Clay	**4.8**	**7.5**	**4.0**	-	-	-	-	-	-	-	-	-
	HEY3_0.9-1.0	Sand	-	-	-	**5.3**	**4.8**	**0.008**	<3	<0.005	NA	NA	<10	<0.02
	HEY3_1.4-1.5	Sand	-	-	-	**6.0**	**3.2**	**0.005**	<3	<0.005	NA	NA	<10	<0.02
HEY4	HEY4_0.0-0.2	FILL: Sandy Clay	**5.3**	**8.3**	**4.0**	-	-	-	-	-	-	-	-	-
	HEY4_0.4-0.5 (A)	FILL: Sandy Clay	**4.8**	**7.9**	**4.0**	-	-	-	-	-	-	-	-	-
	HEY4_0.9-1.0	Sand	-	-	-	**7.1**	<2	<0.003	<3	<0.005	**33**	**0.05**	<10	<0.02
	HEY4_1.4-1.5	Sand	-	-	-	**6.4**	<2	<0.003	<3	<0.005	NA	NA	<10	<0.02
HEY5	HEY5_0.0-0.2	FILL: Sandy Clay	**6.9**	**9.1**	**4.0**	-	-	-	-	-	-	-	-	-
	HEY5_0.4-0.5	FILL: Sandy Clay	**5.8**	**8.0**	**3.0**	-	-	-	-	-	-	-	-	-
	HEY5_0.9-1.0	FILL: Sandy Clay	**5.2**	**7.2**	**3.0**	-	-	-	-	-	-	-	-	-
	HEY5_1.4-1.5	FILL: Sandy Clay	**4.9**	**6.3**	**3.0**	-	-	-	-	-	-	-	-	-
HEY6	HEY6_0.0-0.3	FILL: Sandy Clay	**4.0**	**6.5**	**3.0**	-	-	-	-	-	-	-	-	-
	HEY6_0.4-0.5	FILL: Sandy Clay	**2.5**	**5.5**	**3.0**	**4.9**	**22**	**0.036**	**5.1**	**0.008**	NA	NA	**27**	**0.04**
	HEY6_0.9-1.0	FILL: Sandy Clay	**3.1**	**5.5**	**3.0**	-	-	-	-	-	-	-	-	-
	HEY6_1.4-1.5	FILL: Sandy Clay	-	-	-	**4.8**	**11**	**0.018**	<3	<0.005	NA	NA	**11**	<0.02
HEY7	HEY7_0.0-0.2	FILL: Clayey Sand	**2.8**	**6.1**	**3.0**	-	-	-	-	-	-	-	-	-
	HEY7_0.5-0.6	FILL: Clayey Sand	**3.0**	**6.1**	**3.0**	-	-	-	-	-	-	-	-	-
	HEY7_0.9-1.0	FILL: Clay	**3.0**	**4.4**	**3.0**	**4.6**	**48**	**0.077**	**37**	**0.060**	NA	NA	**85**	**0.14**
	HEY7_1.4-1.5	FILL: Clay	-	-	-	**4.5**	**42**	**0.068**	**16**	**0.025**	NA	NA	**67**	**0.11**
HEY8	HEY8_0.0-0.3	FILL: Clayey Sand	**2.8**	**6.1**	**4.0**	-	-	-	-	-	-	-	-	-
	HEY8_0.4-0.5	FILL: Clayey Sand	**2.9**	**5.1**	**3.0**	**5.9**	**2.7**	**0.004**	**7.1**	**0.011**	NA	NA	<10	<0.02
	HEY8_0.6-0.7	FILL: Clayey Sand	**2.9**	**5.3**	**3.0**	-	-	-	-	-	-	-	-	-
	HEY8_0.9-1.0	FILL: Clayey Sand	**2.9**	**4.8**	**3.0**	**5.2**	**6.0**	**0.010**	**6.6**	**0.011**	NA	NA	**13**	**0.02**
	HEY8_1.3-1.4	Sandy Clay	-	-	-	**4.4**	**24**	**0.039**	<3	<0.005	NA	NA	**30**	**0.05**

Criteria:
(DPIPWE 2009) Tasmanian Acid Sulfate Soil Management Guidelines Table 2 Action Criteria for Medium Texture material: 100 - 1000 tonnes disturbed material
(DPIPWE 2009) Tasmanian Acid Sulfate Soil Management Guidelines Table 2 Action Criteria for Medium Texture material: > 1000 tonnes disturbed material
*Acid Neutralising Capacity is only required if pH (KCl) ≥ pH 6.5

TABLE 2
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Analytical Results - Stockpiles Preliminary Classification

					Field ID	SP2_01	SP2_02	SP2_03	SP3_01	SP5_01	SP5_02	SP5_03	SP8_01	SP8_02	SP9_01	SP9_02	SP9_03	SP9_04	SP10_01	SP10_02	SP10_03
					Stockpile	Stockpile 2	Stockpile 2	Stockpile 2	Stockpile 3	Stockpile 5	Stockpile 5	Stockpile 5	Stockpile 8	Stockpile 8	Stockpile 9	Stockpile 9	Stockpile 9	Stockpile 9	Stockpile 10	Stockpile 10	Stockpile 10
					Date	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023
					Lab Report Number	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775
	Unit	EQL	EPA Tas IB105 Contaminated Soil (Level 3)	EPA Tas IB105 Low Level Contaminated Soil (Level 2)	EPA Tas IB105 Fill material (Level 1)																
Physical Parameters																					
Moisture Content (dried @ 103°C)	%	1	-	-	-	21	22	15	13	11	14	15	7.1	7.2	16	12	13	22	19	6.0	15
Metals																					
Arsenic	mg/kg	2	750	200	20	<2	2.2	<2	<2	2.3	2.6	<2	2.0	<2	<2	<2	<2	<2	<2	3.3	17
Cadmium	mg/kg	0.4	400	40	3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium (III+VI)	mg/kg	5	5,000	500	50	130	280	140	87	20	29	17	29	63	62	67	31	21	84	<5	70
Copper	mg/kg	5	7,500	2,000	100	50	170	43	64	17	17	15	19	24	22	24	18	24	32	<5	85
Lead	mg/kg	5	3,000	1,200	300	110	48	30	130	50	380	78	33	18	14	29	11	13	41	11	55
Mercury	mg/kg	0.1	110	30	1	0.3	6.7	0.2	9.8	0.2	0.4	0.3	<0.1	0.2	0.1	0.1	<0.1	<0.1	0.8	<0.1	0.5
Molybdenum	mg/kg	5	4,000	1,000	10	<5	-	-	-	<5	-	-	-	-	<5	-	-	-	<5	-	-
Nickel	mg/kg	5	3,000	600	60	98	90	110	56	34	18	13	51	94	40	43	51	37	45	<5	73
Silver	mg/kg	2	720	180	10	<2	-	-	-	<2	-	-	-	-	<2	-	-	-	<2	-	-
Selenium	mg/kg	2	200	50	10	<2	-	-	-	<2	-	-	-	-	<2	-	-	-	<2	-	-
Tin	mg/kg	10	900	500	50	<10	-	-	-	<10	-	-	-	-	<10	-	-	-	<10	-	-
Zinc	mg/kg	5	50,000	14,000	200	120	50	120	110	47	53	38	160	90	71	88	52	47	110	8.6	400
BTEX																					
Benzene	mg/kg	0.1	50	5	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	1,000	100	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	1,080	100	3	<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	<0.1	<0.1
Xylene Total	mg/kg	0.3	1,800	180	14	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Naphthalene (VOC)	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylene (o)	mg/kg	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	<0.1	<0.1	<0.1
Xylene (m & p)	mg/kg	0.2	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Petroleum Hydrocarbons																					
C6 - C9	mg/kg	20	1,000	650	65	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C10 - C14	mg/kg	20	-	-	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C15 - C28	mg/kg	50	-	-	-	<50	<50	<50	<50	76	140	130	85	58	<50	<50	210	160	<50	51	<50
C29 - C36	mg/kg	50	-	-	-	91	<50	<50	<50	240	200	170	280	140	<50	59	450	520	<50	<50	<50
C10 - C36 (Sum of total)	mg/kg	50	10,000	5,000	1,000	91	<50	<50	<50	316	340	300	365	198	<50	59	660	680	<50	51	<50
Total Recoverable Hydrocarbons																					
F1 (C6 - C10)	mg/kg	20	-	-	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
F1 (C6 - C10) less BTEX	mg/kg	20	-	-	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
F2 (C10 - C16)	mg/kg	50	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F2 C10 - C16 (minus Naphthalene)	mg/kg	50	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 - C34)	mg/kg	100	-	-	-	120	<100	<100	<100	250	300	260	300	180	<100	<100	530	520	<100	<100	<100
F4 (C34 - C40)	mg/kg	100	-	-	-	<100	<100	<100	<100	140	<100	<100	220	<100	<100	<100	370	430	<100	<100	<100
C10 - C40 (Sum of total)	mg/kg	100	-	-	-	120	<100	<100	<100	390	300	260	520	180	<100	<100	900	950	<100	<100	<100
Polycyclic Aromatic Hydrocarbons																					
Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.5	-	-	-	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	-	-	-	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a) pyrene	mg/kg	0.5	20	2	0.08	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	mg/kg	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAHs (Sum of total)	mg/kg	0.5	200	40	20	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Halogenated Benzenes																					
Hexachlorobenzene	mg/kg	0.05	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
PCBs																					
Arochlor 1016	mg/kg	0.1	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Arochlor 1221	mg/kg	0.1	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Arochlor 1232	mg/kg	0.1	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Arochlor 1242	mg/kg	0.1	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Arochlor 1248	mg/kg	0.1	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-

TABLE 2
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Analytical Results - Stockpiles Preliminary Classification

					Field ID	SP2_01	SP2_02	SP2_03	SP3_01	SP5_01	SP5_02	SP5_03	SP8_01	SP8_02	SP9_01	SP9_02	SP9_03	SP9_04	SP10_01	SP10_02	SP10_03
					Stockpile	Stockpile 2	Stockpile 2	Stockpile 2	Stockpile 3	Stockpile 5	Stockpile 5	Stockpile 5	Stockpile 8	Stockpile 8	Stockpile 9	Stockpile 9	Stockpile 9	Stockpile 9	Stockpile 10	Stockpile 10	Stockpile 10
					Date	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023	8/03/2023
					Lab Report Number	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775	971775
	Unit	EQL	EPA Tas IB105 Contaminated Soil (Level 3)	EPA Tas IB105 Low Level Contaminated Soil (Level 2)	EPA Tas IB105 Fill material (Level 1)																
Arochlor 1254	mg/kg	**0.1**	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Arochlor 1260	mg/kg	**0.1**	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-
PCBs (Sum of total)	mg/kg	**0.1**	50	20	2	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Phenols																					
3/4-Methylphenol (m/p-cresol)	mg/kg	**0.4**	-	-	-	<0.4	-	-	-	<0.4	-	-	-	-	<0.4	-	-	-	<0.4	-	-
2,4-Dinitrophenol	mg/kg	**5**	-	-	-	<5	-	-	-	<5	-	-	-	-	<5	-	-	-	<5	-	-
2,4,5-Trichlorophenol	mg/kg	**1**	-	-	-	<1	-	-	-	<1	-	-	-	-	<1	-	-	-	<1	-	-
2,4,6-Trichlorophenol	mg/kg	**1**	-	-	-	<1	-	-	-	<1	-	-	-	-	<1	-	-	-	<1	-	-
2,4-Dichlorophenol	mg/kg	**0.5**	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	<0.5	-	-
2,4-Dimethylphenol	mg/kg	**0.5**	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	<0.5	-	-
2,6-Dichlorophenol	mg/kg	**0.5**	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	<0.5	-	-
2-Chlorophenol	mg/kg	**0.5**	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	<0.5	-	-
2-Methylphenol	mg/kg	**0.2**	-	-	-	<0.2	-	-	-	<0.2	-	-	-	-	<0.2	-	-	-	<0.2	-	-
2-Nitrophenol	mg/kg	**1**	-	-	-	<1	-	-	-	<1	-	-	-	-	<1	-	-	-	<1	-	-
4,6-Dinitro-2-methylphenol	mg/kg	**5**	-	-	-	<5	-	-	-	<5	-	-	-	-	<5	-	-	-	<5	-	-
4,6-Dinitro-o-cyclohexyl phenol	mg/kg	**20**	-	-	-	<20	-	-	-	<20	-	-	-	-	<20	-	-	-	<20	-	-
4-Nitrophenol	mg/kg	**5**	-	-	-	<5	-	-	-	<5	-	-	-	-	<5	-	-	-	<5	-	-
4-chloro-3-methylphenol	mg/kg	**1**	-	-	-	<1	-	-	-	<1	-	-	-	-	<1	-	-	-	<1	-	-
Cresol Total	mg/kg	**0.5**	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	<0.5	-	-
Pentachlorophenol	mg/kg	**1**	-	-	-	<1	-	-	-	<1	-	-	-	-	<1	-	-	-	<1	-	-
Phenol	mg/kg	**0.5**	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	<0.5	-	-
Tetrachlorophenols	mg/kg	**10**	-	-	-	<10	-	-	-	<10	-	-	-	-	<10	-	-	-	<10	-	-
Phenols (Total Halogenated)	mg/kg	**1**	-	-	-	<1	-	-	-	<1	-	-	-	-	<1	-	-	-	<1	-	-
Phenols (Total Non Halogenated)	mg/kg	**20**	2,000	500	25	<20	-	-	-	<20	-	-	-	-	<20	-	-	-	<20	-	-
OCP																					
Organochlorine pesticides EPAVic	mg/kg	**0.1**	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Other organochlorine pesticides EPAVic	mg/kg	**0.1**	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Herbicides																					
Dinoseb	mg/kg	**20**	-	-	-	<20	-	-	-	<20	-	-	-	-	<20	-	-	-	<20	-	-
Organochlorine Pesticides																					
4,4-DDE	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
a-BHC	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Aldrin	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Aldrin + Dieldrin	mg/kg	**0.05**	50	20	2	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
b-BHC	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
chlordane	mg/kg	**0.1**	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-
d-BHC	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
DDD	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
DDT	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
DDT+DDE+DDD	mg/kg	**0.05**	1,000	200	2	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Dieldrin	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endrin aldehyde	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endrin ketone	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endosulfan I	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endosulfan II	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endosulfan sulphate	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endrin	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
g-BHC (Lindane)	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Heptachlor	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Heptachlor epoxide	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Methoxychlor	mg/kg	**0.05**	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Toxaphene	mg/kg	**0.5**	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	<0.5	-	-

Environmental Standards
EPA Tasmania, 2018, Information Bulletin No. 105 Contaminated Soil (Level 3)
EPA Tasmania, 2018, Information Bulletin No. 105 Low Level Contaminated Soil (Level 2)
EPA Tasmania, 2018, Information Bulletin No. 105 Fill Material (Level 1)

TABLE 3
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Analytical Results - Stockpiles (NEPM)

			NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (0m - 1m)	NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind	NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil	NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil									
Field ID								**SP2_01**	**SP2_02**	**SP2_03**	**SP3_01**	**SP5_01**	**SP5_02**	**SP5_03**	**SP8_01**	**SP8_02**
Stockpile								**Stockpile 2**	**Stockpile 2**	**Stockpile 2**	**Stockpile 3**	**Stockpile 5**	**Stockpile 5**	**Stockpile 5**	**Stockpile 8**	**Stockpile 8**
Date								**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**
Lab Report Number								**971775**	**971775**	**971775**	**971775**	**971775**	**971775**	**971775**	**971775**	**971775**
	Unit	EQL														
Physical Parameters																
Moisture Content (dried @ 103°C)	%	**1**	-	-	-	-	-	**21**	**22**	**15**	**13**	**11**	**14**	**15**	**7.1**	**7.2**
Metals																
Arsenic	mg/kg	**2**	3,000	-	160	-	-	<2	**2.2**	<2	<2	**2.3**	**2.6**	<2	**2.0**	<2
Cadmium	mg/kg	**0.4**	900	-	-	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium (III+VI)	mg/kg	**5**	-	-	-	-	-	**130**	**280**	**140**	**87**	**20**	**29**	**17**	**29**	**63**
Copper	mg/kg	**5**	240,000	-	90*	-	-	**50**	**170**	**43**	**64**	**17**	**17**	**15**	**19**	**24**
Lead	mg/kg	**5**	1,500	-	1,800	-	-	**110**	**48**	**30**	**130**	**50**	**380**	**78**	**33**	**18**
Mercury	mg/kg	**0.1**	730	-	-	-	-	**0.3**	**6.7**	**0.2**	**9.8**	**0.2**	**0.4**	**0.3**	<0.1	**0.2**
Molybdenum	mg/kg	**5**	-	-	-	-	-	<5	-	-	-	<5	-	-	-	-
Nickel	mg/kg	**5**	6,000	-	65*	-	-	**98**	**90**	**110**	**56**	**34**	**18**	**13**	**51**	**94**
Silver	mg/kg	**2**	-	-	-	-	-	<2	-	-	-	<2	-	-	-	-
Selenium	mg/kg	**2**	10,000	-	-	-	-	<2	-	-	-	<2	-	-	-	-
Tin	mg/kg	**10**	-	-	-	-	-	<10	-	-	-	<10	-	-	-	-
Zinc	mg/kg	**5**	400,000	-	190*	-	-	**120**	**50**	**120**	**110**	**47**	**53**	**38**	**160**	**90**
BTEX																
Benzene	mg/kg	**0.1**	-	3	-	75	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	**0.1**	-	-	-	135	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	**0.1**	-	-	-	165	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Xylene Total	mg/kg	**0.3**	-	230	-	180	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Naphthalene (VOC)	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylene (o)	mg/kg	**0.1**	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Xylene (m & p)	mg/kg	**0.2**	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Petroleum Hydrocarbons																
C6 - C9	mg/kg	**20**	-	-	-	-	-	<20	<20	<20	<20	<20	<20	<20	<20	<20
C10 - C14	mg/kg	**20**	-	-	-	-	-	<20	<20	<20	<20	<20	<20	<20	<20	<20
C15 - C28	mg/kg	**50**	-	-	-	-	-	<50	<50	<50	<50	**76**	**140**	**130**	**85**	**58**
C29 - C36	mg/kg	**50**	-	-	-	-	-	**91**	<50	<50	<50	**240**	**200**	**170**	**280**	**140**
C10 - C36 (Sum of total)	mg/kg	**50**	-	-	-	-	-	**91**	<50	<50	<50	**316**	**340**	**300**	**365**	**198**
Total Recoverable Hydrocarbons																
F1 (C6 - C10)	mg/kg	**20**	-	-	-	-	700	<20	<20	<20	<20	<20	<20	<20	<20	<20
F1 (C6 - C10) less BTEX	mg/kg	**20**	-	260	-	215	-	<20	<20	<20	<20	<20	<20	<20	<20	<20
F2 (C10 - C16)	mg/kg	**50**	-	-	-	-	1,000	<50	<50	<50	<50	<50	<50	<50	<50	<50
F2 C10 - C16 (minus Naphthalene)	mg/kg	**50**	-	-	-	170	-	<50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 - C34)	mg/kg	**100**	-	-	-	1,700	3,500	**120**	<100	<100	<100	**250**	**300**	**260**	**300**	**180**
F4 (C34 - C40)	mg/kg	**100**	-	-	-	3,300	10,000	<100	<100	<100	<100	**140**	<100	<100	**220**	<100
C10 - C40 (Sum of total)	mg/kg	**100**	-	-	-	-	-	**120**	<100	<100	<100	**390**	**300**	**260**	**520**	**180**
Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene TEQ calc (Half)	mg/kg	**0.5**	40	-	-	-	-	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
Benzo(a)pyrene TEQ (LOR)	mg/kg	**0.5**	40	-	-	-	-	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	**0.5**	40	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a) pyrene	mg/kg	**0.5**	-	-	-	1.4	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	mg/kg	**0.5**	-	-	370	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAHs (Sum of total)	mg/kg	**0.5**	4,000	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Halogenated Benzenes																
Hexachlorobenzene	mg/kg	**0.05**	80	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
PCBs																
Arochlor 1016	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-
Arochlor 1221	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-
Arochlor 1232	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-
Arochlor 1242	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-

TABLE 3
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Analytical Results - Stockpiles (NEPM)

								Field ID	**SP2_01**	**SP2_02**	**SP2_03**	**SP3_01**	**SP5_01**	**SP5_02**	**SP5_03**	**SP8_01**	**SP8_02**
								Stockpile	**Stockpile 2**	**Stockpile 2**	**Stockpile 2**	**Stockpile 3**	**Stockpile 5**	**Stockpile 5**	**Stockpile 5**	**Stockpile 8**	**Stockpile 8**
								Date	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**
								Lab Report Number	**971775**	**971775**	**971775**	**971775**	**971775**	**971775**	**971775**	**971775**	**971775**
	Unit	EQL	NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (0m - 1m)	NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind	NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil	NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil										
Arochlor 1248	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-
Arochlor 1254	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-
Arochlor 1260	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-
PCBs (Sum of total)	mg/kg	**0.1**	7	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-
Phenols																
3/4-Methylphenol (m/p-cresol)	mg/kg	**0.4**	-	-	-	-	-	<0.4	-	-	-	<0.4	-	-	-	-
2,4-Dinitrophenol	mg/kg	**5**	-	-	-	-	-	<5	-	-	-	<5	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	**1**	-	-	-	-	-	<1	-	-	-	<1	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	**1**	-	-	-	-	-	<1	-	-	-	<1	-	-	-	-
2,4-Dichlorophenol	mg/kg	**0.5**	-	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-
2,4-Dimethylphenol	mg/kg	**0.5**	-	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-
2,6-Dichlorophenol	mg/kg	**0.5**	-	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-
2-Chlorophenol	mg/kg	**0.5**	-	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-
2-Methylphenol	mg/kg	**0.2**	-	-	-	-	-	<0.2	-	-	-	<0.2	-	-	-	-
2-Nitrophenol	mg/kg	**1**	-	-	-	-	-	<1	-	-	-	<1	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	**5**	-	-	-	-	-	<5	-	-	-	<5	-	-	-	-
4,6-Dinitro-o-cyclohexyl phenol	mg/kg	**20**	-	-	-	-	-	<20	-	-	-	<20	-	-	-	-
4-Nitrophenol	mg/kg	**5**	-	-	-	-	-	<5	-	-	-	<5	-	-	-	-
4-chloro-3-methylphenol	mg/kg	**1**	-	-	-	-	-	<1	-	-	-	<1	-	-	-	-
Cresol Total	mg/kg	**0.5**	25,000	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-
Pentachlorophenol	mg/kg	**1**	660	-	-	-	-	<1	-	-	-	<1	-	-	-	-
Phenol	mg/kg	**0.5**	240,000	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-
Tetrachlorophenols	mg/kg	**10**	-	-	-	-	-	<10	-	-	-	<10	-	-	-	-
Phenols (Total Halogenated)	mg/kg	**1**	-	-	-	-	-	<1	-	-	-	<1	-	-	-	-
Phenols (Total Non Halogenated)	mg/kg	**20**	-	-	-	-	-	<20	-	-	-	<20	-	-	-	-
OCP																
Organochlorine pesticides EPAVic	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-
Other organochlorine pesticides EPAVic	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-
Herbicides																
Dinoseb	mg/kg	**20**	-	-	-	-	-	<20	-	-	-	<20	-	-	-	-
Organochlorine Pesticides																
4,4-DDE	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
a-BHC	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Aldrin	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Aldrin + Dieldrin	mg/kg	**0.05**	45	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
b-BHC	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
chlordane	mg/kg	**0.1**	530	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-
d-BHC	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
DDD	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
DDT	mg/kg	**0.05**	-	-	640	-	-	<0.05	-	-	-	<0.05	-	-	-	-
DDT+DDE+DDD	mg/kg	**0.05**	3,600	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Dieldrin	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Endrin aldehyde	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Endrin ketone	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Endosulfan I	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Endosulfan II	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Endosulfan sulphate	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Endrin	mg/kg	**0.05**	100	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
g-BHC (Lindane)	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Heptachlor	mg/kg	**0.05**	50	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Heptachlor epoxide	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Methoxychlor	mg/kg	**0.05**	2,500	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-
Toxaphene	mg/kg	**0.5**	160	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-

Environmental Standards
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (0m - 1m)
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil
*Calculated using the following parameters: CEC = 5 cmolc/kg dwt, OC = 1%, clay = 10%, pH = 4.4

TABLE 3
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Analytical Results - Stockpiles (NEPM)

Field ID								**SP9_01**	**SP9_02**	**SP9_03**	**SP9_04**	**SP10_01**	**SP10_02**	**SP10_03**
Stockpile								**Stockpile 9**	**Stockpile 9**	**Stockpile 9**	**Stockpile 9**	**Stockpile 10**	**Stockpile 10**	**Stockpile 10**
Date								**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**
Lab Report Number								**971775**	**971775**	**971775**	**971775**	**971775**	**971775**	**971775**
	Unit	EQL	NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (0m - 1m)	NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind	NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil	NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil							
Physical Parameters														
Moisture Content (dried @ 103°C)	%	**1**	-	-	-	-	-	**16**	**12**	**13**	**22**	**19**	**6.0**	**15**
Metals														
Arsenic	mg/kg	**2**	3,000	-	160	-	-	<2	<2	<2	<2	<2	**3.3**	**17**
Cadmium	mg/kg	**0.4**	900	-	-	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium (III+VI)	mg/kg	**5**	-	-	-	-	-	**62**	**67**	**31**	**21**	**84**	<5	**70**
Copper	mg/kg	**5**	240,000	-	90*	-	-	**22**	**24**	**18**	**24**	**32**	<5	**85**
Lead	mg/kg	**5**	1,500	-	1,800	-	-	**14**	**29**	**11**	**13**	**41**	**11**	**55**
Mercury	mg/kg	**0.1**	730	-	-	-	-	**0.1**	**0.1**	<0.1	<0.1	**0.8**	<0.1	**0.5**
Molybdenum	mg/kg	**5**	-	-	-	-	-	<5	-	-	-	<5	-	-
Nickel	mg/kg	**5**	6,000	-	65*	-	-	**40**	**43**	**51**	**37**	**45**	<5	**73**
Silver	mg/kg	**2**	-	-	-	-	-	<2	-	-	-	<2	-	-
Selenium	mg/kg	**2**	10,000	-	-	-	-	<2	-	-	-	<2	-	-
Tin	mg/kg	**10**	-	-	-	-	-	<10	-	-	-	<10	-	-
Zinc	mg/kg	**5**	400,000	-	190*	-	-	**71**	**88**	**52**	**47**	**110**	**8.6**	**400**
BTEX														
Benzene	mg/kg	**0.1**	-	3	-	75	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	**0.1**	-	-	-	135	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	**0.1**	-	-	-	165	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Xylene Total	mg/kg	**0.3**	-	230	-	180	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Naphthalene (VOC)	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylene (o)	mg/kg	**0.1**	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Xylene (m & p)	mg/kg	**0.2**	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Petroleum Hydrocarbons														
C6 - C9	mg/kg	**20**	-	-	-	-	-	<20	<20	<20	<20	<20	<20	<20
C10 - C14	mg/kg	**20**	-	-	-	-	-	<20	<20	<20	<20	<20	<20	<20
C15 - C28	mg/kg	**50**	-	-	-	-	-	<50	<50	**210**	**160**	<50	**51**	<50
C29 - C36	mg/kg	**50**	-	-	-	-	-	<50	**59**	**450**	**520**	<50	<50	<50
C10 - C36 (Sum of total)	mg/kg	**50**	-	-	-	-	-	<50	**59**	**660**	**680**	<50	**51**	<50
Total Recoverable Hydrocarbons														
F1 (C6 - C10)	mg/kg	**20**	-	-	-	-	700	<20	<20	<20	<20	<20	<20	<20
F1 (C6 - C10) less BTEX	mg/kg	**20**	-	260	-	215	-	<20	<20	<20	<20	<20	<20	<20
F2 (C10 - C16)	mg/kg	**50**	-	-	-	-	1,000	<50	<50	<50	<50	<50	<50	<50
F2 C10 - C16 (minus Naphthalene)	mg/kg	**50**	-	-	-	170	-	<50	<50	<50	<50	<50	<50	<50
F3 (C16 - C34)	mg/kg	**100**	-	-	-	1,700	3,500	<100	<100	**530**	**520**	<100	<100	<100
F4 (C34 - C40)	mg/kg	**100**	-	-	-	3,300	10,000	<100	<100	**370**	**430**	<100	<100	<100
C10 - C40 (Sum of total)	mg/kg	**100**	-	-	-	-	-	<100	<100	**900**	**950**	<100	<100	<100
Polycyclic Aromatic Hydrocarbons														
Benzo(a)pyrene TEQ calc (Half)	mg/kg	**0.5**	40	-	-	-	-	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
Benzo(a)pyrene TEQ (LOR)	mg/kg	**0.5**	40	-	-	-	-	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	**0.5**	40	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a) pyrene	mg/kg	**0.5**	-	-	-	1.4	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	mg/kg	**0.5**	-	-	370	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	mg/kg	**0.5**	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PAHs (Sum of total)	mg/kg	**0.5**	4,000	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Halogenated Benzenes														
Hexachlorobenzene	mg/kg	**0.05**	80	-	-	-	-	<0.05	-	-	-	<0.05	-	-
PCBs														
Arochlor 1016	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Arochlor 1221	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Arochlor 1232	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Arochlor 1242	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-

TABLE 3
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Analytical Results - Stockpiles (NEPM)

							Field ID	**SP9_01**	**SP9_02**	**SP9_03**	**SP9_04**	**SP10_01**	**SP10_02**	**SP10_03**
							Stockpile	**Stockpile 9**	**Stockpile 9**	**Stockpile 9**	**Stockpile 9**	**Stockpile 10**	**Stockpile 10**	**Stockpile 10**
							Date	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**	**8/03/2023**
							Lab Report Number	**971775**	**971775**	**971775**	**971775**	**971775**	**971775**	**971775**
	Unit	EQL	NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (0m - 1m)	NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind	NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil	NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil							
Arochlor 1248	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Arochlor 1254	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Arochlor 1260	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-
PCBs (Sum of total)	mg/kg	**0.1**	7	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Phenols														
3/4-Methylphenol (m/p-cresol)	mg/kg	**0.4**	-	-	-	-	-	<0.4	-	-	-	<0.4	-	-
2,4-Dinitrophenol	mg/kg	**5**	-	-	-	-	-	<5	-	-	-	<5	-	-
2,4,5-Trichlorophenol	mg/kg	**1**	-	-	-	-	-	<1	-	-	-	<1	-	-
2,4,6-Trichlorophenol	mg/kg	**1**	-	-	-	-	-	<1	-	-	-	<1	-	-
2,4-Dichlorophenol	mg/kg	**0.5**	-	-	-	-	-	<0.5	-	-	-	<0.5	-	-
2,4-Dimethylphenol	mg/kg	**0.5**	-	-	-	-	-	<0.5	-	-	-	<0.5	-	-
2,6-Dichlorophenol	mg/kg	**0.5**	-	-	-	-	-	<0.5	-	-	-	<0.5	-	-
2-Chlorophenol	mg/kg	**0.5**	-	-	-	-	-	<0.5	-	-	-	<0.5	-	-
2-Methylphenol	mg/kg	**0.2**	-	-	-	-	-	<0.2	-	-	-	<0.2	-	-
2-Nitrophenol	mg/kg	**1**	-	-	-	-	-	<1	-	-	-	<1	-	-
4,6-Dinitro-2-methylphenol	mg/kg	**5**	-	-	-	-	-	<5	-	-	-	<5	-	-
4,6-Dinitro-o-cyclohexyl phenol	mg/kg	**20**	-	-	-	-	-	<20	-	-	-	<20	-	-
4-Nitrophenol	mg/kg	**5**	-	-	-	-	-	<5	-	-	-	<5	-	-
4-chloro-3-methylphenol	mg/kg	**1**	-	-	-	-	-	<1	-	-	-	<1	-	-
Cresol Total	mg/kg	**0.5**	25,000	-	-	-	-	<0.5	-	-	-	<0.5	-	-
Pentachlorophenol	mg/kg	**1**	660	-	-	-	-	<1	-	-	-	<1	-	-
Phenol	mg/kg	**0.5**	240,000	-	-	-	-	<0.5	-	-	-	<0.5	-	-
Tetrachlorophenols	mg/kg	**10**	-	-	-	-	-	<10	-	-	-	<10	-	-
Phenols (Total Halogenated)	mg/kg	**1**	-	-	-	-	-	<1	-	-	-	<1	-	-
Phenols (Total Non Halogenated)	mg/kg	**20**	-	-	-	-	-	<20	-	-	-	<20	-	-
OCP														
Organochlorine pesticides EPAVic	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Other organochlorine pesticides EPAVic	mg/kg	**0.1**	-	-	-	-	-	<0.1	-	-	-	<0.1	-	-
Herbicides														
Dinoseb	mg/kg	**20**	-	-	-	-	-	<20	-	-	-	<20	-	-
Organochlorine Pesticides														
4,4-DDE	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
a-BHC	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Aldrin	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Aldrin + Dieldrin	mg/kg	**0.05**	45	-	-	-	-	<0.05	-	-	-	<0.05	-	-
b-BHC	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
chlordane	mg/kg	**0.1**	530	-	-	-	-	<0.1	-	-	-	<0.1	-	-
d-BHC	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
DDD	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
DDT	mg/kg	**0.05**	-	-	640	-	-	<0.05	-	-	-	<0.05	-	-
DDT+DDE+DDD	mg/kg	**0.05**	3,600	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Dieldrin	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endrin aldehyde	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endrin ketone	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endosulfan I	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endosulfan II	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endosulfan sulphate	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Endrin	mg/kg	**0.05**	100	-	-	-	-	<0.05	-	-	-	<0.05	-	-
g-BHC (Lindane)	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Heptachlor	mg/kg	**0.05**	50	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Heptachlor epoxide	mg/kg	**0.05**	-	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Methoxychlor	mg/kg	**0.05**	2,500	-	-	-	-	<0.05	-	-	-	<0.05	-	-
Toxaphene	mg/kg	**0.5**	160	-	-	-	-	<0.5	-	-	-	<0.5	-	-

Environmental Standards
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (0m - 1m)
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil
*Calculated using the following parameters: CEC = 5 cmolc/kg dwt, OC = 1%, clay = 10%, pH = 4.4

TABLE 4
Contaminated Land and Acid Sulfate Soil Impact Assessment
Heybridge Converter Station
Analytical Results - Surface Water

						Field ID	**HEY_SW1**	**HEY_SW2**
						Date	**08 Mar 2023**	**08 Mar 2023**
						Lab Report Number	**971775**	**971775**
						Sample Code	**M23-Ma0033629**	**M23-Ma0033628**
	Unit	**EQL**	ANZECC (2000) Recreational water quality and aesthetics	ANZG (2018) Freshwater 95% toxicant DGVs	ANZG (2018) Marine water 95% toxicant DGVs		
Metals							
Arsenic	mg/L	**0.001**	0.05	-	-	<0.001	**0.001**
Cadmium	mg/L	**0.0002**	0.005	0.0002	0.0055	<0.0002	<0.0002
Chromium (III+VI)	mg/L	**0.001**	0.05	-	-	<0.001	<0.001
Copper	mg/L	**0.001**	1	0.0014	0.0013	**0.003**	**0.003**
Lead	mg/L	**0.001**	0.05	0.0034	0.0044	**0.001**	<0.001
Mercury	mg/L	**0.0001**	0.001	0.0006	0.0004	<0.0001	<0.0001
Molybdenum	mg/L	**0.005**	-	-	-	<0.005	<0.005
Nickel	mg/L	**0.001**	0.1	0.011	0.07	**0.002**	**0.005**
Silver	mg/L	**0.005**	0.05	0.00005	0.0014	<0.005	<0.005
Selenium	mg/L	**0.001**	0.01	0.011	-	<0.001	<0.001
Tin	mg/L	**0.005**	-	-	-	<0.005	<0.005
Zinc	mg/L	**0.005**	5	0.008	0.015	**0.012**	**0.067**
BTEX							
Benzene	mg/L	**0.001**	0.01	0.95	0.7	<0.001	<0.001
Toluene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Ethylbenzene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Xylene Total	mg/L	**0.003**	-	-	-	<0.003	<0.003
Naphthalene (VOC)	mg/L	**0.01**	-	-	-	<0.01	<0.01
Xylene (o)	mg/L	**0.001**	-	0.35	-	<0.001	<0.001
Xylene (m & p)	mg/L	**0.002**	-	-	-	<0.002	<0.002
Total Petroleum Hydrocarbons							
C6 - C9	mg/L	**0.02**	-	-	-	<0.02	<0.02
C10 - C14	mg/L	**0.05**	-	-	-	<0.05	<0.05
C15 - C28	mg/L	**0.1**	-	-	-	**0.4**	<0.1
C29 - C36	mg/L	**0.1**	-	-	-	<0.1	<0.1
C10 - C36 (Sum of total)	mg/L	**0.1**	-	-	-	**0.4**	<0.1
Total Recoverable Hydrocarbons							
F1 (C6 - C10)	mg/L	**0.02**	-	-	-	<0.02	<0.02
F1 (C6 - C10) less BTEX	mg/L	**0.02**	-	-	-	<0.02	<0.02
F2 (C10 - C16)	mg/L	**0.05**	-	-	-	<0.05	<0.05
F2 C10 - C16 (minus Naphthalene)	mg/L	**0.05**	-	-	-	<0.05	<0.05
F3 (C16 - C34)	mg/L	**0.1**	-	-	-	**0.4**	<0.1
F4 (C34 - C40)	mg/L	**0.1**	-	-	-	<0.1	<0.1
C10 - C40 (Sum of total)	mg/L	**0.1**	-	-	-	**0.4**	<0.1
Polycyclic Aromatic Hydrocarbons							
Benzo(b+j)fluoranthene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Acenaphthene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Acenaphthylene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Anthracene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Benz(a)anthracene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Benzo(a) pyrene	mg/L	**0.001**	0.00001	-	-	<0.001	<0.001
Benzo(g,h,i)perylene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Benzo(k)fluoranthene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Chrysene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Dibenz(a,h)anthracene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Fluoranthene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Fluorene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Naphthalene	mg/L	**0.001**	-	0.016	0.07	<0.001	<0.001
Phenanthrene	mg/L	**0.001**	-	-	-	<0.001	<0.001
Pyrene	mg/L	**0.001**	-	-	-	<0.001	<0.001
PAHs (Sum of total)	mg/L	**0.001**	-	-	-	<0.001	<0.001
Halogenated Benzenes							
Hexachlorobenzene	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
PCBs							
Arochlor 1016	mg/L	**0.005**	-	-	-	<0.005	<0.005
Arochlor 1221	mg/L	**0.005**	-	-	-	<0.005	<0.005
Arochlor 1232	mg/L	**0.005**	-	-	-	<0.005	<0.005
Arochlor 1242	mg/L	**0.005**	-	0.0006	-	<0.005	<0.005
Arochlor 1248	mg/L	**0.005**	-	-	-	<0.005	<0.005
Arochlor 1254	mg/L	**0.005**	-	0.00003	-	<0.005	<0.005
Arochlor 1260	mg/L	**0.005**	-	-	-	<0.005	<0.005
PCBs (Sum of total)	mg/L	**0.005**	-	-	-	<0.005	<0.005
Phenols							
3/4-Methylphenol (m/p-cresol)	mg/L	**0.006**	-	-	-	<0.006	<0.006

TABLE 4
Contaminated Land and Acid Sulfate Soil Impact Assessment
Heybridge Converter Station
Analytical Results - Surface Water

					Field ID	**HEY_SW1**	**HEY_SW2**
					Date	**08 Mar 2023**	**08 Mar 2023**
					Lab Report Number	**971775**	**971775**
					Sample Code	**M23-Ma0033629**	**M23-Ma0033628**
	Unit	**EQL**	ANZECC (2000) Recreational water quality and aesthetics	ANZG (2018) Freshwater 95% toxicant DGVs	ANZG (2018) Marine water 95% toxicant DGVs		
2,4-Dinitrophenol	mg/L	**0.03**	-	0.045	-	<0.03	<0.03
2,4,5-Trichlorophenol	mg/L	**0.01**	0.001	-	-	<0.01	<0.01
2,4,6-Trichlorophenol	mg/L	**0.01**	0.01	0.02	-	<0.01	<0.01
2,4-Dichlorophenol	mg/L	**0.003**	-	0.16	-	<0.003	<0.003
2,4-Dimethylphenol	mg/L	**0.003**	-	-	-	<0.003	<0.003
2,6-Dichlorophenol	mg/L	**0.003**	-	-	-	<0.003	<0.003
2-Chlorophenol	mg/L	**0.003**	-	0.49	-	<0.003	<0.003
2-Methylphenol	mg/L	**0.003**	-	-	-	<0.003	<0.003
2-Nitrophenol	mg/L	**0.01**	-	-	-	<0.01	<0.01
4,6-Dinitro-2-methylphenol	mg/L	**0.03**	-	-	-	<0.03	<0.03
4,6-Dinitro-o-cyclohexyl phenol	mg/L	**0.1**	-	-	-	<0.1	<0.1
4-Nitrophenol	mg/L	**0.03**	-	-	-	<0.03	<0.03
4-chloro-3-methylphenol	mg/L	**0.01**	-	-	-	<0.01	<0.01
Cresol Total	mg/L	**0.01**	-	-	-	<0.01	<0.01
Pentachlorophenol	mg/L	**0.01**	0.01	0.01	0.022	<0.01	<0.01
Phenol	mg/L	**0.003**	-	0.32	0.4	<0.003	<0.003
Tetrachlorophenols	mg/L	**0.03**	-	-	-	<0.03	<0.03
Phenols (Total Halogenated)	mg/L	**0.01**	-	-	-	<0.01	<0.01
Phenols (Total Non Halogenated)	mg/L	**0.1**	-	-	-	<0.1	<0.1
OCP							
Organochlorine pesticides EPAVic	mg/L	**0.002**	-	-	-	<0.002	<0.002
Other organochlorine pesticides EPAVic	mg/L	**0.002**	-	-	-	<0.002	<0.002
Herbicides							
Dinoseb	mg/L	**0.1**	-	-	-	<0.1	<0.1
Organochlorine Pesticides							
4,4-DDE	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
a-BHC	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
Aldrin	mg/L	**0.0002**	0.001	-	-	<0.0002	<0.0002
Aldrin + Dieldrin	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
b-BHC	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
chlordane	mg/L	**0.002**	0.006	0.00008	-	<0.002	<0.002
d-BHC	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
DDD	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
DDT	mg/L	**0.0002**	0.003	0.00001	-	<0.0002	<0.0002
DDT+DDE+DDD	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
Dieldrin	mg/L	**0.0002**	0.001	-	-	<0.0002	<0.0002
Endrin aldehyde	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
Endrin ketone	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
Endosulfan I	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
Endosulfan II	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
Endosulfan sulphate	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
Endrin	mg/L	**0.0002**	0.001	0.00002	0.000008	<0.0002	<0.0002
g-BHC (Lindane)	mg/L	**0.0002**	0.01	0.0002	-	<0.0002	<0.0002
Heptachlor	mg/L	**0.0002**	0.003	0.00009	-	<0.0002	<0.0002
Heptachlor epoxide	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
Methoxychlor	mg/L	**0.0002**	-	-	-	<0.0002	<0.0002
Toxaphene	mg/L	**0.005**	-	0.0002	-	<0.005	<0.005

Environmental Standards
ANZECC (2000) Recreational water quality and aesthetics
ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality - Freshwater 95% toxicant DGVs
ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality - Marine water 95% toxicant DGVs

TABLE 5a
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Field Duplicates - Acid Sulfate Soils

Field ID			**HEY7_0.5-0.6**	**QC01**	**RPD**	**HEY7_0.5-0.6**	**QC02**	**RPD**	**HEY6_0.0-0.3**	**QC03**	**RPD**	**HEY6_0.0-0.3**	**QC04**	**RPD**	**HEY3_0.9-1.0**	**QC05**	**RPD**	**HEY3_0.9-1.0**	**QC06**
Date			**08 Mar 2023**	**08 Mar 2023**		**08 Mar 2023**	**08 Mar 2023**		**08 Mar 2023**	**08 Mar 2023**		**08 Mar 2023**	**08 Mar 2023**		**08 Mar 2023**	**08 Mar 2023**		**08 Mar 2023**	**08 Mar 2023**
Lab Report Number			**971775**	**971775**		**971775**	**EM2304527**		**971775**	**971775**		**971775**	**EM2304527**		**971775**	**971775**		**971775**	**EM2304527**
Matrix Type			**Soil**	**Soil**		**Soil**	**Soil**		**Soil**	**Soil**		**Soil**	**Soil**		**Soil**	**Soil**		**Soil**	**Soil**
	Unit	EQL																	
CRS																			
CRS Suite - Net Acidity - NASSG (Including ANC)	MOL H+/T	**10**	-	-	-	-	-	-	-	-	-	-	-	-	<10	<10	0	<10	-
CRS Suite Net Acidity - NASSG (Including ANC)	% S	**0.02**	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.02	0	<0.02	-
Particle Size																			
<2mm Fraction	G	**0.005**	-	-	-	-	-	-	-	-	-	-	-	-	**140**	**140**	0	**140**	-
>2mm Fraction	G	**0.005**	-	-	-	-	-	-	-	-	-	-	-	-	**18**	**31**	**53**	**18**	-
Inorganics																			
Extraneous Material	%	**0.1**	-	-	-	-	-	-	-	-	-	-	-	-	**11**	**18**	**48**	**11**	-
Analysed Material	%	**0.1**	-	-	-	-	-	-	-	-	-	-	-	-	**89**	**82**	8	**89**	-
SPOCAS																			
Reaction Rate	-	**0**	**3.0**	**3.0**	0	**3.0**	**3**	0	**3.0**	**4.0**	29	**3.0**	**2**	**40**	-	-	-	-	-
Field pH of Peroxide extract	pH Unit	**0.1**	**3.0**	**3.1**	3	**3.0**	**2.8**	7	**4.0**	**4.3**	7	**4.0**	**4.5**	12	-	-	-	-	-
pH (F)	pH Unit	**0.1**	**6.1**	**5.4**	12	**6.1**	**5.5**	10	**6.5**	**6.5**	0	**6.5**	**6.2**	5	-	-	-	-	-
ANC Fineness Factor	-	**0.5**	-	-	-	-	-	-	-	-	-	-	-	-	**1.5**	**1.5**	0	**1.5**	**1.5**
Chromium Reducible Sulfur	%S	**0.005**	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	**0.005**	0	<0.005	**0.009**
Chromium Reducible Sulphur	mole H+/t	**3**	-	-	-	-	-	-	-	-	-	-	-	-	<3	**3.3**	10	<3	<10
HCl Extractable Sulfur Correction Factor	FACTOR	**1**	-	-	-	-	-	-	-	-	-	-	-	-	**2.0**	**2.0**	0	**2.0**	-
pH (KCl)	-	**0.1**	-	-	-	-	-	-	-	-	-	-	-	-	**5.3**	**5.3**	0	**5.3**	**6.2**
sulfidic - Titratable Actual Acidity	%S	**0.003**	-	-	-	-	-	-	-	-	-	-	-	-	**0.008**	**0.007**	13	**0.008**	<0.02
Titratable Actual Acidity	mole H+/t	**2**	-	-	-	-	-	-	-	-	-	-	-	-	**4.8**	**4.5**	6	**4.8**	**5**

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 50 (1 - 10 x EQL); 30 (10 - 10 x EQL); 30 (> 10 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

TABLE 5a
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Field Duplicates - Acid Sulfate Soils

			Field ID Date Lab Report Number Matrix Type	RPD
	Unit	EQL		
CRS				
CRS Suite - Net Acidity - NASSG (Including ANC)	MOL H+/T	**10**		-
CRS Suite Net Acidity - NASSG (Including ANC)	% S	**0.02**		-
Particle Size				
<2mm Fraction	G	**0.005**		-
>2mm Fraction	G	**0.005**		-
Inorganics				
Extraneous Material	%	**0.1**		-
Analysed Material	%	**0.1**		-
SPOCAS				
Reaction Rate	-	**0**		-
Field pH of Peroxide extract	pH Unit	**0.1**		-
pH (F)	pH Unit	**0.1**		-
ANC Fineness Factor	-	**0.5**		0
Chromium Reducible Sulfur	%S	**0.005**		**57**
Chromium Reducible Sulphur	mole H+/t	**3**		0
HCl Extractable Sulfur Correction Factor	FACTOR	**1**		-
pH (KCl)	-	**0.1**		16
sulfidic - Titratable Actual Acidity	%S	**0.003**		0
Titratable Actual Acidity	mole H+/t	**2**		4

*RPDs have only been considered where a concentration is greater tha
**Elevated RPDs are highlighted as per QAQC Profile settings (Accepta
***Interlab Duplicates are matched on a per compound basis as meth

TABLE 5b
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Field Duplicates - Surface Water

			Field ID	HEY_SW1	QC09		HEY_SW1	QC10	
			Date	08 Mar 2023	08 Mar 2023		08 Mar 2023	08 Mar 2023	
			Lab Report Number	971775	971775		971775	EM2304527	
			Matrix Type	Water	Water	RPD	Water	Water	RPD
	Unit	EQL							
Ions									
Cyanide Total	mg/L	**0.005**		<0.005	<0.005	0	<0.005	-	-
Fluoride	mg/L	**0.1**		<0.5	<0.5	0	<0.5	<0.1	0
Metals									
Arsenic	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.001	0
Cadmium	mg/L	**0.0001**		<0.0002	<0.0002	0	<0.0002	<0.0001	0
Chromium (III+VI)	mg/L	**0.001**		<0.001	**0.001**	0	<0.001	**0.001**	0
Copper	mg/L	**0.001**		**0.003**	**0.004**	29	**0.003**	**0.004**	29
Lead	mg/L	**0.001**		**0.001**	**0.002**	67	**0.001**	**0.002**	67
Mercury	mg/L	**0.0001**		<0.0001	<0.0001	0	<0.0001	<0.0001	0
Molybdenum	mg/L	**0.005**		<0.005	<0.005	0	<0.005	-	-
Nickel	mg/L	**0.001**		**0.002**	**0.002**	0	**0.002**	**0.002**	0
Silver	mg/L	**0.001**		<0.005	<0.005	0	<0.005	<0.001	0
Selenium	mg/L	**0.001**		<0.001	<0.001	0	<0.001	-	-
Tin	mg/L	**0.001**		<0.005	<0.005	0	<0.005	<0.001	0
Zinc	mg/L	**0.005**		**0.012**	**0.011**	9	**0.012**	**0.009**	29
BTEX									
Benzene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.001	0
Toluene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.002	0
Ethylbenzene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.002	0
Xylene Total	mg/L	**0.002**		<0.003	<0.003	0	<0.003	<0.002	0
Naphthalene (VOC)	mg/L	**0.005**		<0.01	<0.01	0	<0.01	<0.005	0
Total BTEX	mg/L	**0.001**		-	-	-	-	<0.001	-
Xylene (o)	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.002	0
Xylene (m & p)	mg/L	**0.002**		<0.002	<0.002	0	<0.002	<0.002	0
Total Petroleum Hydrocarbons									
C6 - C9	mg/L	**0.02**		<0.02	<0.02	0	<0.02	<0.02	0
C10 - C14	mg/L	**0.05**		<0.05	<0.05	0	<0.05	<0.05	0
C15 - C28	mg/L	**0.1**		**0.4**	**0.4**	0	**0.4**	**0.45**	12
C29 - C36	mg/L	**0.05**		<0.1	<0.1	0	<0.1	<0.05	0
C10 - C36 (Sum of total)	mg/L	**0.05**		**0.4**	**0.4**	0	**0.4**	**0.45**	12
Total Recoverable Hydrocarbons									
F1 (C6 - C10)	mg/L	**0.02**		<0.02	<0.02	0	<0.02	<0.02	0
F1 (C6 - C10) less BTEX	mg/L	**0.02**		<0.02	<0.02	0	<0.02	<0.02	0
F2 (C10 - C16)	mg/L	**0.05**		<0.05	<0.05	0	<0.05	<0.1	0
F2 C10 - C16 (minus Naphthalene)	mg/L	**0.05**		<0.05	<0.05	0	<0.05	<0.1	0
F3 (C16 - C34)	mg/L	**0.1**		**0.4**	**0.4**	0	**0.4**	**0.43**	7
F4 (C34 - C40)	mg/L	**0.1**		<0.1	<0.1	0	<0.1	<0.1	0
C10 - C40 (Sum of total)	mg/L	**0.1**		**0.4**	**0.4**	0	**0.4**	**0.43**	7
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene TEQ calc (Zero)	mg/L	**0.0005**		-	-	-	-	<0.0005	-
Benzo(b+j)fluoranthene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Acenaphthene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Acenaphthylene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Anthracene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Benz(a)anthracene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Benzo(a) pyrene	mg/L	**0.0005**		<0.001	<0.001	0	<0.001	<0.0005	0
Benzo(g,h,i)perylene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Benzo(k)fluoranthene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Chrysene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Dibenz(a,h)anthracene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Fluoranthene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Fluorene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Indeno(1,2,3-c,d)pyrene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Naphthalene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Phenanthrene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
Pyrene	mg/L	**0.001**		<0.001	<0.001	0	<0.001	<0.0010	0
PAHs (Sum of total)	mg/L	**0.0005**		<0.001	<0.001	0	<0.001	<0.0005	0
Halogenated Benzenes									
Hexachlorobenzene	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
PCBs									
Arochlor 1016	mg/L	**0.005**		<0.005	<0.005	0	<0.005	-	-
Arochlor 1221	mg/L	**0.005**		<0.005	<0.005	0	<0.005	-	-
Arochlor 1232	mg/L	**0.005**		<0.005	<0.005	0	<0.005	-	-
Arochlor 1242	mg/L	**0.005**		<0.005	<0.005	0	<0.005	-	-
Arochlor 1248	mg/L	**0.005**		<0.005	<0.005	0	<0.005	-	-
Arochlor 1254	mg/L	**0.005**		<0.005	<0.005	0	<0.005	-	-
Arochlor 1260	mg/L	**0.005**		<0.005	<0.005	0	<0.005	-	-
PCBs (Sum of total)	mg/L	**0.001**		<0.005	<0.005	0	<0.005	<0.001	0
Phenols									
3/4-Methylphenol (m/p-cresol)	mg/L	**0.002**		<0.006	<0.006	0	<0.006	<0.0020	0
2,4-Dinitrophenol	mg/L	**0.03**		<0.03	<0.03	0	<0.03	-	-
2,4,5-Trichlorophenol	mg/L	**0.001**		<0.01	<0.01	0	<0.01	<0.0010	0
2,4,6-Trichlorophenol	mg/L	**0.001**		<0.01	<0.01	0	<0.01	<0.0010	0
2,4-Dichlorophenol	mg/L	**0.001**		<0.003	<0.003	0	<0.003	<0.0010	0
2,4-Dimethylphenol	mg/L	**0.001**		<0.003	<0.003	0	<0.003	<0.0010	0
2,6-Dichlorophenol	mg/L	**0.001**		<0.003	<0.003	0	<0.003	<0.0010	0
2-Chlorophenol	mg/L	**0.001**		<0.003	<0.003	0	<0.003	<0.0010	0
2-Methylphenol	mg/L	**0.001**		<0.003	<0.003	0	<0.003	<0.0010	0
2-Nitrophenol	mg/L	**0.001**		<0.01	<0.01	0	<0.01	<0.0010	0
4,6-Dinitro-2-methylphenol	mg/L	**0.03**		<0.03	<0.03	0	<0.03	-	-
4,6-Dinitro-o-cyclohexyl phenol	mg/L	**0.1**		<0.1	<0.1	0	<0.1	-	-
4-Nitrophenol	mg/L	**0.03**		<0.03	<0.03	0	<0.03	-	-
4-chloro-3-methylphenol	mg/L	**0.001**		<0.01	<0.01	0	<0.01	<0.0010	0
Cresol Total	mg/L	**0.01**		<0.01	<0.01	0	<0.01	-	-
Pentachlorophenol	mg/L	**0.002**		<0.01	<0.01	0	<0.01	<0.0020	0
Phenol	mg/L	**0.001**		<0.003	<0.003	0	<0.003	<0.0010	0
Tetrachlorophenols	mg/L	**0.03**		<0.03	<0.03	0	<0.03	-	-
Phenols (Total Halogenated)	mg/L	**0.01**		<0.01	<0.01	0	<0.01	-	-
Phenols (Total Non Halogenated)	mg/L	**0.1**		<0.1	<0.1	0	<0.1	-	-
OCP									
Organochlorine pesticides EPAVic	mg/L	**0.002**		<0.002	<0.002	0	<0.002	-	-
Other organochlorine pesticides EPAVic	mg/L	**0.002**		<0.002	<0.002	0	<0.002	-	-
Herbicides									

			Field ID	HEY_SW1	QC09		HEY_SW1	QC10	
			Date	08 Mar 2023	08 Mar 2023		08 Mar 2023	08 Mar 2023	
			Lab Report Number	971775	971775		971775	EM2304527	
			Matrix Type	Water	Water	RPD	Water	Water	RPD
	Unit	EQL							
Dinoseb	mg/L	**0.1**		<0.1	<0.1	0	<0.1	-	-
Organochlorine Pesticides									
4,4-DDE	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
a-BHC	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Aldrin	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Aldrin + Dieldrin	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
b-BHC	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
chlordane	mg/L	**0.0005**		<0.002	<0.002	0	<0.002	<0.0005	0
Chlordane (cis)	mg/L	**0.0005**		-	-	-	-	<0.0005	-
Chlordane (trans)	mg/L	**0.0005**		-	-	-	-	<0.0005	-
d-BHC	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
DDD	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
DDT	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0020	0
DDT+DDE+DDD	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Dieldrin	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Endrin aldehyde	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Endrin ketone	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Endosulfan I	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Endosulfan II	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Endosulfan sulphate	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Endrin	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
g-BHC (Lindane)	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Heptachlor	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Heptachlor epoxide	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0005	0
Methoxychlor	mg/L	**0.0002**		<0.0002	<0.0002	0	<0.0002	<0.0020	0
Toxaphene	mg/L	**0.005**		<0.005	<0.005	0	<0.005	-	-

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 200 (1 - 10 x EQL); 50 (10 - 20 x EQL); 30 (> 20 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

TABLE 6
Contaminated Land and Acid Sulfate Soils Impact Assessment
Heybridge Converter Station
Field Duplicates - Soil Stockpiles

		Field ID	SP9_01	QC07	RPD	SP9_01	QC08	RPD
		Date	08 Mar 2023	08 Mar 2023		08 Mar 2023	08 Mar 2023	
		Lab Report Number	971775	971775		971775	EM2304527	
		Matrix Type	Soil	Soil		Soil	Soil	
	Unit	EQL						
Metals								
Arsenic	mg/kg	2	<2	<2	0	<2	<5	0
Cadmium	mg/kg	0.4	<0.4	<0.4	0	<0.4	<1	0
Chromium (III+VI)	mg/kg	2	62	120	64	62	50	21
Copper	mg/kg	5	22	42	62	22	18	20
Lead	mg/kg	5	14	20	35	14	14	0
Mercury	mg/kg	0.1	0.1	0.2	67	0.1	0.1	0
Nickel	mg/kg	2	40	78	64	40	29	32
Zinc	mg/kg	5	71	120	51	71	58	20
BTEX								
Benzene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.2	0
Toluene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Xylene Total	mg/kg	0.3	<0.3	<0.3	0	<0.3	<0.5	0
Naphthalene (VOC)	mg/kg	0.5	<0.5	<0.5	0	<0.5	<1	0
Xylene (o)	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Xylene (m & p)	mg/kg	0.2	<0.2	<0.2	0	<0.2	<0.5	0
Total Petroleum Hydrocarbons								
C6 - C9	mg/kg	10	<20	<20	0	<20	<10	0
C10 - C14	mg/kg	20	<20	<20	0	<20	<50	0
C15 - C28	mg/kg	50	<50	<50	0	<50	<100	0
C29 - C36	mg/kg	50	<50	<50	0	<50	<100	0
C10 - C36 (Sum of total)	mg/kg	50	<50	<50	0	<50	<50	0
Total Recoverable Hydrocarbons								
F1 (C6 - C10)	mg/kg	10	<20	<20	0	<20	<10	0
F1 (C6 - C10) less BTEX	mg/kg	10	<20	<20	0	<20	<10	0
F2 (C10 - C16)	mg/kg	50	<50	<50	0	<50	<50	0
F2 C10 - C16 (minus Naphthalene)	mg/kg	50	<50	<50	0	<50	<50	0
F3 (C16 - C34)	mg/kg	100	<100	<100	0	<100	<100	0
F4 (C34 - C40)	mg/kg	100	<100	<100	0	<100	<100	0
C10 - C40 (Sum of total)	mg/kg	50	<100	<100	0	<100	<50	0
Polycyclic Aromatic Hydrocarbons								
Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.5	0.6	0.6	0	0.6	0.6	0
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	1.2	1.2	0	1.2	1.2	0
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Acenaphthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Benzo(a) pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Chrysene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Fluorene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Naphthalene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Phenanthrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
PAHs (Sum of total)	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 50 (1 - 10 x EQL); 30 (10 - 10 x EQL); 30 (> 10 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

APPENDIX D: TEST PIT LOGS

TETRA TECH COFFEY

Engineering Log - Test pit

Borehole ID.	**HEY1**
sheet:	1 of 1
project no.	**754-MELEN215878**
client:	**Marinus Link Pty Ltd**
principal:	
project:	**Contaminated Land and Acid Sulfate Soils Impact Assessment**
location:	**Heybridge Converter Station**
date started:	**08 Mar 2023**
date completed:	**08 Mar 2023**
logged by:	**JR**
checked by:	**BT**

position: Not Specified | surface elevation: Not Specified | angle from horizontal: N/A

drill model: N/A | drilling fluid: Excavator | pit dimensions : 3.0 m long x 1.5 m wide

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	soil origin, structure and additional observations
E			E		0		CL-CH	**FILL: Sandy CLAY**: medium to high plasticity, brown grey, with fine grained gravels, with bricks and wood fragments.				**FILL**
			E		0.5		SC	**FILL: CLAYEY SAND**: coarse grained, dark grey, mottled black and white, with gravels.				**NATURAL**
			E		1.0		GC	**CLAYEY GRAVEL**: dark grey, with sand.				
			E		1.5		CI-CH	**Gravelly CLAY**: medium to high plasticity, pale grey, with quartz pebbles.				Sulfur-like odour
								Test pit HEY1 terminated at 1.5 m				
					2.0							
					2.5							
					3.0							
					3.5							

CDF_0_10_00.4_LIBRARY (1).GLB rev:CDF_0_10_00.4 2021-09-30 Log COF BOREHOLE: NON CORED 754-MELEN215878.GPJ <<DrawingFile>> 27/03/2023 11:17

method
- DT diatube
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- RR rock roller

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

soil group symbol & material description based on AS 1726:2017

moisture condition
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

TETRA TECH COFFEY

Engineering Log - Test pit

Borehole ID.	**HEY2**
sheet:	1 of 1
project no.	**754-MELEN215878**
client:	**Marinus Link Pty Ltd**
principal:	
project:	**Contaminated Land and Acid Sulfate Soils Impact Assessment**
location:	**Heybridge Converter Station**
date started:	**08 Mar 2023**
date completed:	**08 Mar 2023**
logged by:	**JR**
checked by:	**BT**

position: Not Specified | surface elevation: Not Specified | angle from horizontal: N/A

drill model: N/A | drilling fluid: Excavator | pit dimensions : 3.0 m long x 1.5 m wide

drilling information | **material substance**

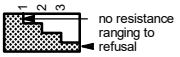
method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (**SOIL NAME**: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	soil origin, structure and additional observations
E			E		0		CL-CH	**FILL: Sandy CLAY**: medium to high plasticity, red brown, with gravels.				**FILL**
							CI-CH	**CLAY**: dark brown, with root and charcoal fragments.				
			E		0.5							**NATURAL**
			E		1.0							
			E		1.5			with mudstone boulder				
								Test pit HEY2 terminated at 1.5 m				
					2.0							
					2.5							
					3.0							
					3.5							

method
- DT diatube
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- RR rock roller

* bit shown by suffix e.g. AD/T
- B blank bit
- T TC bit
- V V bit

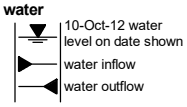
support
- M mud
- C casing
- N nil

penetration



no resistance ranging to refusal

water



10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

soil group symbol & material description based on AS 1726:2017

moisture condition
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

TETRA TECH COFFEY

Engineering Log - Test pit

Borehole ID.	**HEY3**
sheet:	1 of 1
project no.	**754-MELEN215878**
client:	**Marinus Link Pty Ltd**
date started:	**08 Mar 2023**
principal:	
date completed:	**08 Mar 2023**
project:	**Contaminated Land and Acid Sulfate Soils Impact Assessment**
logged by:	**JR**
location:	**Heybridge Converter Station**
checked by:	**BT**

position: Not Specified | surface elevation: Not Specified | angle from horizontal: N/A

drill model: N/A | drilling fluid: Excavator | pit dimensions : 3.0 m long x 1.5 m wide

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (**SOIL NAME**: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	soil origin, structure and additional observations
E			E				CL-CH	**FILL: Sandy CLAY**: medium to high plasticity, dark brown, with brick fragments.				**FILL**
												NATURAL
			E		0.5		SP	**SAND**: medium to coarse grained, grey, with shell fragments.				
			E		1.0			becoming coarse grained, with quartz fragments				
			E		1.5			becoming dark grey				
								Test pit HEY3 terminated at 1.5 m				
					2.0							
					2.5							
					3.0							
					3.5							

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method
- DT diatube
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- RR rock roller

* bit shown by suffix e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

soil group symbol & material description based on AS 1726:2017

moisture condition
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

TETRA TECH COFFEY

Engineering Log - Test pit

Borehole ID.	**HEY4**
sheet:	1 of 1
project no.	**754-MELEN215878**
client:	**Marinus Link Pty Ltd**
principal:	
project:	**Contaminated Land and Acid Sulfate Soils Impact Assessment**
location:	**Heybridge Converter Station**
date started:	**08 Mar 2023**
date completed:	**08 Mar 2023**
logged by:	**JR**
checked by:	**BT**

position: Not Specified | surface elevation: Not Specified | angle from horizontal: N/A

drill model: N/A | drilling fluid: Excavator | pit dimensions : 3.0 m long x 1.5 m wide

drilling information | **material substance**

method & support	penetration (1 2 3)	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (**SOIL NAME**: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	soil origin, structure and additional observations
E			E		0.0		CI-CH	**FILL: Sandy CLAY**: medium to high plasticity, with boulders, bricks, wood and concrete.				**FILL**
			E		0.5							
			E		1.0		SP	**SAND**: medium to coarse grained, dark grey.				**NATURAL**
			E		1.5			with shell fragments				
								Test pit HEY4 terminated at 1.5 m				
					2.0							
					2.5							
					3.0							
					3.5							

method
DT diatube
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
RR rock roller

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
HP hand penetrometer (kPa)
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
VS vane shear; peak/remouded (kPa)
R refusal
HB hammer bouncing

soil group symbol & material description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

TETRA TECH COFFEY

Engineering Log - Test pit

Borehole ID.	**HEY5**
sheet:	1 of 1
project no.	**754-MELEN215878**
client:	**Marinus Link Pty Ltd**
date started:	**08 Mar 2023**
principal:	
date completed:	**08 Mar 2023**
project:	**Contaminated Land and Acid Sulfate Soils Impact Assessment**
logged by:	**JR**
location:	**Heybridge Converter Station**
checked by:	**BT**

position: Not Specified | surface elevation: Not Specified | angle from horizontal: N/A

drill model: N/A | drilling fluid: Excavator | pit dimensions : 3.0 m long x 1.5 m wide

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (**SOIL NAME**: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	soil origin, structure and additional observations
E			E		0.0		CI-CH	**FILL: Sandy CLAY**: medium to high plasticity, with conrete block, with plastic fragments.				**FILL**
			E		0.5			becoming yellow, with gravels and conrete chuncks				
			E		1.0			with gravels, possibly fill				
			E		1.5			Test pit HEY5 terminated at 1.5 m				
					2.0							
					2.5							
					3.0							
					3.5							

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method
- DT diatube
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- RR rock roller

* bit shown by suffix e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration 1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

soil group symbol & material description based on AS 1726:2017

moisture condition
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density
- VS very soft
- S soft
- F firm
- St stiff
- VSt very stiff
- H hard
- Fb friable
- VL very loose
- L loose
- MD medium dense
- D dense
- VD very dense

TETRA TECH COFFEY

Engineering Log - Test pit

Borehole ID.	**HEY6**
sheet:	1 of 1
project no.	**754-MELEN215878**
client:	**Marinus Link Pty Ltd**
date started:	**08 Mar 2023**
principal:	
date completed:	**08 Mar 2023**
project:	**Contaminated Land and Acid Sulfate Soils Impact Assessment**
logged by:	**JR**
location:	**Heybridge Converter Station**
checked by:	**BT**

position: Not Specified | surface elevation: Not Specified | angle from horizontal: N/A

drill model: N/A | drilling fluid: Excavator | pit dimensions : 3.0 m long x 1.5 m wide

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (**SOIL NAME**: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	soil origin, structure and additional observations
E			E		0.0		CI	**FILL: Sandy CLAY**: medium plasticity, dark brown.				**FILL** QC03, QC04
			E		0.5			Becoming dark grey with mudstone gravels				
			E		1.0			Pale yellow with rounded quartz gravels and mudstone fragments/boulders				
			E		1.5			Brown with mudstone, limestone gravels, with rounded quartz Test pit HEY6 terminated at 1.5 m				
					2.0							
					2.5							
					3.0							
					3.5							

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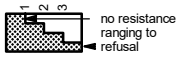
method
- DT diatube
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- RR rock roller

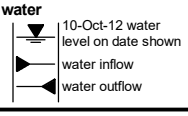
* bit shown by suffix e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration



water



samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

soil group symbol & material description based on AS 1726:2017

moisture condition
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

TETRA TECH COFFEY

Engineering Log - Test pit

Borehole ID.	**HEY7**
sheet:	1 of 1
project no.	**754-MELEN215878**
client:	**Marinus Link Pty Ltd**
date started:	**08 Mar 2023**
principal:	
date completed:	**08 Mar 2023**
project:	**Contaminated Land and Acid Sulfate Soils Impact Assessment**
logged by:	**JR**
location:	**Heybridge Converter Station**
checked by:	**BT**

position: Not Specified | surface elevation: Not Specified | angle from horizontal: N/A

drill model: N/A | drilling fluid: Excavator | pit dimensions : 3.0 m long x 1.5 m wide

drilling information | **material substance**

method & support	penetration (1 2 3)	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (**SOIL NAME**: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa)	soil origin, structure and additional observations
E			E		0.0		SC	**FILL: CLAYEY SAND**: medium grained, yellow grey, with gravels and boulders, size up to 300mm.				**FILL**
			E		0.5							QC01, QC02
			E		1.0		Cl	**FILL: CLAY**: medium plasticity, pale grey, with boulders and wood fragments, with gravels.	D			
			E		1.5			Test pit HEY7 terminated at 1.5 m				
					2.0							
					2.5							
					3.0							
					3.5							

method
DT diatube
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
RR rock roller

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
HP hand penetrometer (kPa)
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
VS vane shear; peak/remouded (kPa)
R refusal
HB hammer bouncing

soil group symbol & material description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

TETRA TECH COFFEY

Engineering Log - Test pit

Borehole ID.	**HEY8**
sheet:	1 of 1
project no.	**754-MELEN215878**
client:	**Marinus Link Pty Ltd**
principal:	
project:	**Contaminated Land and Acid Sulfate Soils Impact Assessment**
location:	**Heybridge Converter Station**
date started:	**08 Mar 2023**
date completed:	**08 Mar 2023**
logged by:	**JR**
checked by:	**BT**

position: Not Specified | surface elevation: Not Specified | angle from horizontal: N/A

drill model: N/A | drilling fluid: Excavator | pit dimensions : 3.0 m long x 1.5 m wide

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	soil origin, structure and additional observations
E			E		0.0		SC	**FILL: CLAYEY SAND**: fine grained, grey, with boulders and mudstone gravels.				**FILL**
			E		0.5			becoming medium grained				**NATURAL**
			E					with rounded pebbles				
			E		1.0			becoming fine grained, mottled orange, with rounded quartz pebbles	D			
			E				CI-CH	**Sandy CLAY**: medium to high plasticity, yellow, mottled orange, with boulders.				
					1.5			Test pit HEY8 terminated at 1.4 m				
					2.0							
					2.5							
					3.0							
					3.5							

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method
DT diatube
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
RR rock roller

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
1 2 3 — no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
HP hand penetrometer (kPa)
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
VS vane shear; peak/remouded (kPa)
R refusal
HB hammer bouncing

soil group symbol & material description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

APPENDIX E: FIELD NOTES

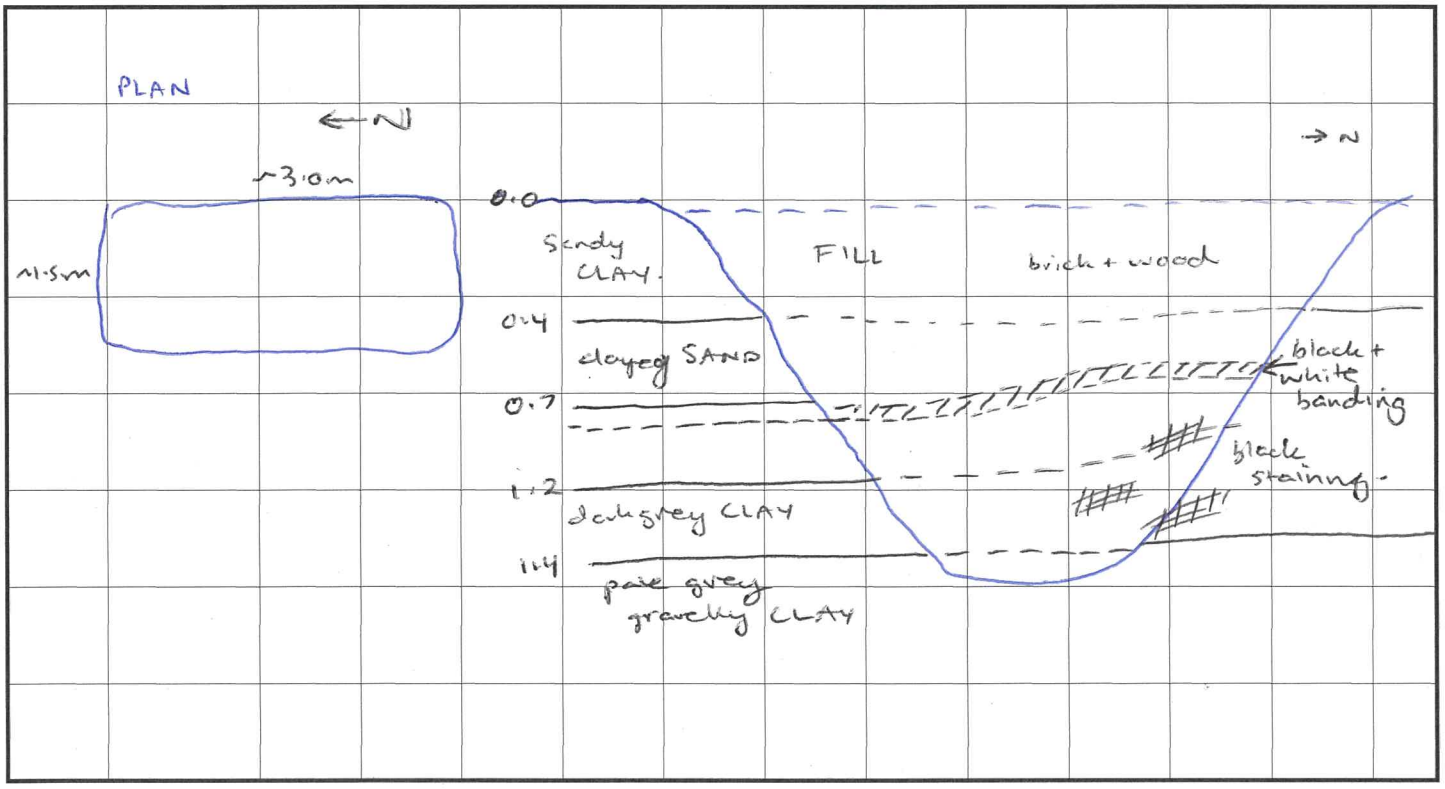
HEY1

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**PID Serial Number :**	N/A
		Page	1 of 1

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
FILL HEY1_0.0-0.2	sandy CLAY, with gravels, brown-grey, fg. brick and wood debris	0.0-0.2		
HEY1-0.6-0.7	clayey SAND, cg with gravels, dark grey with black + white mottling (staining?)	0.6-0.7	black + white stain?	
DIST. NAT? HEY1-0.9-1.0	clayey GRAVELS with sand, dark grey with cemented chunks	0.9-1.0	black mottling / staining.	
NAT HEY1-1.4-1.5	gravelly CLAY, MH-HP, pale grey with quartz pebbles + coarse sand	1.4-1.5	sulfur odour	

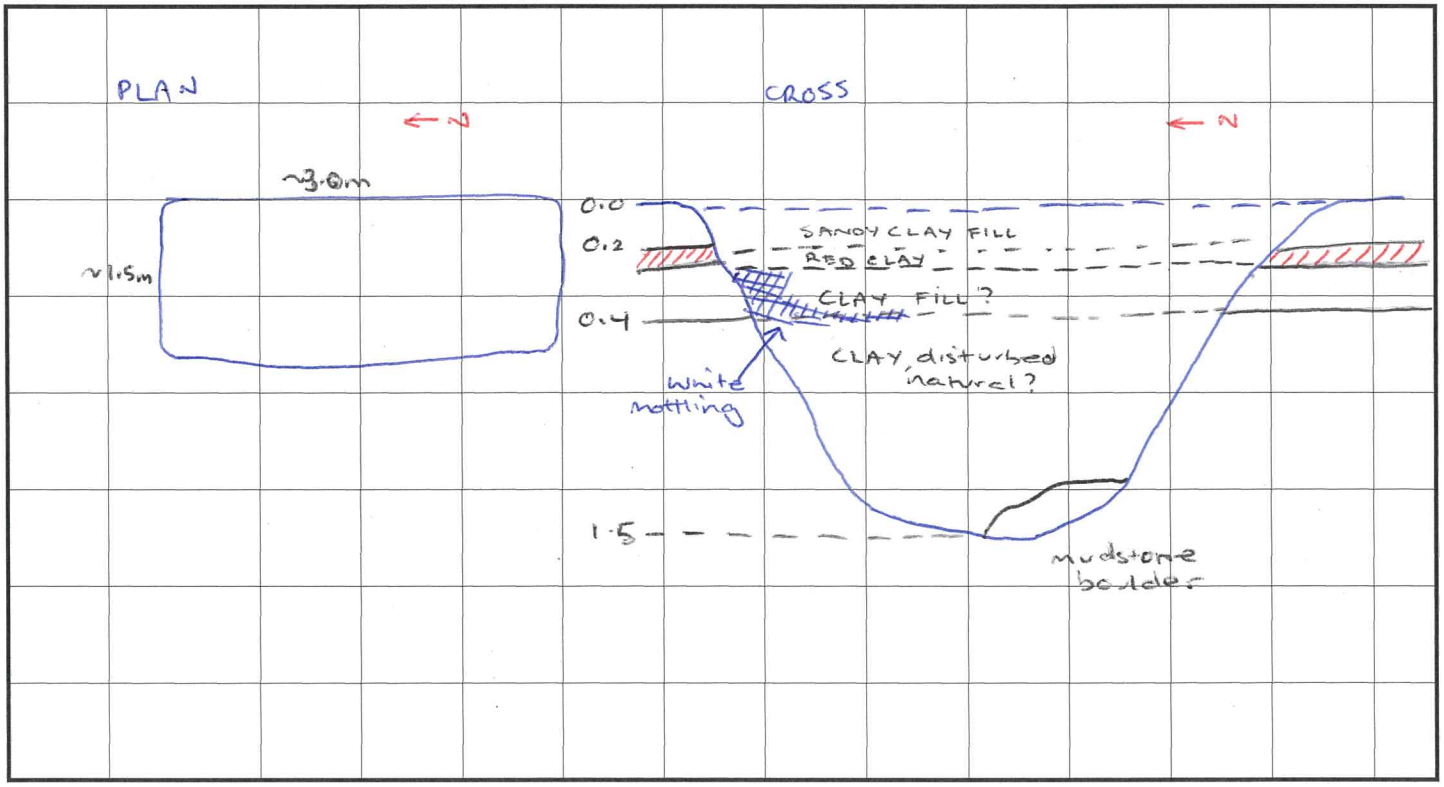
HEY2

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**PID Serial Number :**	N/A
		Page	1 of 1

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



	Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
FILL	HEY2_0002	Sandy CLAY, with gravels, red-brown	0.0-0.2	N/A	N/A
	HEY2_0.6-0.7	CLAY, dark-brown with rootlets and charcoal fragments	0.6-0.7	"	"
	—	misplaced sample 0.9-1.0		"	"
DIST NAT?	HEY2_1.4-1.5	CLAY, dark brown with mudstone boulder disturbed natural? moist.	1.4-1.5	"	"

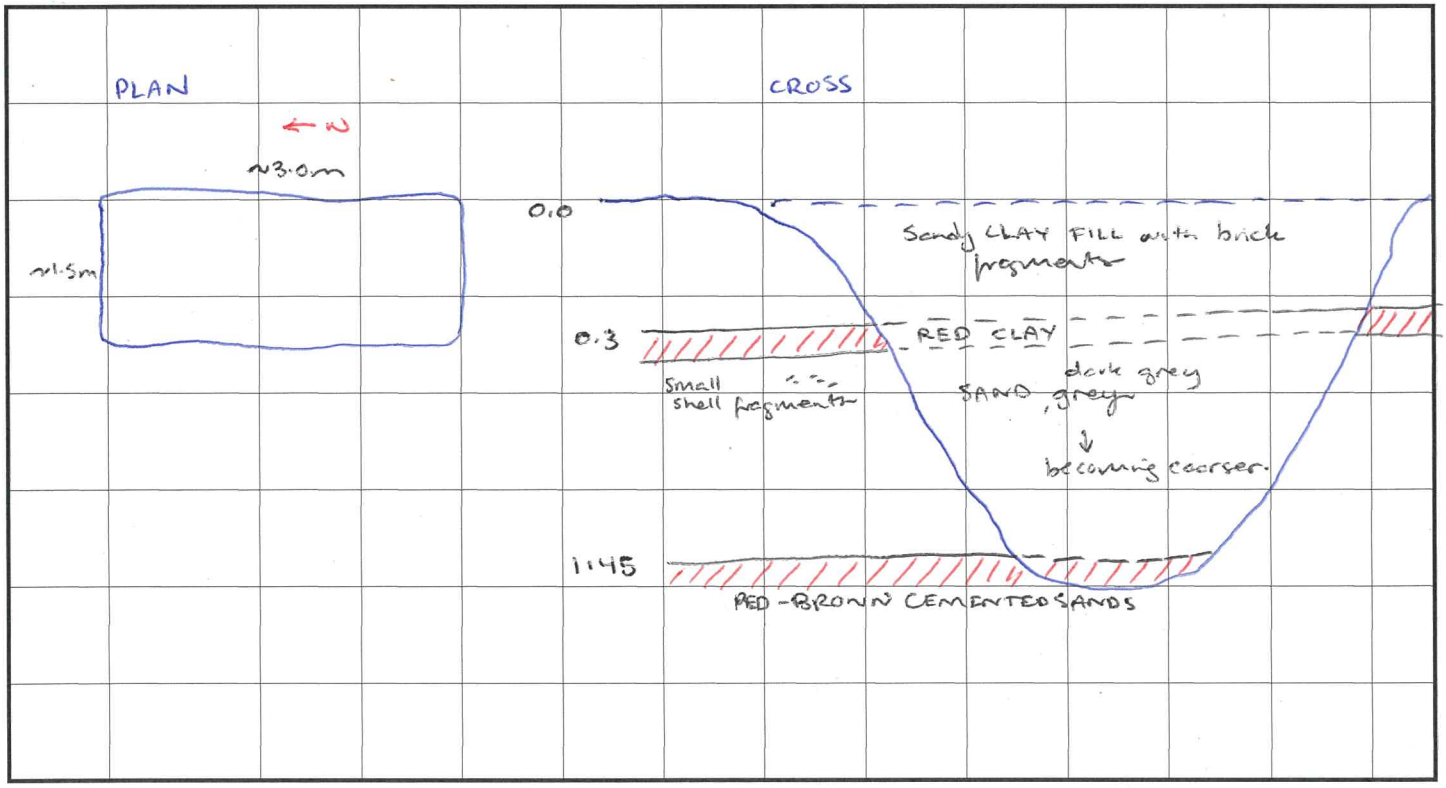
HEY3

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**PID Serial Number :**	N/A
		Page	1 of 1

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
FILL. HEY3-0.0-0.2	Sandy CLAY with gravels, FILL, rubbish (brick) fragments, dark brown	0.0-0.2	N/A	N/A
NAT. HEY3-0.4-0.5	SAND, grey with small shell fragments m-cg	0.4-0.5	"	"
QC05 QC06 HEY3-0.9-1.0	SAND, grey, becoming coarser, quartz fragments, cg	0.9-1.0	"	"
HEY3-1.4-1.5	SAND, cg, dark grey with oxidised red-brown coloured	1.4-1.5	"	"
	cemented layer at 1.45mbgs			

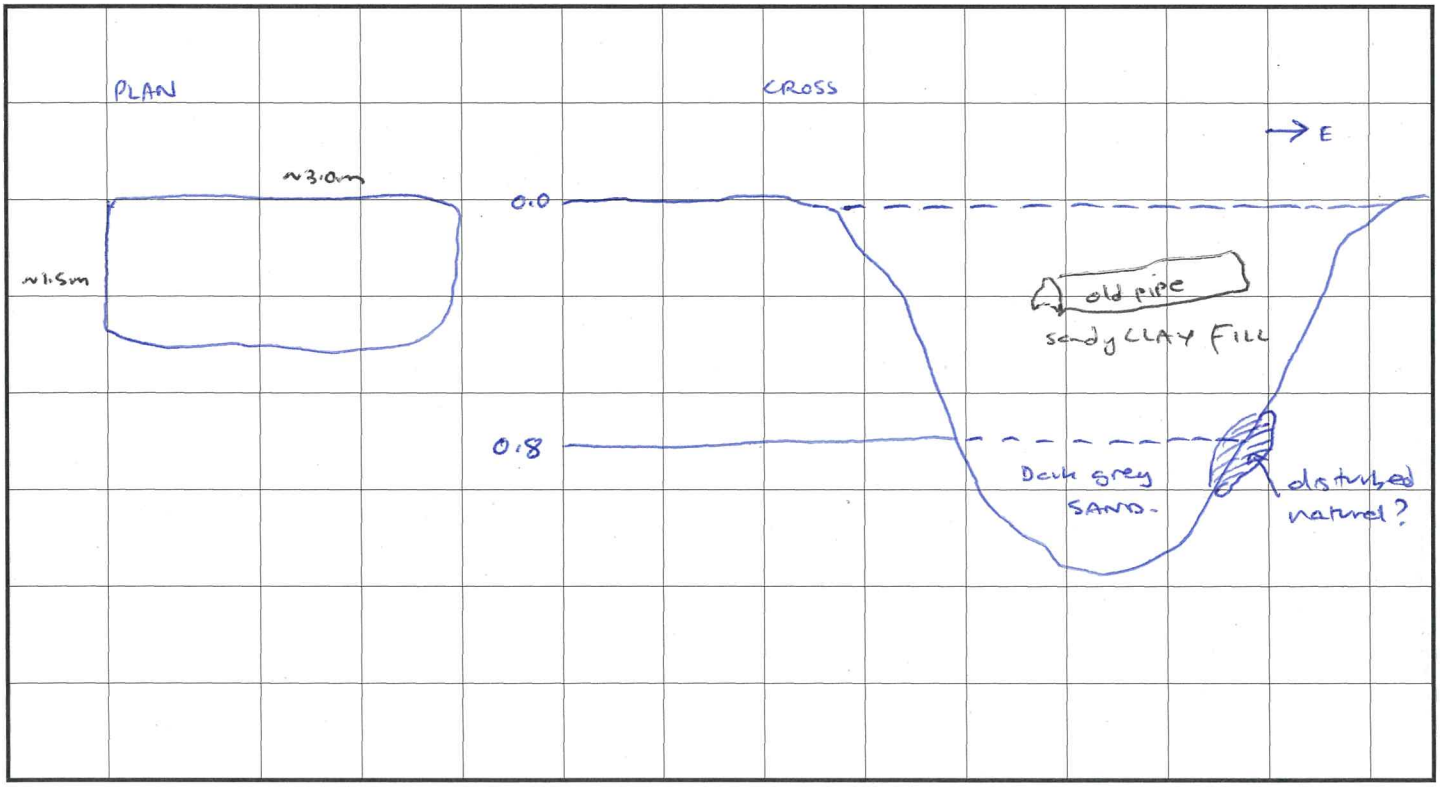
HEY 4

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**PID Serial Number :**	N/A
		Page	1 of 1

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



	Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
FILL	HEY4-0.0-0.2	Sandy CLAY, with boulders, bricks, wood, old Pipe fragments, brown	0.0-0.2	N/A	N/A
	HEY4-0.4-0.5	Sandy CLAY with boulders, rubbish	0.4-0.5	Red-brown	"
NAT.	HEY4-0.9-1.0	SAND, dark grey, m-cg, dk grey banding.	0.9-1.0	N/A	"
	HEY4-1.4-1.5	SAND, dark grey with very small shell fragments	1.4-1.5	N/A	"

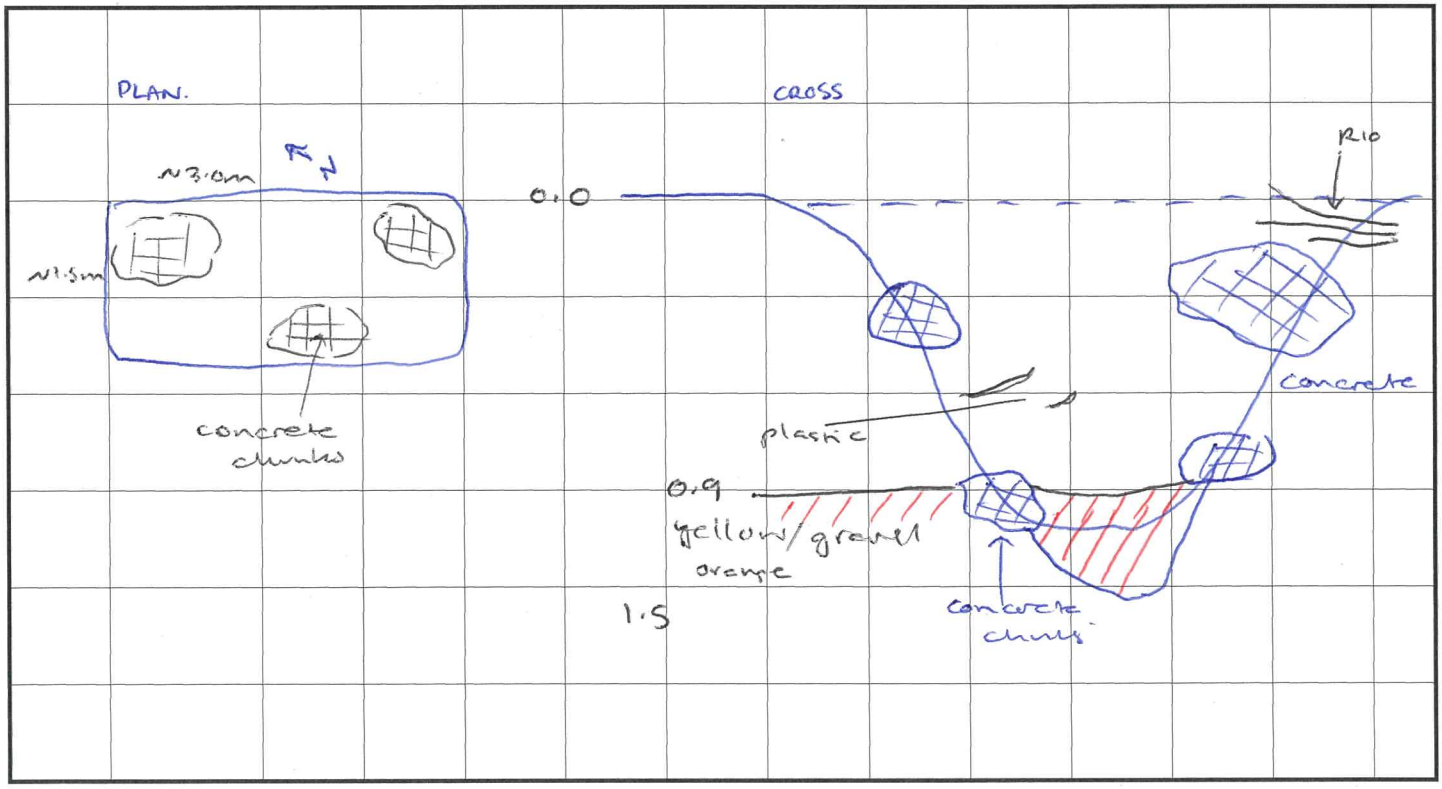
HEY5

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**PID Serial Number :**	N/A
		Page	1 of 1

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
HEY5-0.0-0.2	Sandy CLAY, with concrete block, RIO wire, plastic fragments	0.0-0.2		
HEY5-0.4-0.5	Sandy CLAY, yellow with gravels concrete chunk, brick	0.4-0.5		
HEY5-0.9-1.0	Sandy CLAY, yellow with gravels possible FILL	0.9-1.0		
HEY5-1.4-1.5	Sandy CLAY, yellow with gravels	1.4-1.5		

FILL

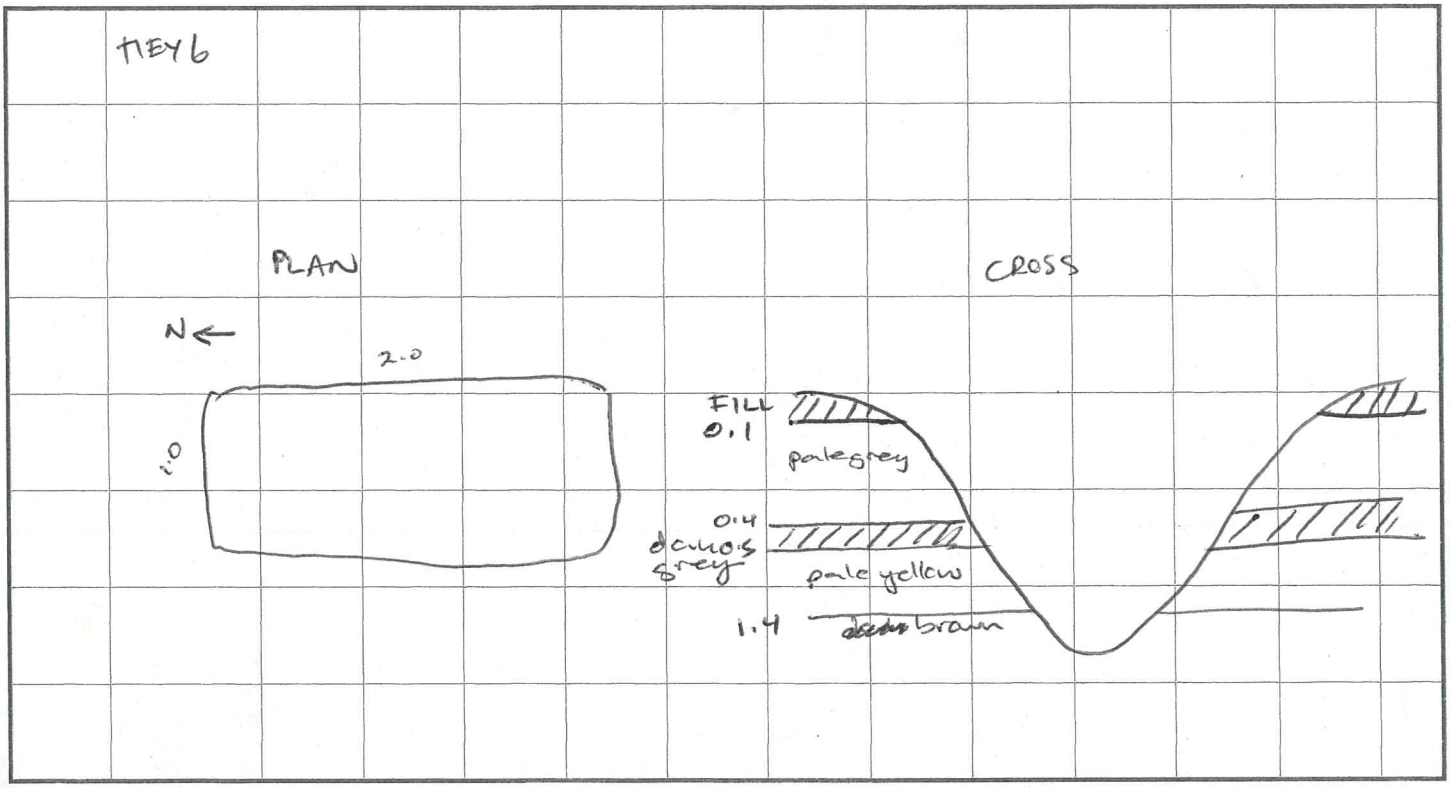
HEY 6

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**Page**	1 of 1
PID Serial Number :	N/A		

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
QC03 2004 HEY6_0.1-0.3	Sandy CLAY, dark brown, organic rich for top 0.1. then pale grey, mp.	0.1-0.3		
HEY6_0.4-0.5	sandy CLAY, dark grey with gravels of mudstone.	0.4-0.5		
HEY6_0.9-1.0	sandy CLAY, pale yellow with rounded quartz gravels and mudstone clasts/boulders	0.9-1.0		
HEY6_1.4-1.5	Sandy CLAY, brown with gravels incl. mudstone, dark grey rock (limestone?) and rounded quartz. dry	1.4-1.5		

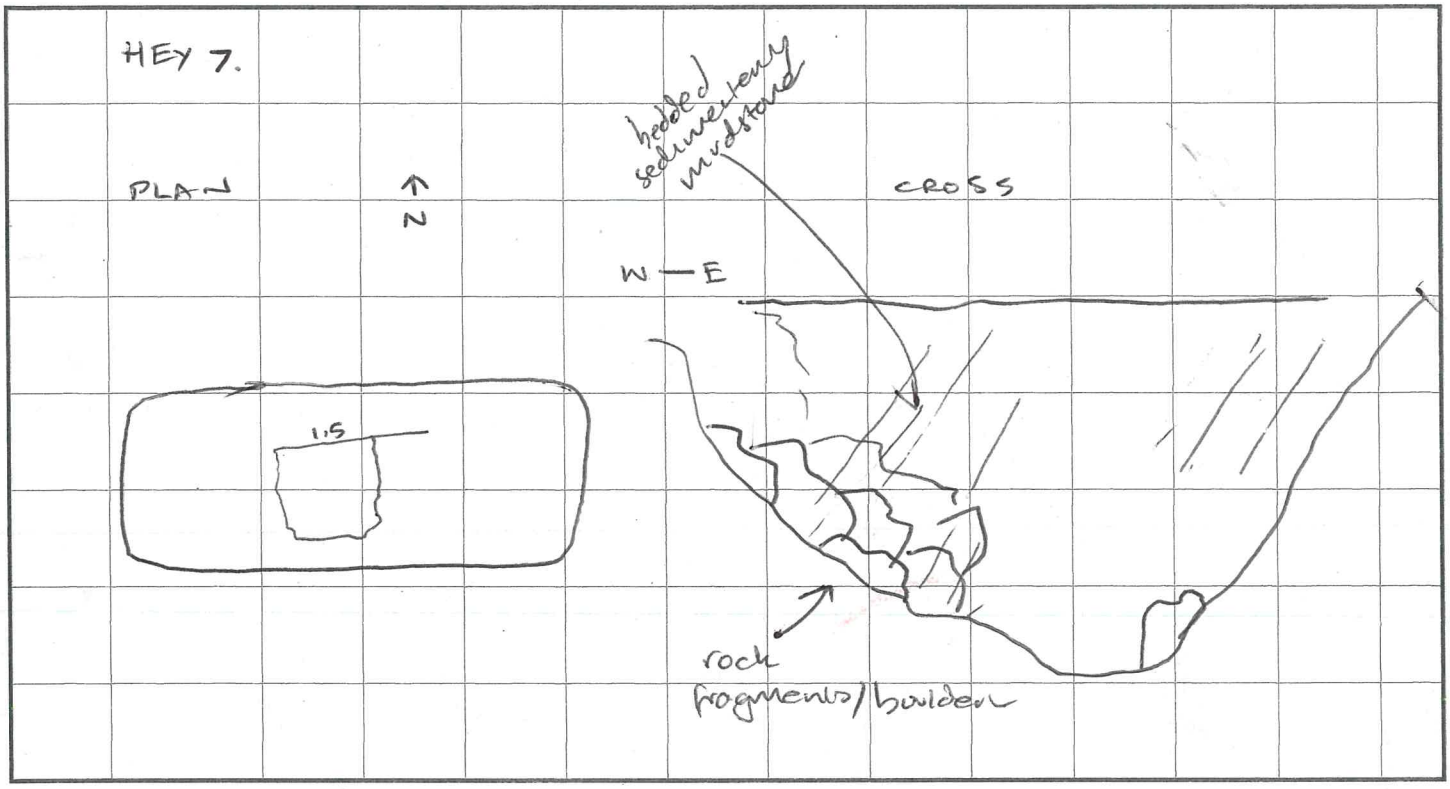
HEY7.

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**PID Serial Number :**	N/A
		Page	1 of

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
HEY7_0.0-0.2	gclayey SAND with GRAVELS and boulders. yellow-grey, (boulders up to 30cm). Mg.	0.0-0.2	None	None.
HEY7_0.5-0.6	" QC01 + QC02.	0.5-0.6	none	none
~~HEY7_0.6-1.0~~	~~gclayey SAND with GRAVELS and boulders~~	~~0.6-1.0~~	~~none~~	~~none~~
HEY7_0.9-1.0	CLAY Mp, pale grey with boulders and wood fragments and gravels, dry.	0.9-1.0	none	none.
HEY7_1.4-1.5	"	1.4-1.5	none	none

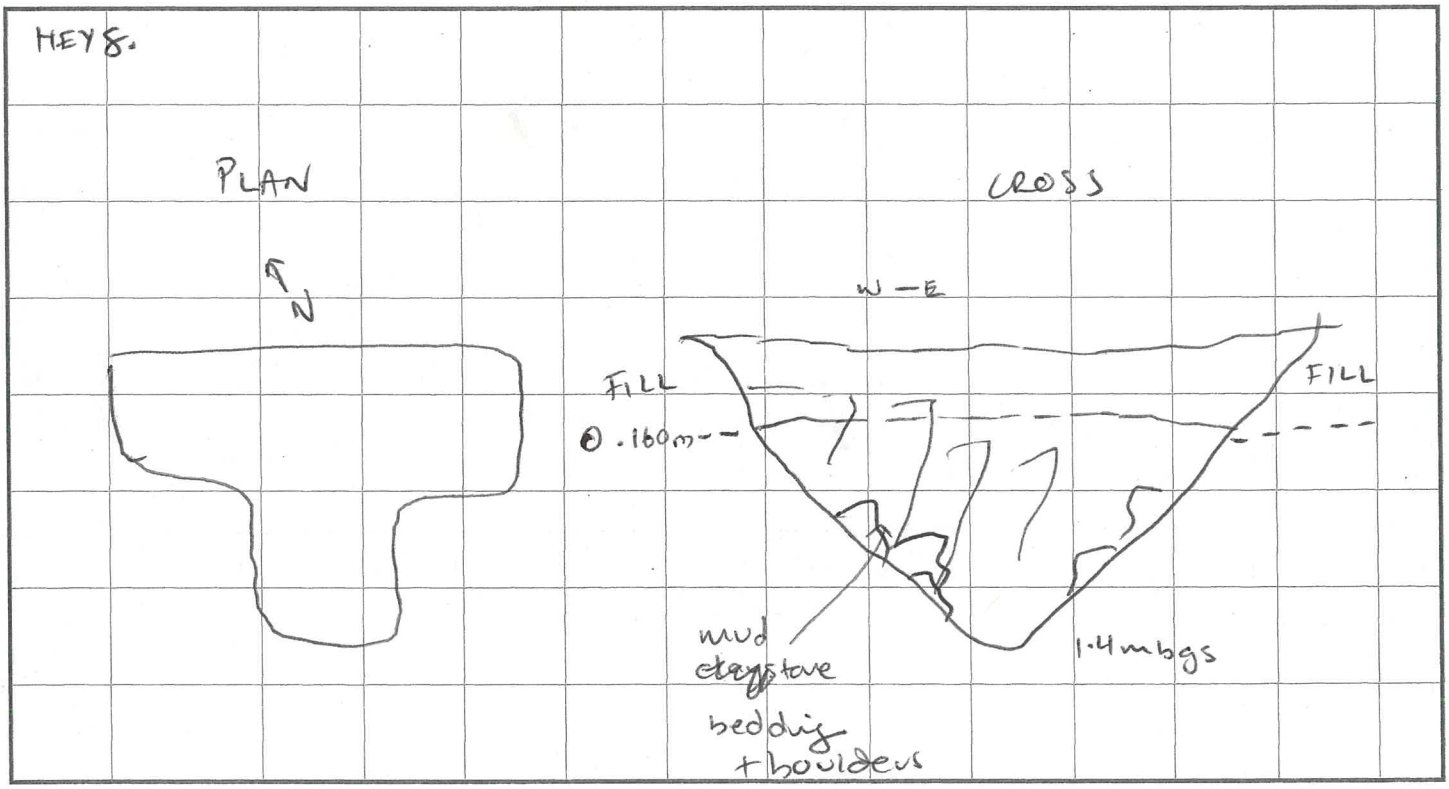
HEY8

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**PID Serial Number :**	N/A
		Page	1 of 1

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
FILL HEY8_0.0-0.3	clayey SAND, fg, with boulders and gravels, mainly mudstone fragments; grey.	0.0-0.3.		
NAT. HEY8_0.4-0.5	clayey SAND, mg, with boulders + gravels. yellow.	0.4-0.5		
HEY8_0.6-0.7	clayey SAND, mg, with boulders and some rounded pebbles	0.6-0.7		
HEY8_0.9-1.0	clayey SAND, fg with boulders + rounded quartz pebbles, orange mottling	0.9-1.0		
HEY8_1.3-1.4	Sandy CLAY yellow with orange mottling. with boulders dry	1.3-1.4		

TETRA TECH COFFEY

Surface Water Sampling Form

PROJECT NAME:	Marinus Link – Contaminated land and PASS assessment	PROJECT NUMBER:	754-MELEN215878ML
FIELD PERSONNEL:	JR	DATE:	8.3.23
PROJECT MANAGER:	BT	PAGE:	1 of 1

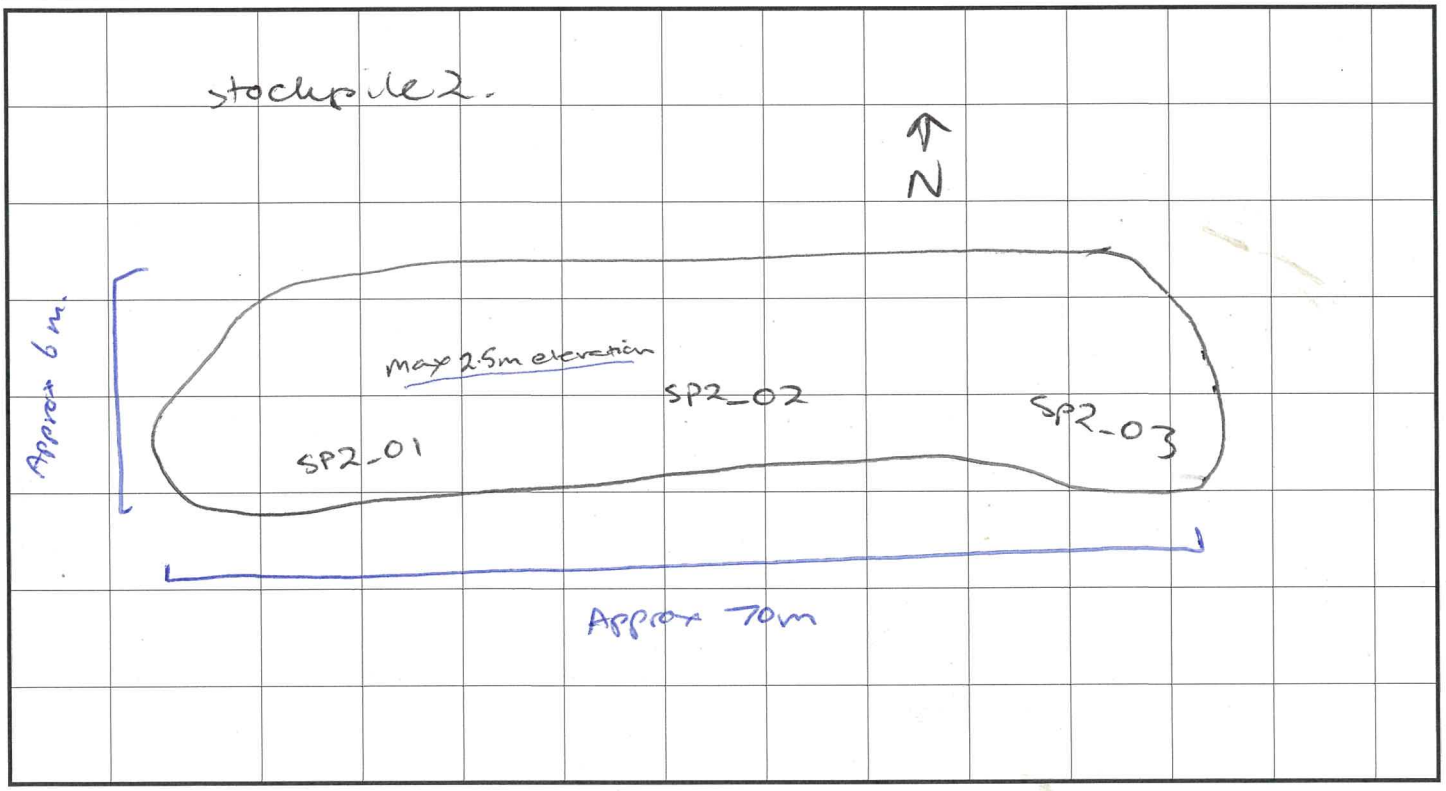
Date	Time of Day	Title	Location ID	Sample ID	Location Type	Water body Dimensions/Details	SAMPLE COMMENTS ODOUR, COLOUR, SHEEN, NAPL (and its colour), REMEDIATION SYSTEM, etc
8.3.23	16 43	T1286	HEY-SW2A1+	HEY-SW2	Drain outlet onto beach	large storm water pipe from under road to beach	No apparent odour clear, with green algae in it.
8.3.23	17.16	T2000	HEY-SW1	HEY-SW3 to be changed to 1.	Ponding surface water on site	6 m long 3 m wide with reeds	slightly dark brown NO odour.

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**Page**	1 of 1
PID Serial Number :	N/A		

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



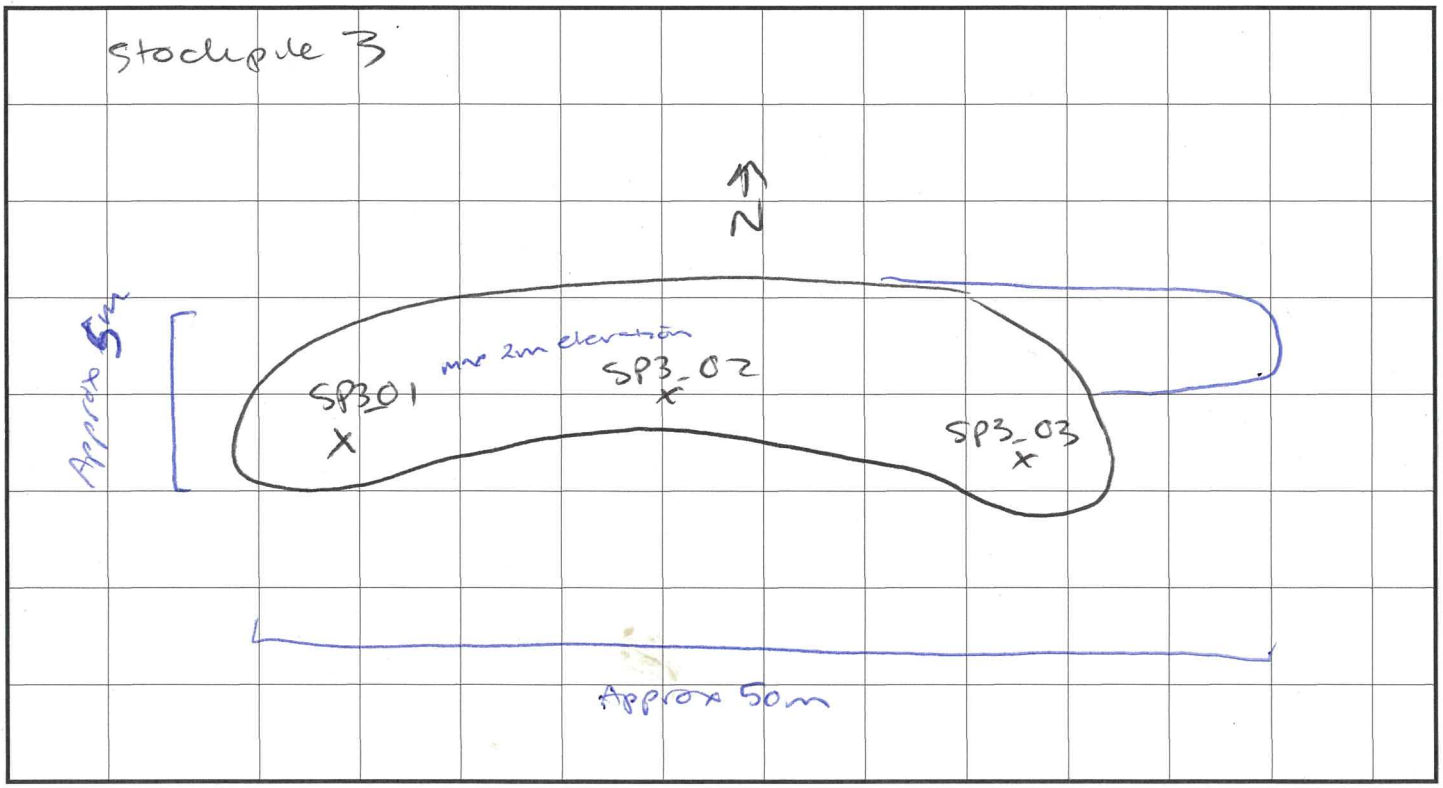
Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
SP2_01	sandy CLAY with gravels + rubbish - plastic, clay pipe	0.2-0.3	organic odour	
SP2_02	sandy CLAY with gravels and concrete chunks	0.2-0.3	organic odour	
SP2_03	sandy CLAY with gravels and rubbish - glass fragments	0.2-0.3	organic odour	

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**PID Serial Number :**	n/a
		Page	_____ of _____

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



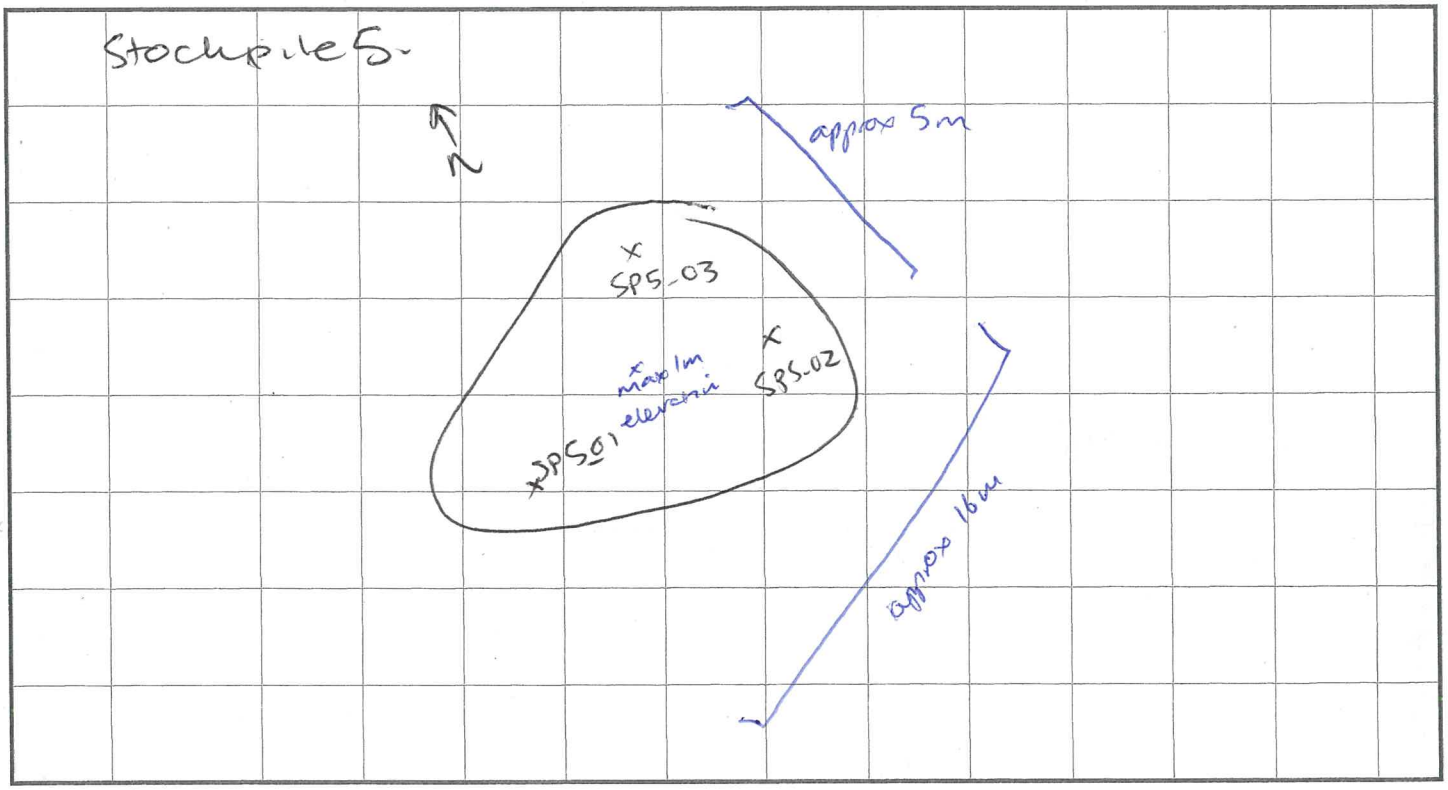
Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
SP3_01	~~clay~~ sandy CLAY, dark brown, organic rich with brick fragments			
SP3_02	into asbestos zone – stopped			
SP3_03				

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**PID Serial Number :**	N/A
		Page	1 of 1

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



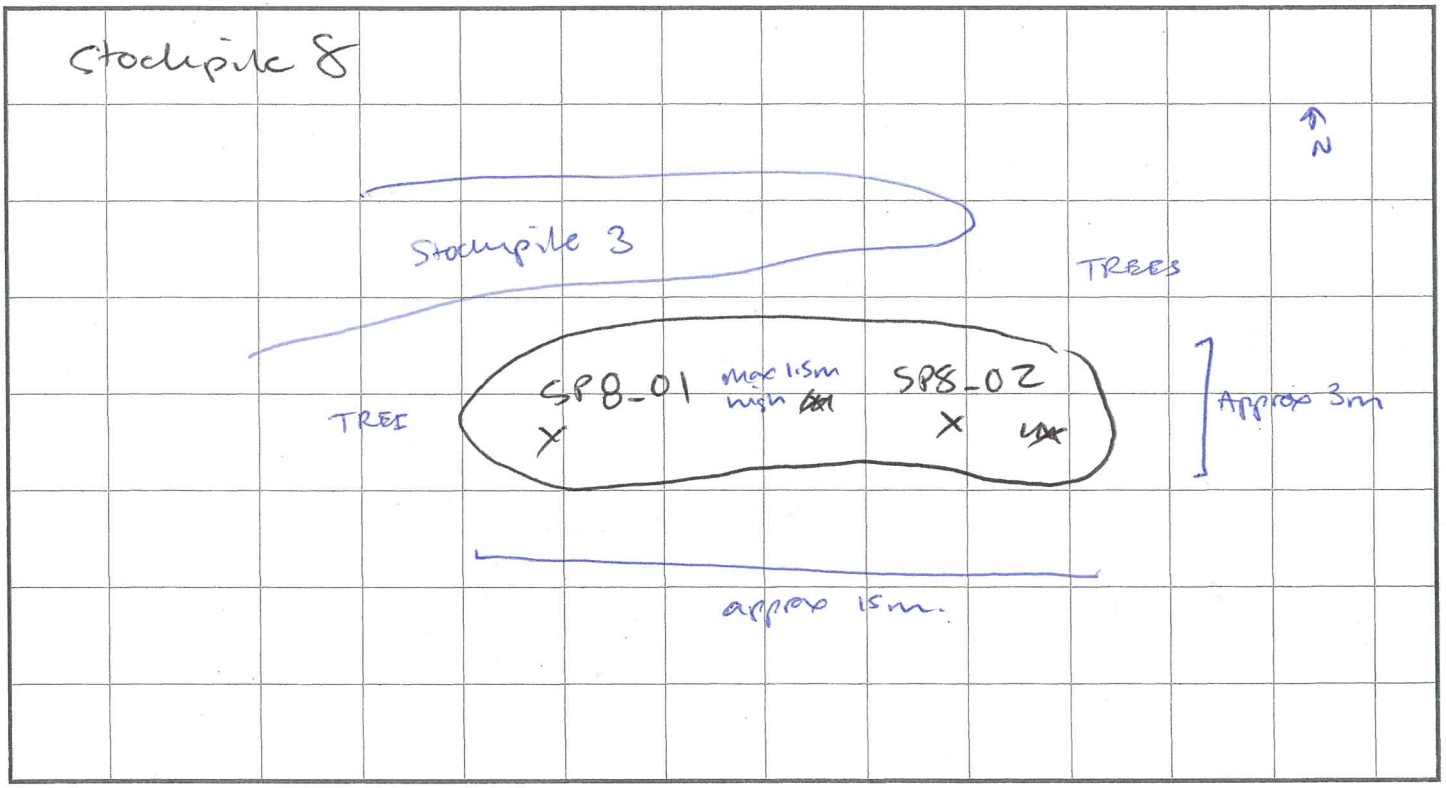
Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
SP5_01	Sandy CLAY with gravels and wood fragments	0.1-0.2		
SP5_02	"	0.0-0.1		
SP5_03	"	0.0-0.1		

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8-3-23
Project Manager (Initials):	BT	**PID Serial Number :**	N/A
		Page	1 of 1

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



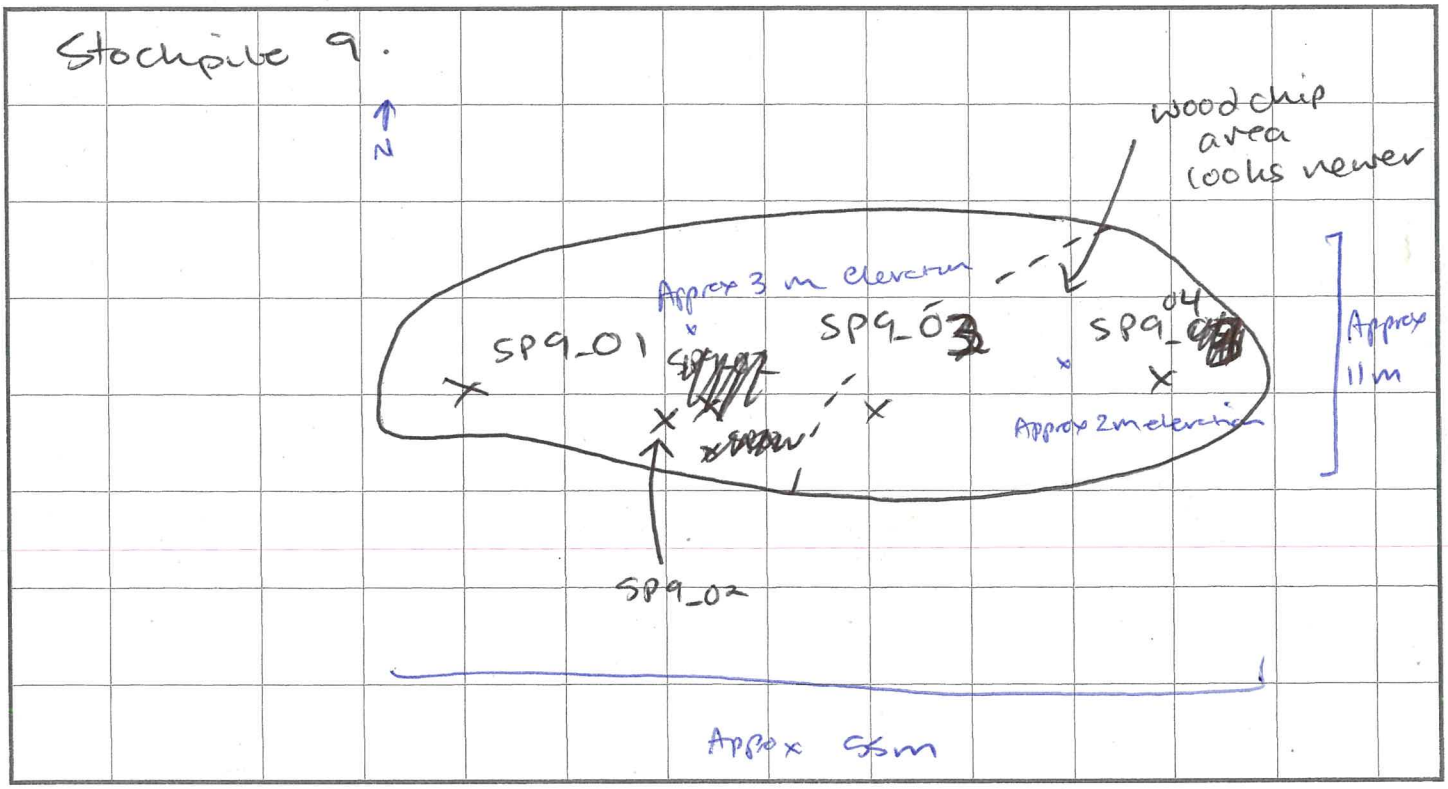
Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
SP8_01	Sandy CLAY with gravels - no rubbish visible	0.2-0.3		
SP8_02	sandy CLAY with gravels	0.2-0.3		

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	Project No.	754-MELEN215878ML
Field Personnel (Initials):	JR	Date:	8.3.23
Project Manager (Initials):	BT	PID Serial Number :	N/A
		Page	____ of ____

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow.
Where possible estimate stockpile volume



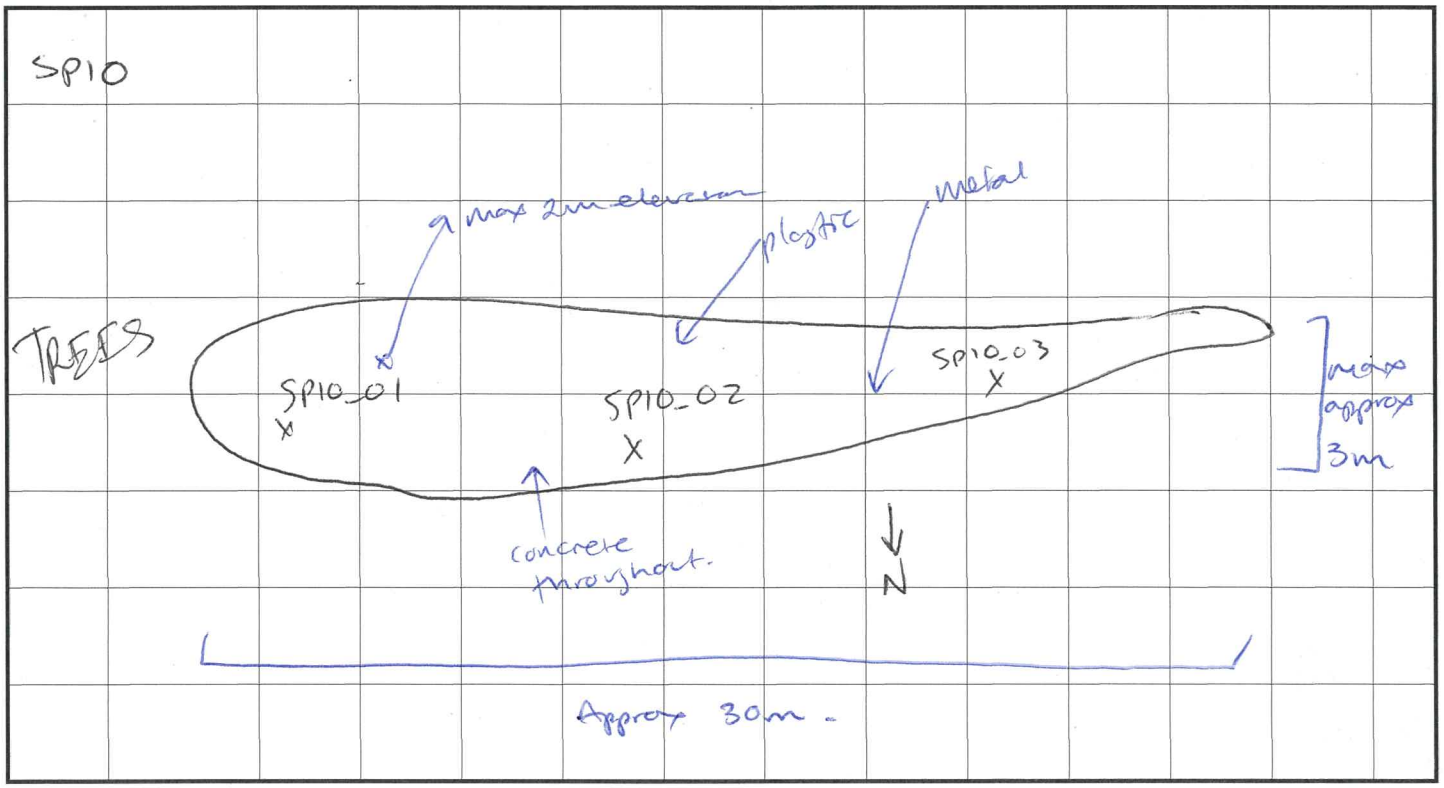
Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
QC07 2008 SP9_01	Sandy CLAY with gravels	0.2-0.3	Organic odour white staining	
SP9_02	Sandy CLAY with gravels and boulders	0.2-0.3		
SP9_03	Sandy CLAY with gravels. Dark brown and lots of bark chips.	0.2-0.3		
SP9_04	Sandy CLAY with gravels, dark brown and lots of bark chips	0.3 - 0.4		

STOCKPILE AND EXCAVATION SAMPLING

TETRA TECH

Project Name:	Marinus Link - Contaminated Land ASS assessment	**Project No.**	754-MELEN215878ML
Field Personnel (Initials):	JR	**Date:**	8.3.23
Project Manager (Initials):	BT	**Page**	1 of 1
PID Serial Number :	N/A		

Note: All sketches of excavations and stockpiles must include dimensions and a North arrow. Where possible estimate stockpile volume



Sample ID	Soil Description (soil type, moisture, colour etc)	Depth (m)	Staining/ Odour (descriptive)	PID (ppm)
SP10_01	Sandy clay with wood, brick and concrete	0.1-0.2		
SP10_02	"	0.1-0.2		
SP10_03	"	0.1-0.2		

APPENDIX F: LABORATORY DOCUMENTS

Tetra Tech Coffey Pty Ltd VIC
Level 11, 2 Riverside Quay,
Southbank
VIC 3006

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Bryden Tiddy**

Report **971775-S**
Project name MARINUS LINK - HYPERBRIDGE
Project ID 754-MELEN215878
Received Date Mar 10, 2023

Client Sample ID			**HEY7_0.0-0.2**	**HEY7_0.5-0.6**	**QC01**	**HEY7_0.9-1.0**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**M23-Ma0033594**	**M23-Ma0033595**	**M23-Ma0033596**	**M23-Ma0033597**
Date Sampled			**Mar 08, 2023**	**Mar 08, 2023**	**Mar 08, 2023**	**Mar 08, 2023**
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.1	6.1	5.4	4.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.8	3.0	3.1	3.0
Reaction Ratings*[S05]	0	-	3.0	3.0	3.0	3.0

Client Sample ID			**HEY7_1.4-1.5**	**HEY8_0.0-0.3**	**HEY8_0.4-0.5**	**HEY8_0.6-0.7**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**M23-Ma0033598**	**M23-Ma0033599**	**M23-Ma0033600**	**M23-Ma0033601**
Date Sampled			**Mar 08, 2023**	**Mar 08, 2023**	**Mar 08, 2023**	**Mar 08, 2023**
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	-	6.1	5.1	5.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	-	2.8	2.9	2.9
Reaction Ratings*[S05]	0	-	-	4.0	3.0	3.0
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.5	-	-	-
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	42	-	-	-
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.068	-	-	-
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	0.025	-	-	-
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	16	-	-	-
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	-	-	-
HCl Extractable Sulfur	0.005	% S	0.009	-	-	-
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	0.019	-	-	-
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	0.014	-	-	-
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	8.8	-	-	-
HCl Extractable Sulfur Correction Factor	1	factor	2.0	-	-	-
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	N/A	-	-	-
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	N/A	-	-	-
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	-	-	-
ANC Fineness Factor		factor	1.5	-	-	-

Client Sample ID			HEY7_1.4-1.5	HEY8_0.0-0.3	HEY8_0.4-0.5	HEY8_0.6-0.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033598	M23-Ma0033599	M23-Ma0033600	M23-Ma0033601
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	0.11	-	-	-
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	67	-	-	-
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	5.0	-	-	-
Extraneous Material						
<2mm Fraction	0.005	g	210	-	-	-
>2mm Fraction	0.005	g	67	-	-	-
Analysed Material	0.1	%	75	-	-	-
Extraneous Material	0.1	%	25	-	-	-
Sample Properties						
% Moisture	1	%	13	-	-	-

Client Sample ID			HEY8_0.9-1.0	HEY8_1.3-1.4	HEY6_0.0-0.3	QC03
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033602	M23-Ma0033603	M23-Ma0033604	M23-Ma0033605
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	4.8	-	6.5	6.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.9	-	4.0	4.3
Reaction Ratings*[S05]	0	-	3.0	-	3.0	4.0
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	-	4.4	-	-
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	-	24	-	-
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	-	0.039	-	-
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	-	< 0.005	-	-
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	-	< 3	-	-
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	-	< 0.005	-	-
HCl Extractable Sulfur	0.005	% S	-	0.006	-	-
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	-	0.012	-	-
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	-	0.009	-	-
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	-	5.7	-	-
HCl Extractable Sulfur Correction Factor	1	factor	-	2.0	-	-
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	-	N/A	-	-
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	-	N/A	-	-
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	-	N/A	-	-
ANC Fineness Factor		factor	-	1.5	-	-
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	-	0.05	-	-
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	-	30	-	-
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	-	2.3	-	-

Client Sample ID			HEY8_0.9-1.0	HEY8_1.3-1.4	HEY6_0.0-0.3	QC03
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033602	M23-Ma0033603	M23-Ma0033604	M23-Ma0033605
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	-	180	-	-
>2mm Fraction	0.005	g	-	2.1	-	-
Analysed Material	0.1	%	-	99	-	-
Extraneous Material	0.1	%	-	1.1	-	-
Sample Properties						
% Moisture	1	%	-	7.2	-	-

Client Sample ID			HEY6_0.4-0.5	HEY6_0.9-1.0	HEY6_1.4-1.5	HEY5_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033606	M23-Ma0033607	M23-Ma0033608	M23-Ma0033609
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.5	5.5	-	9.1
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.5	3.1	-	6.9
Reaction Ratings*[S05]	0	-	3.0	3.0	-	4.0
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	-	-	4.8	-
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	-	-	11	-
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	-	-	0.018	-
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	-	-	< 0.005	-
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	-	-	< 3	-
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	-	-	N/A	-
HCl Extractable Sulfur	0.005	% S	-	-	N/A	-
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	-	-	N/A	-
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	-	-	N/A	-
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	-	-	N/A	-
HCl Extractable Sulfur Correction Factor	1	factor	-	-	2.0	-
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	-	-	N/A	-
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	-	-	N/A	-
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	-	-	N/A	-
ANC Fineness Factor		factor	-	-	1.5	-
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	-	-	< 0.02	-
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	-	-	11	-
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	-	-	< 1	-
Extraneous Material						
<2mm Fraction	0.005	g	-	-	200	-
>2mm Fraction	0.005	g	-	-	36	-
Analysed Material	0.1	%	-	-	85	-
Extraneous Material	0.1	%	-	-	15	-
Sample Properties						
% Moisture	1	%	-	-	6.5	-

Client Sample ID			HEY5_0.4-0.5	HEY5_0.9-1.0	HEY5_1.4-1.5	HEY4_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033610	M23-Ma0033611	M23-Ma0033612	M23-Ma0033613
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	8.0	7.2	6.3	8.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.8	5.2	4.9	5.3
Reaction Ratings*[S05]	0	-	3.0	3.0	3.0	4.0

Client Sample ID			HEY4_0.4-0.5 (A)	HEY4_0.9-1.0	HEY4_1.4-1.5	HEY3_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033614	M23-Ma0033615	M23-Ma0033616	M23-Ma0033617
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	7.9	-	-	7.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.8	-	-	4.8
Reaction Ratings*[S05]	0	-	4.0	-	-	4.0
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	-	7.1	6.4	-
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	-	< 2	< 2	-
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	-	< 0.003	< 0.003	-
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	-	< 0.005	< 0.005	-
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	-	< 3	< 3	-
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	-	N/A	N/A	-
HCl Extractable Sulfur	0.005	% S	-	N/A	N/A	-
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	-	N/A	N/A	-
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	-	N/A	N/A	-
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	-	N/A	N/A	-
HCl Extractable Sulfur Correction Factor	1	factor	-	2.0	2.0	-
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	-	0.17	N/A	-
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	-	0.05	N/A	-
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	-	33	N/A	-
ANC Fineness Factor		factor	-	1.5	1.5	-
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	-	< 0.02	< 0.02	-
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	-	< 10	< 10	-
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	-	< 1	< 1	-
Extraneous Material						
<2mm Fraction	0.005	g	-	240	220	-
>2mm Fraction	0.005	g	-	< 0.005	13	-
Analysed Material	0.1	%	-	100	94	-
Extraneous Material	0.1	%	-	< 0.1	5.6	-
Sample Properties						
% Moisture	1	%	-	4.9	6.3	-

Client Sample ID			HEY3_0.9-1.0	HEY3_1.4-1.5	QC05	HEY2_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033618	M23-Ma0033619	M23-Ma0033620	M23-Ma0033621
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	-	-	-	5.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	-	-	-	4.1
Reaction Ratings*[S05]	0	-	-	-	-	4.0
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.3	6.0	5.3	-
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	4.8	3.2	4.5	-
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.008	0.005	0.007	-
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	< 0.005	< 0.005	0.005	-
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	< 3	< 3	3.3	-
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	N/A	N/A	N/A	-
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	-
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	-
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	-
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	-
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	-
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	N/A	N/A	N/A	-
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	N/A	N/A	N/A	-
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	N/A	N/A	-
ANC Fineness Factor		factor	1.5	1.5	1.5	-
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	< 0.02	< 0.02	< 0.02	-
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	< 10	< 10	< 10	-
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	< 1	< 1	< 1	-
Extraneous Material						
<2mm Fraction	0.005	g	140	160	140	-
>2mm Fraction	0.005	g	18	25	31	-
Analysed Material	0.1	%	89	86	82	-
Extraneous Material	0.1	%	11	14	18	-
Sample Properties						
% Moisture	1	%	5.1	8.2	5.5	-

Client Sample ID			HEY2_0.6-0.7	HEY2_1.4-1.5	HEY1_0.0-0.2	HEY1_0.4-0.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033622	M23-Ma0033623	M23-Ma0033624	M23-Ma0033625
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.6	-	5.8	6.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.1	-	3.1	4.2
Reaction Ratings*[S05]	0	-	4.0	-	3.0	4.0

Client Sample ID			HEY2_0.6-0.7	HEY2_1.4-1.5	HEY1_0.0-0.2	HEY1_0.4-0.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033622	M23-Ma0033623	M23-Ma0033624	M23-Ma0033625
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	-	4.6	-	-
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	-	41	-	-
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	-	0.065	-	-
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	-	0.008	-	-
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	-	5.2	-	-
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	-	N/A	-	-
HCl Extractable Sulfur	0.005	% S	-	N/A	-	-
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	-	N/A	-	-
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	-	N/A	-	-
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	-	N/A	-	-
HCl Extractable Sulfur Correction Factor	1	factor	-	2.0	-	-
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	-	N/A	-	-
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	-	N/A	-	-
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	-	N/A	-	-
ANC Fineness Factor		factor	-	1.5	-	-
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	-	0.07	-	-
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	-	46	-	-
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	-	3.4	-	-
Extraneous Material						
<2mm Fraction	0.005	g	-	110	-	-
>2mm Fraction	0.005	g	-	13	-	-
Analysed Material	0.1	%	-	89	-	-
Extraneous Material	0.1	%	-	11	-	-
Sample Properties						
% Moisture	1	%	-	17	-	-

Client Sample ID			HEY1_0.9-1.0	HEY1_1.4-1.5	SP2_01	SP2_02
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033626	M23-Ma0033627	M23-Ma0033633	M23-Ma0033634
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.9	5.1	-	-
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	7.2	7.8	-	-
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.012	0.013	-	-
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	0.007	0.011	-	-
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	4.2	6.9	-	-
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	N/A	N/A	-	-
HCl Extractable Sulfur	0.005	% S	N/A	N/A	-	-

Client Sample ID			HEY1_0.9-1.0	HEY1_1.4-1.5	SP2_01	SP2_02
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033626	M23-Ma0033627	M23-Ma0033633	M23-Ma0033634
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	-	-
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	-	-
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	-	-
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	-	-
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	N/A	N/A	-	-
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	N/A	N/A	-	-
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	N/A	-	-
ANC Fineness Factor		factor	1.5	1.5	-	-
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	< 0.02	0.02	-	-
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	11	15	-	-
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	< 1	1.1	-	-
Extraneous Material						
<2mm Fraction	0.005	g	120	130	-	-
>2mm Fraction	0.005	g	21	100	-	-
Analysed Material	0.1	%	85	55	-	-
Extraneous Material	0.1	%	15	45	-	-
Sample Properties						
% Moisture	1	%	20	8.6	21	22
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	-	-	< 20	< 20
TRH C10-C14	20	mg/kg	-	-	< 20	< 20
TRH C15-C28	50	mg/kg	-	-	< 50	< 50
TRH C29-C36	50	mg/kg	-	-	91	< 50
TRH C10-C36 (Total)	50	mg/kg	-	-	91	< 50
TRH C6-C10	20	mg/kg	-	-	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	-	< 20	< 20
TRH >C10-C16	50	mg/kg	-	-	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	-	< 50	< 50
TRH >C16-C34	100	mg/kg	-	-	120	< 100
TRH >C34-C40	100	mg/kg	-	-	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	-	120	< 100
BTEX						
Benzene	0.1	mg/kg	-	-	< 0.1	< 0.1
Toluene	0.1	mg/kg	-	-	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	-	-	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	-	-	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	-	-	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	-	-	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	-	89	89
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	-	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	-	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	-	1.2	1.2
Acenaphthene	0.5	mg/kg	-	-	< 0.5	< 0.5

Client Sample ID			HEY1_0.9-1.0	HEY1_1.4-1.5	SP2_01	SP2_02
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033626	M23-Ma0033627	M23-Ma0033633	M23-Ma0033634
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthylene	0.5	mg/kg	-	-	< 0.5	< 0.5
Anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	-	< 0.5	< 0.5
Chrysene	0.5	mg/kg	-	-	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	-	-	< 0.5	< 0.5
Fluorene	0.5	mg/kg	-	-	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	-	-	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Pyrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	-	-	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	-	68	59
p-Terphenyl-d14 (surr.)	1	%	-	-	56	115
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	-	< 0.1	-
4.4'-DDD	0.05	mg/kg	-	-	< 0.05	-
4.4'-DDE	0.05	mg/kg	-	-	< 0.05	-
4.4'-DDT	0.05	mg/kg	-	-	< 0.05	-
a-HCH	0.05	mg/kg	-	-	< 0.05	-
Aldrin	0.05	mg/kg	-	-	< 0.05	-
b-HCH	0.05	mg/kg	-	-	< 0.05	-
d-HCH	0.05	mg/kg	-	-	< 0.05	-
Dieldrin	0.05	mg/kg	-	-	< 0.05	-
Endosulfan I	0.05	mg/kg	-	-	< 0.05	-
Endosulfan II	0.05	mg/kg	-	-	< 0.05	-
Endosulfan sulphate	0.05	mg/kg	-	-	< 0.05	-
Endrin	0.05	mg/kg	-	-	< 0.05	-
Endrin aldehyde	0.05	mg/kg	-	-	< 0.05	-
Endrin ketone	0.05	mg/kg	-	-	< 0.05	-
g-HCH (Lindane)	0.05	mg/kg	-	-	< 0.05	-
Heptachlor	0.05	mg/kg	-	-	< 0.05	-
Heptachlor epoxide	0.05	mg/kg	-	-	< 0.05	-
Hexachlorobenzene	0.05	mg/kg	-	-	< 0.05	-
Methoxychlor	0.05	mg/kg	-	-	< 0.05	-
Toxaphene	0.5	mg/kg	-	-	< 0.5	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	-	< 0.05	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	-	< 0.05	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	-	< 0.1	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	-	< 0.1	-
Dibutylchlorendate (surr.)	1	%	-	-	80	-
Tetrachloro-m-xylene (surr.)	1	%	-	-	65	-

Client Sample ID			HEY1_0.9-1.0	HEY1_1.4-1.5	SP2_01	SP2_02
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033626	M23-Ma0033627	M23-Ma0033633	M23-Ma0033634
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1221	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1232	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1242	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1248	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1254	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1260	0.1	mg/kg	-	-	< 0.1	-
Total PCB*	0.1	mg/kg	-	-	< 0.1	-
Dibutylchlorendate (surr.)	1	%	-	-	80	-
Tetrachloro-m-xylene (surr.)	1	%	-	-	65	-
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	-	-	< 0.5	-
2.4-Dichlorophenol	0.5	mg/kg	-	-	< 0.5	-
2.4.5-Trichlorophenol	1	mg/kg	-	-	< 1	-
2.4.6-Trichlorophenol	1	mg/kg	-	-	< 1	-
2.6-Dichlorophenol	0.5	mg/kg	-	-	< 0.5	-
4-Chloro-3-methylphenol	1	mg/kg	-	-	< 1	-
Pentachlorophenol	1	mg/kg	-	-	< 1	-
Tetrachlorophenols - Total	10	mg/kg	-	-	< 10	-
Total Halogenated Phenol*	1	mg/kg	-	-	< 1	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	-	-	< 20	-
2-Methyl-4.6-dinitrophenol	5	mg/kg	-	-	< 5	-
2-Nitrophenol	1.0	mg/kg	-	-	< 1	-
2.4-Dimethylphenol	0.5	mg/kg	-	-	< 0.5	-
2.4-Dinitrophenol	5	mg/kg	-	-	< 5	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	-	-	< 0.2	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	-	-	< 0.4	-
Total cresols*	0.5	mg/kg	-	-	< 0.5	-
4-Nitrophenol	5	mg/kg	-	-	< 5	-
Dinoseb	20	mg/kg	-	-	< 20	-
Phenol	0.5	mg/kg	-	-	< 0.5	-
Phenol-d6 (surr.)	1	%	-	-	82	-
Total Non-Halogenated Phenol*	20	mg/kg	-	-	< 20	-
Cyanide (total)	5	mg/kg	-	-	< 5	-
Fluoride	100	mg/kg	-	-	< 100	-
Heavy Metals						
Arsenic	2	mg/kg	-	-	< 2	2.2
Cadmium	0.4	mg/kg	-	-	< 0.4	< 0.4
Chromium	5	mg/kg	-	-	130	280
Copper	5	mg/kg	-	-	50	170
Lead	5	mg/kg	-	-	110	48
Mercury	0.1	mg/kg	-	-	0.3	6.7
Molybdenum	5	mg/kg	-	-	< 5	-
Nickel	5	mg/kg	-	-	98	90
Selenium	2	mg/kg	-	-	< 2	-
Silver	2	mg/kg	-	-	< 2	-

Client Sample ID			HEY1_0.9-1.0	HEY1_1.4-1.5	SP2_01	SP2_02
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033626	M23-Ma0033627	M23-Ma0033633	M23-Ma0033634
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Heavy Metals						
Tin	10	mg/kg	-	-	< 10	-
Zinc	5	mg/kg	-	-	120	50

Client Sample ID			SP2_03	SP3_01	SP8_01	SP8_02
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033635	M23-Ma0033636	M23-Ma0033637	M23-Ma0033638
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Sample Properties						
% Moisture	1	%	15	13	7.1	7.2
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	85	58
TRH C29-C36	50	mg/kg	< 50	< 50	280	140
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	365	198
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	300	180
TRH >C34-C40	100	mg/kg	< 100	< 100	220	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	520	180
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	96	99	116	52
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			SP2_03	SP3_01	SP8_01	SP8_02
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033635	M23-Ma0033636	M23-Ma0033637	M23-Ma0033638
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	68	55	61	51
p-Terphenyl-d14 (surr.)	1	%	99	94	87	81
Heavy Metals						
Arsenic	2	mg/kg	< 2	< 2	2.0	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	140	87	29	63
Copper	5	mg/kg	43	64	19	24
Lead	5	mg/kg	30	130	33	18
Mercury	0.1	mg/kg	0.2	9.8	< 0.1	0.2
Nickel	5	mg/kg	110	56	51	94
Zinc	5	mg/kg	120	110	160	90

Client Sample ID			SP9_01	SP9_02	SP9_03	SP9_04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033639	M23-Ma0033640	M23-Ma0033641	M23-Ma0033642
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Sample Properties						
% Moisture	1	%	16	12	13	22
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	210	160
TRH C29-C36	50	mg/kg	< 50	59	450	520
TRH C10-C36 (Total)	50	mg/kg	< 50	59	660	680
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	530	520
TRH >C34-C40	100	mg/kg	< 100	< 100	370	430
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	900	950
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	84	87	83	94

Client Sample ID			SP9_01	SP9_02	SP9_03	SP9_04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033639	M23-Ma0033640	M23-Ma0033641	M23-Ma0033642
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	85	65	50	60
p-Terphenyl-d14 (surr.)	1	%	71	105	86	71
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	-	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	-	-	-
a-HCH	0.05	mg/kg	< 0.05	-	-	-
Aldrin	0.05	mg/kg	< 0.05	-	-	-
b-HCH	0.05	mg/kg	< 0.05	-	-	-
d-HCH	0.05	mg/kg	< 0.05	-	-	-
Dieldrin	0.05	mg/kg	< 0.05	-	-	-
Endosulfan I	0.05	mg/kg	< 0.05	-	-	-
Endosulfan II	0.05	mg/kg	< 0.05	-	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	-
Endrin	0.05	mg/kg	< 0.05	-	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-	-
Endrin ketone	0.05	mg/kg	< 0.05	-	-	-
g-HCH (Lindane)	0.05	mg/kg	< 0.05	-	-	-
Heptachlor	0.05	mg/kg	< 0.05	-	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	-
Methoxychlor	0.05	mg/kg	< 0.05	-	-	-
Toxaphene	0.5	mg/kg	< 0.5	-	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-

Client Sample ID			SP9_01	SP9_02	SP9_03	SP9_04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033639	M23-Ma0033640	M23-Ma0033641	M23-Ma0033642
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	-
Dibutylchlorendate (surr.)	1	%	132	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	83	-	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1221	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1232	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1242	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1248	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1254	0.1	mg/kg	< 0.1	-	-	-
Aroclor-1260	0.1	mg/kg	< 0.1	-	-	-
Total PCB*	0.1	mg/kg	< 0.1	-	-	-
Dibutylchlorendate (surr.)	1	%	132	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	83	-	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	-	-	-
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	-
2.4.5-Trichlorophenol	1	mg/kg	< 1	-	-	-
2.4.6-Trichlorophenol	1	mg/kg	< 1	-	-	-
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	-
4-Chloro-3-methylphenol	1	mg/kg	< 1	-	-	-
Pentachlorophenol	1	mg/kg	< 1	-	-	-
Tetrachlorophenols - Total	10	mg/kg	< 10	-	-	-
Total Halogenated Phenol*	1	mg/kg	< 1	-	-	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20	-	-	-
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	-	-	-
2-Nitrophenol	1.0	mg/kg	< 1	-	-	-
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	-	-	-
2.4-Dinitrophenol	5	mg/kg	< 5	-	-	-
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	-	-	-
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	-	-	-
Total cresols*	0.5	mg/kg	< 0.5	-	-	-
4-Nitrophenol	5	mg/kg	< 5	-	-	-
Dinoseb	20	mg/kg	< 20	-	-	-
Phenol	0.5	mg/kg	< 0.5	-	-	-
Phenol-d6 (surr.)	1	%	49	-	-	-
Total Non-Halogenated Phenol*	20	mg/kg	< 20	-	-	-
Cyanide (total)	5	mg/kg	< 5	-	-	-
Fluoride	100	mg/kg	< 100	-	-	-
Heavy Metals						
Arsenic	2	mg/kg	< 2	< 2	< 2	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	62	67	31	21
Copper	5	mg/kg	22	24	18	24
Lead	5	mg/kg	14	29	11	13
Mercury	0.1	mg/kg	0.1	0.1	< 0.1	< 0.1

Client Sample ID			SP9_01	SP9_02	SP9_03	SP9_04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033639	M23-Ma0033640	M23-Ma0033641	M23-Ma0033642
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Heavy Metals						
Molybdenum	5	mg/kg	< 5	-	-	-
Nickel	5	mg/kg	40	43	51	37
Selenium	2	mg/kg	< 2	-	-	-
Silver	2	mg/kg	< 2	-	-	-
Tin	10	mg/kg	< 10	-	-	-
Zinc	5	mg/kg	71	88	52	47

Client Sample ID			SP5_01	SP5_02	SP5_03	SP10_01
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033643	M23-Ma0033644	M23-Ma0033645	M23-Ma0033646
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Sample Properties						
% Moisture	1	%	11	14	15	19
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	76	140	130	< 50
TRH C29-C36	50	mg/kg	240	200	170	< 50
TRH C10-C36 (Total)	50	mg/kg	316	340	300	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	250	300	260	< 100
TRH >C34-C40	100	mg/kg	140	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	390	300	260	< 100
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	96	69	98	81
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			SP5_01	SP5_02	SP5_03	SP10_01
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033643	M23-Ma0033644	M23-Ma0033645	M23-Ma0033646
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	104	77	67	73
p-Terphenyl-d14 (surr.)	1	%	75	80	83	82
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	-	-	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	-	-	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	-	-	< 0.05
a-HCH	0.05	mg/kg	< 0.05	-	-	< 0.05
Aldrin	0.05	mg/kg	< 0.05	-	-	< 0.05
b-HCH	0.05	mg/kg	< 0.05	-	-	< 0.05
d-HCH	0.05	mg/kg	< 0.05	-	-	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	-	-	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	-	-	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	-	-	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	< 0.05
Endrin	0.05	mg/kg	< 0.05	-	-	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	-	-	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05	-	-	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	-	-	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	-	-	< 0.05
Toxaphene	0.5	mg/kg	< 0.5	-	-	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	< 0.1
Dibutylchlorendate (surr.)	1	%	134	-	-	110
Tetrachloro-m-xylene (surr.)	1	%	80	-	-	77
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1	-	-	< 0.1

Client Sample ID			SP5_01	SP5_02	SP5_03	SP10_01
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033643	M23-Ma0033644	M23-Ma0033645	M23-Ma0033646
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Polychlorinated Biphenyls						
Total PCB*	0.1	mg/kg	< 0.1	-	-	< 0.1
Dibutylchlorendate (surr.)	1	%	134	-	-	110
Tetrachloro-m-xylene (surr.)	1	%	80	-	-	77
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	< 0.5	-	-	< 0.5
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	< 0.5
2.4.5-Trichlorophenol	1	mg/kg	< 1	-	-	< 1
2.4.6-Trichlorophenol	1	mg/kg	< 1	-	-	< 1
2.6-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	< 1	-	-	< 1
Pentachlorophenol	1	mg/kg	< 1	-	-	< 1
Tetrachlorophenols - Total	10	mg/kg	< 10	-	-	< 10
Total Halogenated Phenol*	1	mg/kg	< 1	-	-	< 1
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20	-	-	< 20
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5	-	-	< 5
2-Nitrophenol	1.0	mg/kg	< 1	-	-	< 1
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	-	-	< 0.5
2.4-Dinitrophenol	5	mg/kg	< 5	-	-	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	-	-	< 0.2
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	-	-	< 0.4
Total cresols*	0.5	mg/kg	< 0.5	-	-	< 0.5
4-Nitrophenol	5	mg/kg	< 5	-	-	< 5
Dinoseb	20	mg/kg	< 20	-	-	< 20
Phenol	0.5	mg/kg	< 0.5	-	-	< 0.5
Phenol-d6 (surr.)	1	%	47	-	-	77
Total Non-Halogenated Phenol*	20	mg/kg	< 20	-	-	< 20
Cyanide (total)	5	mg/kg	< 5	-	-	< 5
Fluoride	100	mg/kg	< 100	-	-	< 100
Heavy Metals						
Arsenic	2	mg/kg	2.3	2.6	< 2	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	20	29	17	84
Copper	5	mg/kg	17	17	15	32
Lead	5	mg/kg	50	380	78	41
Mercury	0.1	mg/kg	0.2	0.4	0.3	0.8
Molybdenum	5	mg/kg	< 5	-	-	< 5
Nickel	5	mg/kg	34	18	13	45
Selenium	2	mg/kg	< 2	-	-	< 2
Silver	2	mg/kg	< 2	-	-	< 2
Tin	10	mg/kg	< 10	-	-	< 10
Zinc	5	mg/kg	47	53	38	110

Client Sample ID			SP10_02	SP10_03	QC07
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033647	M23-Ma0033648	M23-Ma0033649
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit			
Sample Properties					
% Moisture	1	%	6.0	15	22
Total Recoverable Hydrocarbons					
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	51	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	51	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	69	51	70
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	70	103	78
p-Terphenyl-d14 (surr.)	1	%	84	85	81

Client Sample ID			SP10_02	SP10_03	QC07
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M23-Ma0033647	M23-Ma0033648	M23-Ma0033649
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit			
Heavy Metals					
Arsenic	2	mg/kg	3.3	17	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	70	120
Copper	5	mg/kg	< 5	85	42
Lead	5	mg/kg	11	55	20
Mercury	0.1	mg/kg	< 0.1	0.5	0.2
Nickel	5	mg/kg	< 5	73	78
Zinc	5	mg/kg	8.6	400	120

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Acid Sulfate Soils Field pH Test	Brisbane	Mar 21, 2023	7 Days
- Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests			
Chromium Reducible Sulfur Suite			
Chromium Suite	Brisbane	Mar 22, 2023	6 Week
- Method: LTM-GEN-7070 Chromium Reducible Sulfur Suite			
Extraneous Material	Brisbane	Mar 22, 2023	6 Week
- Method: LTM-GEN-7050/7070			
% Moisture	Melbourne	Mar 14, 2023	14 Days
- Method: LTM-GEN-7080 Moisture			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Mar 15, 2023	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 15, 2023	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Mar 15, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Eurofins Suite B7			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 15, 2023	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Mar 15, 2023	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8	Melbourne	Mar 15, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Organochlorine Pesticides	Melbourne	Mar 15, 2023	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Polychlorinated Biphenyls	Melbourne	Mar 15, 2023	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Phenols (Halogenated)	Melbourne	Mar 15, 2023	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Mar 15, 2023	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Cyanide (total)	Melbourne	Mar 15, 2023	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Fluoride	Melbourne	Mar 16, 2023	28 Days
- Method: LTM-INO-4150 Determination of Total Fluoride PART A – CIC			
Metals IWRG 621 : Metals M12	Melbourne	Mar 15, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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Company Name: Tetra Tech Coffey Pty Ltd VIC
Address: Level 11, 2 Riverside Quay,
Southbank
VIC 3006

Order No.:
Report #: 971775
Phone: 03 9290 7000
Fax:

Received: Mar 10, 2023 9:06 AM
Due: Mar 20, 2023
Priority: 5 Day
Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	HEY7_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033594		X						
2	HEY7_0.5-0.6	Mar 08, 2023		Soil	M23-Ma0033595		X						
3	QC01	Mar 08, 2023		Soil	M23-Ma0033596		X						
4	HEY7_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033597		X						
5	HEY7_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033598			X		X			
6	HEY8_0.0-0.3	Mar 08, 2023		Soil	M23-Ma0033599		X						
7	HEY8_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0033600		X						
8	HEY8_0.6-0.7	Mar 08, 2023		Soil	M23-Ma0033601		X						
9	HEY8_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033602		X						
10	HEY8_1.3-1.4	Mar 08, 2023		Soil	M23-Ma0033603			X		X			
11	HEY6_0.0-0.3	Mar 08, 2023		Soil	M23-Ma0033604		X						
12	QC03	Mar 08, 2023		Soil	M23-Ma0033605		X						

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Company Name: Tetra Tech Coffey Pty Ltd VIC
Address: Level 11, 2 Riverside Quay,
Southbank
VIC 3006

Order No.:
Report #: 971775
Phone: 03 9290 7000
Fax:

Received: Mar 10, 2023 9:06 AM
Due: Mar 20, 2023
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Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
13	HEY6_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0033606		X						
14	HEY6_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033607		X						
15	HEY6_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033608			X		X			
16	HEY5_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033609		X						
17	HEY5_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0033610		X						
18	HEY5_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033611		X						
19	HEY5_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033612		X						
20	HEY4_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033613		X						
21	HEY4_0.4-0.5 (A)	Mar 08, 2023		Soil	M23-Ma0033614		X						
22	HEY4_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033615			X		X			
23	HEY4_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033616			X		X			
24	HEY3_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033617		X						
25	HEY3_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033618			X		X			
26	HEY3_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033619			X		X			

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Company Name: Tetra Tech Coffey Pty Ltd VIC
Address: Level 11, 2 Riverside Quay,
Southbank
VIC 3006

Order No.:
Report #: 971775
Phone: 03 9290 7000
Fax:

Received: Mar 10, 2023 9:06 AM
Due: Mar 20, 2023
Priority: 5 Day
Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
27	QC05	Mar 08, 2023		Soil	M23-Ma0033620			X		X			
28	HEY2_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033621		X						
29	HEY2_0.6-0.7	Mar 08, 2023		Soil	M23-Ma0033622		X						
30	HEY2_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033623			X		X			
31	HEY1_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033624		X						
32	HEY1_0.4-0.7	Mar 08, 2023		Soil	M23-Ma0033625		X						
33	HEY1_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033626			X		X			
34	HEY1_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033627			X		X			
35	HEY_SW2	Mar 08, 2023		Water	M23-Ma0033628						X		
36	HEY_SW1	Mar 08, 2023		Water	M23-Ma0033629						X		
37	QC09	Mar 08, 2023		Water	M23-Ma0033630						X		
38	RB01	Mar 08, 2023		Water	M23-Ma0033631						X		
39	TB01	Mar 08, 2023		Water	M23-Ma0033632								X
40	SP2_01	Mar 08, 2023		Soil	M23-Ma0033633				X		X		
41	SP2_02	Mar 08, 2023		Soil	M23-Ma0033634				X			X	

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Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
42	SP2_03	Mar 08, 2023		Soil	M23-Ma0033635				X			X	
43	SP3_01	Mar 08, 2023		Soil	M23-Ma0033636				X			X	
44	SP8_01	Mar 08, 2023		Soil	M23-Ma0033637				X			X	
45	SP8_02	Mar 08, 2023		Soil	M23-Ma0033638				X			X	
46	SP9_01	Mar 08, 2023		Soil	M23-Ma0033639				X		X		
47	SP9_02	Mar 08, 2023		Soil	M23-Ma0033640				X			X	
48	SP9_03	Mar 08, 2023		Soil	M23-Ma0033641				X			X	
49	SP9_04	Mar 08, 2023		Soil	M23-Ma0033642				X			X	
50	SP5_01	Mar 08, 2023		Soil	M23-Ma0033643				X		X		
51	SP5_02	Mar 08, 2023		Soil	M23-Ma0033644				X			X	
52	SP5_03	Mar 08, 2023		Soil	M23-Ma0033645				X			X	
53	SP10_01	Mar 08, 2023		Soil	M23-Ma0033646				X		X		
54	SP10_02	Mar 08, 2023		Soil	M23-Ma0033647				X			X	
55	SP10_03	Mar 08, 2023		Soil	M23-Ma0033648				X			X	
56	QC07	Mar 08, 2023		Soil	M23-Ma0033649				X			X	

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Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
57	HEY4_0.4-0.5 (B)	Mar 08, 2023		Soil	M23-Ma0033692	X							
Test Counts						1	23	11	28	28	8	13	1

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Fluoride	mg/kg	< 100			100	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	110			70-130	Pass	
TRH C6-C10	%	108			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	91			70-130	Pass	
Toluene	%	92			70-130	Pass	
Ethylbenzene	%	99			70-130	Pass	
m&p-Xylenes	%	102			70-130	Pass	
Xylenes - Total*	%	101			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	94			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	104			70-130	Pass	
Acenaphthylene	%	110			70-130	Pass	
Anthracene	%	106			70-130	Pass	
Benz(a)anthracene	%	101			70-130	Pass	
Benzo(a)pyrene	%	118			70-130	Pass	
Benzo(b&j)fluoranthene	%	116			70-130	Pass	
Benzo(g.h.i)perylene	%	90			70-130	Pass	
Benzo(k)fluoranthene	%	116			70-130	Pass	
Chrysene	%	117			70-130	Pass	
Dibenz(a.h)anthracene	%	74			70-130	Pass	
Fluoranthene	%	115			70-130	Pass	
Fluorene	%	110			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	101			70-130	Pass	
Naphthalene	%	107			70-130	Pass	
Phenanthrene	%	111			70-130	Pass	
Pyrene	%	118			70-130	Pass	
LCS - % Recovery							

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Fluoride			%	81			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M23-Ma0033639	CP	%	89			70-130	Pass	
Acenaphthylene	M23-Ma0033639	CP	%	91			70-130	Pass	
Anthracene	M23-Ma0033639	CP	%	94			70-130	Pass	
Benz(a)anthracene	M23-Ma0033639	CP	%	97			70-130	Pass	
Benzo(a)pyrene	M23-Ma0033639	CP	%	104			70-130	Pass	
Benzo(b&j)fluoranthene	M23-Ma0033639	CP	%	108			70-130	Pass	
Benzo(g.h.i)perylene	M23-Ma0033639	CP	%	103			70-130	Pass	
Benzo(k)fluoranthene	M23-Ma0033639	CP	%	91			70-130	Pass	
Chrysene	M23-Ma0033639	CP	%	98			70-130	Pass	
Dibenz(a.h)anthracene	M23-Ma0033639	CP	%	92			70-130	Pass	
Fluoranthene	M23-Ma0033639	CP	%	80			70-130	Pass	
Fluorene	M23-Ma0033639	CP	%	85			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M23-Ma0033639	CP	%	96			70-130	Pass	
Naphthalene	M23-Ma0033639	CP	%	129			70-130	Pass	
Phenanthrene	M23-Ma0033639	CP	%	82			70-130	Pass	
Pyrene	M23-Ma0033639	CP	%	84			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
a-HCH	M23-Ma0033639	CP	%	80			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	M23-Ma0033639	CP	%	102			30-130	Pass	
2.4-Dichlorophenol	M23-Ma0033639	CP	%	85			30-130	Pass	
2.4.5-Trichlorophenol	M23-Ma0033639	CP	%	71			30-130	Pass	
2.4.6-Trichlorophenol	M23-Ma0033639	CP	%	82			30-130	Pass	
2.6-Dichlorophenol	M23-Ma0033639	CP	%	86			30-130	Pass	
4-Chloro-3-methylphenol	M23-Ma0033639	CP	%	86			30-130	Pass	
Pentachlorophenol	M23-Ma0033639	CP	%	34			30-130	Pass	
Tetrachlorophenols - Total	M23-Ma0033639	CP	%	42			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Nitrophenol	M23-Ma0033639	CP	%	93			30-130	Pass	
2.4-Dimethylphenol	M23-Ma0033639	CP	%	70			30-130	Pass	
2-Methylphenol (o-Cresol)	M23-Ma0033639	CP	%	88			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	M23-Ma0033639	CP	%	90			30-130	Pass	
4-Nitrophenol	M23-Ma0033639	CP	%	85			30-130	Pass	
Dinoseb	M23-Ma0033639	CP	%	31			30-130	Pass	
Phenol	M23-Ma0033639	CP	%	111			30-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M23-Ma0033644	CP	%	90			75-125	Pass	
Cadmium	M23-Ma0033644	CP	%	97			75-125	Pass	
Chromium	M23-Ma0033644	CP	%	82			75-125	Pass	
Copper	M23-Ma0033644	CP	%	99			75-125	Pass	
Mercury	M23-Ma0033644	CP	%	113			75-125	Pass	
Molybdenum	M23-Ma0033644	CP	%	100			75-125	Pass	
Nickel	M23-Ma0033644	CP	%	95			75-125	Pass	
Selenium	M23-Ma0033644	CP	%	91			75-125	Pass	
Silver	M23-Ma0033644	CP	%	101			75-125	Pass	
Tin	M23-Ma0033644	CP	%	98			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Zinc	M23-Ma0033644	CP	%	92			75-125	Pass	
Spike - % Recovery									
				Result 1					
Fluoride	M23-Ma0033646	CP	%	79			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	M23-Ma0033601	CP	pH Units	5.3	5.3	pass	20%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	M23-Ma0033602	CP	pH Units	4.8	4.9	pass	20%	Pass	
Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	M23-Ma0033626	CP	pH Units	5.9	5.9	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	M23-Ma0033626	CP	mol H+/t	7.2	7.3	1.3	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	M23-Ma0033626	CP	% pyrite S	0.012	0.012	1.3	30%	Pass	
Duplicate									
Potential Acidity - Chromium Reducible Sulfur				Result 1	Result 2	RPD			
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)	M23-Ma0033626	CP	% S	0.007	0.007	N/A	20%	Pass	
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	M23-Ma0033626	CP	mol H+/t	4.2	4.1	2.9	30%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	M23-Ma0033626	CP	% S	N/A	N/A	N/A	30%	Pass	
HCl Extractable Sulfur	M23-Ma0033626	CP	% S	N/A	N/A	N/A	20%	Pass	
Duplicate									
Retained Acidity (S-NAS)				Result 1	Result 2	RPD			
Net Acid soluble sulfur (SNAS) NLM-4.1	M23-Ma0033626	CP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (s-SNAS) NLM-4.1	M23-Ma0033626	CP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (a-SNAS) NLM-4.1	M23-Ma0033626	CP	mol H+/t	N/A	N/A	N/A	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	M23-Ma0033626	CP	% CaCO3	N/A	N/A	N/A	20%	Pass	
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)	M23-Ma0033626	CP	% S	N/A	N/A	N/A	30%	Pass	
ANC Fineness Factor	M23-Ma0033626	CP	factor	1.5	1.5	<1	30%	Pass	
Duplicate									
Net Acidity (Including ANC)				Result 1	Result 2	RPD			
CRS Suite - Net Acidity - NASSG (Including ANC)	M23-Ma0033626	CP	% S	< 0.02	< 0.02	<1	30%	Pass	
CRS Suite - Net Acidity - NASSG (Including ANC)	M23-Ma0033626	CP	mol H+/t	11	11	<1	30%	Pass	
CRS Suite - Liming Rate - NASSG (Including ANC)	M23-Ma0033626	CP	kg CaCO3/t	< 1	< 1	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-Ma0033627	CP	%	8.6	7.6	13	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M23-Ma0033633	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10	M23-Ma0033633	CP	mg/kg	< 20	< 20	<1	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M23-Ma0033633	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M23-Ma0033633	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M23-Ma0033633	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M23-Ma0033633	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M23-Ma0033633	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	M23-Ma0033633	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M23-Ma0033633	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M23-Ma0033633	CP	mg/kg	< 2	2.1	3.6	30%	Pass	
Cadmium	M23-Ma0033633	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M23-Ma0033633	CP	mg/kg	130	130	<1	30%	Pass	
Copper	M23-Ma0033633	CP	mg/kg	50	51	<1	30%	Pass	
Lead	M23-Ma0033633	CP	mg/kg	110	110	1.3	30%	Pass	
Mercury	M23-Ma0033633	CP	mg/kg	0.3	0.3	7.6	30%	Pass	
Molybdenum	M23-Ma0033633	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Nickel	M23-Ma0033633	CP	mg/kg	98	99	1.7	30%	Pass	
Selenium	M23-Ma0033633	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Silver	M23-Ma0033633	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Tin	M23-Ma0033633	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Zinc	M23-Ma0033633	CP	mg/kg	120	120	1.1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-Ma0033638	CP	%	7.2	7.1	1.3	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M23-Ma0033638	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M23-Ma0033638	CP	mg/kg	58	51	12	30%	Pass	
TRH C29-C36	M23-Ma0033638	CP	mg/kg	140	120	18	30%	Pass	
TRH >C10-C16	M23-Ma0033638	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M23-Ma0033638	CP	mg/kg	180	150	17	30%	Pass	
TRH >C34-C40	M23-Ma0033638	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M23-Ma0033638	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Fluoride	M23-Ma0033643	CP	mg/kg	< 100	< 100	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M23-Ma0033644	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10	M23-Ma0033644	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M23-Ma0033644	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M23-Ma0033644	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M23-Ma0033644	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M23-Ma0033644	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M23-Ma0033644	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	M23-Ma0033644	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M23-Ma0033644	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M23-Ma0033644	CP	mg/kg	2.6	2.6	<1	30%	Pass	
Cadmium	M23-Ma0033644	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M23-Ma0033644	CP	mg/kg	29	29	<1	30%	Pass	
Copper	M23-Ma0033644	CP	mg/kg	17	18	<1	30%	Pass	
Lead	M23-Ma0033644	CP	mg/kg	380	380	<1	30%	Pass	
Mercury	M23-Ma0033644	CP	mg/kg	0.4	0.4	1.4	30%	Pass	
Molybdenum	M23-Ma0033644	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Nickel	M23-Ma0033644	CP	mg/kg	18	18	1.6	30%	Pass	
Selenium	M23-Ma0033644	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Silver	M23-Ma0033644	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Tin	M23-Ma0033644	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Zinc	M23-Ma0033644	CP	mg/kg	53	53	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-Ma0033648	CP	%	15	16	10	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M23-Ma0033648	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M23-Ma0033648	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M23-Ma0033648	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C10-C16	M23-Ma0033648	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M23-Ma0033648	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M23-Ma0033648	CP	mg/kg	< 100	< 100	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	No
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
S01	Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil' multiply 'reported results' x 'wet bulk density of soil in t/m3'
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5
S03	Acid Neutralising Capacity is only required if the pHKCl if greater than or equal to pH 6.5
S04	Acid Sulfate Soil Samples have a 24 hour holding time unless frozen or dried within that period
S05	Field Screen uses the following fizz rating to classify the rate the samples reacted to the peroxide: 1.0; No reaction to slight. 2.0; Moderate reaction. 3.0; Strong reaction with persistent froth. 4.0; Extreme reaction.

Authorised by:

Harry Bacalis	Analytical Services Manager
Edward Lee	Senior Analyst-Organic
Emily Rosenberg	Senior Analyst-Metal
Harry Bacalis	Senior Analyst-Volatile
Jonathon Angell	Senior Analyst-Sample Properties
Jonathon Angell	Senior Analyst-SPOCAS
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Volatile
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal
Scott Beddoes	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Metal

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Tetra Tech Coffey Pty Ltd VIC
Level 11, 2 Riverside Quay,
Southbank
VIC 3006

Attention: **Bryden Tiddy**

Report **971775-W**
Project name MARINUS LINK - HYPERBRIDGE
Project ID 754-MELEN215878
Received Date Mar 10, 2023

Client Sample ID			**HEY_SW2**	**HEY_SW1**	**QC09**	**RB01**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**M23-Ma0033628**	**M23-Ma0033629**	**M23-Ma0033630**	**M23-Ma0033631**
Date Sampled			**Mar 08, 2023**	**Mar 08, 2023**	**Mar 08, 2023**	**Mar 08, 2023**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	0.4	0.4	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	0.4	0.4	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	0.4	0.4	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	0.4	0.4	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	105	102	98	102
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			HEY_SW2	HEY_SW1	QC09	RB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Ma0033628	M23-Ma0033629	M23-Ma0033630	M23-Ma0033631
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	52	75	57	92
p-Terphenyl-d14 (surr.)	1	%	54	87	83	52
Organochlorine Pesticides						
Chlordanes - Total	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
4.4'-DDD	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
4.4'-DDE	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
4.4'-DDT	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
a-HCH	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Aldrin	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
b-HCH	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
d-HCH	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dieldrin	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Endosulfan I	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Endosulfan II	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Endosulfan sulphate	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Endrin	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Endrin aldehyde	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Endrin ketone	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
g-HCH (Lindane)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Heptachlor	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Heptachlor epoxide	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Hexachlorobenzene	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Methoxychlor	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Toxaphene	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aldrin and Dieldrin (Total)*	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
DDT + DDE + DDD (Total)*	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Vic EPA IWRG 621 OCP (Total)*	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
Vic EPA IWRG 621 Other OCP (Total)*	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
Dibutylchlorendate (surr.)	1	%	90	58	93	59
Tetrachloro-m-xylene (surr.)	1	%	74	97	55	51
Polychlorinated Biphenyls						
Aroclor-1016	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Total PCB*	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Dibutylchlorendate (surr.)	1	%	90	58	93	59
Tetrachloro-m-xylene (surr.)	1	%	74	97	55	51

Client Sample ID			HEY_SW2	HEY_SW1	QC09	RB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Ma0033628	M23-Ma0033629	M23-Ma0033630	M23-Ma0033631
Date Sampled			Mar 08, 2023	Mar 08, 2023	Mar 08, 2023	Mar 08, 2023
Test/Reference	LOR	Unit				
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	59	46	27	35
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Cyanide (total)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Fluoride	0.5	mg/L	< 0.5	< 0.5	< 0.5	< 0.5
Heavy Metals						
Arsenic	0.001	mg/L	0.001	< 0.001	< 0.001	< 0.001
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	< 0.001	< 0.001	0.001	< 0.001
Copper	0.001	mg/L	0.003	0.003	0.004	< 0.001
Lead	0.001	mg/L	< 0.001	0.001	0.002	< 0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Molybdenum	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Nickel	0.001	mg/L	0.005	0.002	0.002	< 0.001
Selenium	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Silver	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Tin	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Zinc	0.005	mg/L	0.067	0.012	0.011	< 0.005

Client Sample ID			TB01
Sample Matrix			Water
Eurofins Sample No.			M23-Ma0033632
Date Sampled			Mar 08, 2023
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	104
Volatile Organics			
Naphthalene[N02]	0.01	mg/L	< 0.01

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Mar 16, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 16, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Melbourne	Mar 14, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Mar 16, 2023	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Eurofins Suite B7			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 16, 2023	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Mar 16, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Organochlorine Pesticides	Melbourne	Mar 16, 2023	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Polychlorinated Biphenyls	Melbourne	Mar 16, 2023	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Phenols (Halogenated)	Melbourne	Mar 16, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Mar 16, 2023	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Cyanide (total)	Melbourne	Mar 16, 2023	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Fluoride	Melbourne	Mar 16, 2023	28 Days
- Method: in-house method LTM-INO-4390 Fluoride by Discrete Analyser			
Metals IWRG 621 : Metals M12	Melbourne	Mar 16, 2023	28 Days
- Method:			

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Company Name: Tetra Tech Coffey Pty Ltd VIC
Address: Level 11, 2 Riverside Quay,
Southbank
VIC 3006

Order No.:
Report #: 971775
Phone: 03 9290 7000
Fax:

Received: Mar 10, 2023 9:06 AM
Due: Mar 20, 2023
Priority: 5 Day
Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	HEY7_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033594		X						
2	HEY7_0.5-0.6	Mar 08, 2023		Soil	M23-Ma0033595		X						
3	QC01	Mar 08, 2023		Soil	M23-Ma0033596		X						
4	HEY7_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033597		X						
5	HEY7_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033598			X		X			
6	HEY8_0.0-0.3	Mar 08, 2023		Soil	M23-Ma0033599		X						
7	HEY8_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0033600		X						
8	HEY8_0.6-0.7	Mar 08, 2023		Soil	M23-Ma0033601		X						
9	HEY8_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033602		X						
10	HEY8_1.3-1.4	Mar 08, 2023		Soil	M23-Ma0033603			X		X			
11	HEY6_0.0-0.3	Mar 08, 2023		Soil	M23-Ma0033604		X						
12	QC03	Mar 08, 2023		Soil	M23-Ma0033605		X						

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Order No.:
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Phone: 03 9290 7000
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Received: Mar 10, 2023 9:06 AM
Due: Mar 20, 2023
Priority: 5 Day
Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
13	HEY6_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0033606		X						
14	HEY6_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033607		X						
15	HEY6_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033608			X		X			
16	HEY5_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033609		X						
17	HEY5_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0033610		X						
18	HEY5_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033611		X						
19	HEY5_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033612		X						
20	HEY4_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033613		X						
21	HEY4_0.4-0.5 (A)	Mar 08, 2023		Soil	M23-Ma0033614		X						
22	HEY4_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033615			X		X			
23	HEY4_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033616			X		X			
24	HEY3_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033617		X						
25	HEY3_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033618			X		X			
26	HEY3_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033619			X		X			

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Order No.:
Report #: 971775
Phone: 03 9290 7000
Fax:

Received: Mar 10, 2023 9:06 AM
Due: Mar 20, 2023
Priority: 5 Day
Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
27	QC05	Mar 08, 2023		Soil	M23-Ma0033620			X		X			
28	HEY2_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033621		X						
29	HEY2_0.6-0.7	Mar 08, 2023		Soil	M23-Ma0033622		X						
30	HEY2_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033623			X		X			
31	HEY1_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033624		X						
32	HEY1_0.4-0.7	Mar 08, 2023		Soil	M23-Ma0033625		X						
33	HEY1_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033626			X		X			
34	HEY1_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033627			X		X			
35	HEY_SW2	Mar 08, 2023		Water	M23-Ma0033628						X		
36	HEY_SW1	Mar 08, 2023		Water	M23-Ma0033629						X		
37	QC09	Mar 08, 2023		Water	M23-Ma0033630						X		
38	RB01	Mar 08, 2023		Water	M23-Ma0033631						X		
39	TB01	Mar 08, 2023		Water	M23-Ma0033632								X
40	SP2_01	Mar 08, 2023		Soil	M23-Ma0033633				X		X		
41	SP2_02	Mar 08, 2023		Soil	M23-Ma0033634				X			X	

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Order No.:
Report #: 971775
Phone: 03 9290 7000
Fax:

Received: Mar 10, 2023 9:06 AM
Due: Mar 20, 2023
Priority: 5 Day
Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
42	SP2_03	Mar 08, 2023		Soil	M23-Ma0033635				X			X	
43	SP3_01	Mar 08, 2023		Soil	M23-Ma0033636				X			X	
44	SP8_01	Mar 08, 2023		Soil	M23-Ma0033637				X			X	
45	SP8_02	Mar 08, 2023		Soil	M23-Ma0033638				X			X	
46	SP9_01	Mar 08, 2023		Soil	M23-Ma0033639				X		X		
47	SP9_02	Mar 08, 2023		Soil	M23-Ma0033640				X			X	
48	SP9_03	Mar 08, 2023		Soil	M23-Ma0033641				X			X	
49	SP9_04	Mar 08, 2023		Soil	M23-Ma0033642				X			X	
50	SP5_01	Mar 08, 2023		Soil	M23-Ma0033643				X		X		
51	SP5_02	Mar 08, 2023		Soil	M23-Ma0033644				X			X	
52	SP5_03	Mar 08, 2023		Soil	M23-Ma0033645				X			X	
53	SP10_01	Mar 08, 2023		Soil	M23-Ma0033646				X		X		
54	SP10_02	Mar 08, 2023		Soil	M23-Ma0033647				X			X	
55	SP10_03	Mar 08, 2023		Soil	M23-Ma0033648				X			X	
56	QC07	Mar 08, 2023		Soil	M23-Ma0033649				X			X	

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Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
57	HEY4_0.4-0.5 (B)	Mar 08, 2023		Soil	M23-Ma0033692	X							
Test Counts						1	23	11	28	28	8	13	1

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M23-Ma0033629	CP	%	101			70-130	Pass	
Acenaphthylene	M23-Ma0033629	CP	%	97			70-130	Pass	
Anthracene	M23-Ma0033629	CP	%	93			70-130	Pass	
Benz(a)anthracene	M23-Ma0033629	CP	%	108			70-130	Pass	
Benzo(a)pyrene	M23-Ma0033629	CP	%	82			70-130	Pass	
Benzo(b&j)fluoranthene	M23-Ma0033629	CP	%	88			70-130	Pass	
Benzo(g.h.i)perylene	M23-Ma0033629	CP	%	82			70-130	Pass	
Benzo(k)fluoranthene	M23-Ma0033629	CP	%	82			70-130	Pass	
Chrysene	M23-Ma0033629	CP	%	108			70-130	Pass	
Dibenz(a.h)anthracene	M23-Ma0033629	CP	%	91			70-130	Pass	
Fluoranthene	M23-Ma0033629	CP	%	82			70-130	Pass	
Fluorene	M23-Ma0033629	CP	%	96			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M23-Ma0033629	CP	%	90			70-130	Pass	
Naphthalene	M23-Ma0033629	CP	%	88			70-130	Pass	
Phenanthrene	M23-Ma0033629	CP	%	102			70-130	Pass	
Pyrene	M23-Ma0033629	CP	%	85			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	M23-Ma0033629	CP	%	84			70-130	Pass	
4.4'-DDD	M23-Ma0033629	CP	%	70			70-130	Pass	
4.4'-DDE	M23-Ma0033629	CP	%	77			70-130	Pass	
4.4'-DDT	M23-Ma0033629	CP	%	100			70-130	Pass	
a-HCH	M23-Ma0033629	CP	%	74			70-130	Pass	
Aldrin	M23-Ma0033629	CP	%	91			70-130	Pass	
b-HCH	M23-Ma0033629	CP	%	90			70-130	Pass	
d-HCH	M23-Ma0033629	CP	%	76			70-130	Pass	
Dieldrin	M23-Ma0033629	CP	%	91			70-130	Pass	
Endosulfan I	M23-Ma0033629	CP	%	70			70-130	Pass	
Endosulfan II	M23-Ma0033629	CP	%	82			70-130	Pass	
Endosulfan sulphate	M23-Ma0033629	CP	%	84			70-130	Pass	
Endrin	M23-Ma0033629	CP	%	73			70-130	Pass	
Endrin aldehyde	M23-Ma0033629	CP	%	82			70-130	Pass	
Endrin ketone	M23-Ma0033629	CP	%	81			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
g-HCH (Lindane)	M23-Ma0033629	CP	%	84			70-130	Pass	
Heptachlor	M23-Ma0033629	CP	%	77			70-130	Pass	
Heptachlor epoxide	M23-Ma0033629	CP	%	88			70-130	Pass	
Hexachlorobenzene	M23-Ma0033629	CP	%	79			70-130	Pass	
Methoxychlor	M23-Ma0033629	CP	%	82			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1016	M23-Ma0033629	CP	%	84			70-130	Pass	
Aroclor-1260	M23-Ma0033629	CP	%	94			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	M23-Ma0033629	CP	%	48			30-130	Pass	
2.4-Dichlorophenol	M23-Ma0033629	CP	%	54			30-130	Pass	
2.4.5-Trichlorophenol	M23-Ma0033629	CP	%	58			30-130	Pass	
2.4.6-Trichlorophenol	M23-Ma0033629	CP	%	49			30-130	Pass	
2.6-Dichlorophenol	M23-Ma0033629	CP	%	54			30-130	Pass	
4-Chloro-3-methylphenol	M23-Ma0033629	CP	%	58			30-130	Pass	
Pentachlorophenol	M23-Ma0033629	CP	%	31			30-130	Pass	
Tetrachlorophenols - Total	M23-Ma0033629	CP	%	33			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4.6-dinitrophenol	M23-Ma0033629	CP	%	85			30-130	Pass	
2-Methyl-4.6-dinitrophenol	M23-Ma0033629	CP	%	48			30-130	Pass	
2-Nitrophenol	M23-Ma0033629	CP	%	42			30-130	Pass	
2.4-Dimethylphenol	M23-Ma0033629	CP	%	53			30-130	Pass	
2.4-Dinitrophenol	M23-Ma0033629	CP	%	46			30-130	Pass	
2-Methylphenol (o-Cresol)	M23-Ma0033629	CP	%	46			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	M23-Ma0033629	CP	%	48			30-130	Pass	
Dinoseb	M23-Ma0033629	CP	%	49			30-130	Pass	
Phenol	M23-Ma0033629	CP	%	44			30-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Fluoride	M23-Ma0033629	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Fluoride	M23-Ma0033630	CP	mg/L	< 0.5	< 0.5	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	No
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised by:

Harry Bacalis	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Carroll Lee	Senior Analyst-Volatile
Emily Rosenberg	Senior Analyst-Metal
Harry Bacalis	Senior Analyst-Volatile
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Volatile
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

TETRA TECH COFFEY

Consigning Office: Newtown

Report Results to: Jamie Rodden Mobile: 0408651268 Email: jamie.rodden@tetratech.com

Bryden Tiddy 0409400219 bryden.tiddy@tetratech.com

Ed Grinter ed.grinter@tetratech.com

Invoices to: Lisa Marnell Phone: 9406 1000 Email:

Project No: 754-MELEN215878 Task No:

Project Name: Marinus Link - Heybridge Laboratory: Eurofins, ALS

Sampler's Name: Jamie Rodden Project Manager: Bryden Tiddy

Quote number (if different to current quoted prices):

Special Instructions: Please forward samples QC02, QC04, QC06 and QC08 to ALS. Please relabel HEY_SW3 to HEYSW1

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Analysis Request Section: CrS Suite	ASS field Test	B7: TRH/ BTEXN/ PAH/ Metals (8 inc Hg)	R6: Vic EPA Short Screen (Tas EPA Acreen)	TRH C6-C10+BTEX			HOLD					NOTES
	HEY7_0.0-0.2	8.3.2023	AM	S	1Z	Standard		X											
	HEY7_0.5-0.6	8.3.2023	AM	S	1Z	Standard		X											
	QC01	8.3.2023	AM	S	1Z	Standard		X											
	QC02	8.3.2023	AM	S	1Z	Standard		X											Please forward to ALS
	HEY7_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X											
	HEY7_1.4-1.5	8.3.2023	AM	S	1Z	Standard	X												
	HEY8_0.0-0.3	8.3.2023	AM	S	1Z	Standard		X											#071775
	HEY8_0.4-0.5	8.3.2023	AM	S	1Z	Standard		X											
	HYE8_0.6-0.7	8.3.2023	AM	S	1Z	Standard		X											
	HEY8_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X											14/3/23
	HEY8_1.3-1.4	8.3.2023	AM	S	1Z	Standard	X												
	HEY6_0.1-0.3	8.3.2023	AM	S	1Z	Standard		X											
	QC03	8.3.2023	AM	S	1Z	Standard		X											
	QC04	8.3.2023	AM	S	1Z	Standard		X											
	HEY6_0.4-0.5	8.3.2023	AM	S	1Z	Standard		X											Please forward to ALS
	HEY6_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X											
	HEY6_1.4-1.5	8.3.2023	AM	S	1Z, 1J	Standard	X												

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

	HEY5_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X												
	HEY5_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X												
	HEY5_0.9-1.0	8.3.2023	PM	S	1Z	Standard		X												
	HEY5_1.4-1.5	8.3.2023	PM	S	1Z	Standard		X												
	HEY4_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X												
	HEY4_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X												
	HEY4_0.9-1.0	8.3.2023	PM	S	1Z, 1J	Standard	X													
	HEY4_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X													
	HEY3_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X												
	HEY3_0.4-0.5	8.3.2023	PM	S	1Z	Standard	X													
	HEY3_0.9-1.0	8.3.2023	PM	S	1Z	Standard	X													
	HEY3_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X													
	QC05	8.3.2023	PM	S	1Z	Standard	X													
	QC06	8.3.2023	PM	S	1Z	Standard	X													
	HEY2_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X												
	HEY2_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X												
	HEY2_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X													
	HEY1_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X												
	HEY1_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X												
	HEY1_0.9-1.0	8.3.2023	PM	S	1Z	Standard	X													
	HEY1_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X													
	HEY_SW2	8.3.2023	PM	W	3p, 1a, 4v	Standard				X										
	HEY_SW3	8.3.2023	PM	W	3p, 1a, 4v	Standard				X										
	QC09	8.3.2023	PM	W	3p, 1a, 4v	Standard				X										
	QC10	8.3.2023	PM	W	3p, 1a, 4v	Standard				X										
	RB01	8.3.2023	PM	W	3p, 1a, 2v	Standard				x										
	TB01	8.3.2023	PM	W	2v	Standard					X									
	SP2_01	8.3.2023	PM	S	1J	Standard				X										
	SP2_02	8.3.2023	PM	S	1J	Standard			x											
	SP2_03	8.3.2023	PM	S	1J	Standard			x											

Please forward to ALS

#91775

14/3/23

Please relabel as HEY_SW1

Please forward to ALS

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

	SP3_01	8.3.2023	PM	S	1J	Standard			x											
	SP8_01	8.3.2023	PM	S	1J	Standard			x											
	SP8_02	8.3.2023	PM	S	1J	Standard			x											
	SP9_01	8.3.2023	PM	S	1J	Standard				X										
	SP9_02	8.3.2023	PM	S	1J	Standard			x											
	SP9_03	8.3.2023	PM	S	1J	Standard			x											
	SP9_04	8.3.2023	PM	S	1J	Standard			x											
	SP5_01	8.3.2023	PM	S	1J	Standard				X										
	SP5_02	8.3.2023	PM	S	1J	Standard			x											
	SP5_03	8.3.2023	PM	S	1J	Standard			x											#471775
	SP10_01	8.3.2023	PM	S	1J	Standard				X										
	SP10_02	8.3.2023	PM	S	1J	Standard			x											
	SP10_03	8.3.2023	PM	S	1J	Standard			x											14/3/23
	QC07	8.3.2023	PM	S	1J	Standard			x											
	QC08	8.3.2023	PM	S	1J	Standard			x											Please forward to ALS

RELINQUISHED BY		RECEIVED BY		Sample Receipt Advice: (Lab Use Only)
Name:	Date:	Name:	Date:	All Samples Recieved in Good Condition ☐
Coffey	Time:	Company:	Time:	All Documentation is in Proper Order ☐
Name:	Date: →	Name:	Date:	Samples Received Properly Chilled ☐
Company:	Time:	Company:	Time:	Lab. Ref/Batch No.

***Container Type & Preservation Codes:** **P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** Sodium Thiosulfate, **NP** - No Preservative

Count

Price Per test

Tyrone Gowans

From: Savini Suduweli Kondage
Sent: Tuesday, 14 March 2023 12:05 PM
To: #AU_CAU001_EnviroSampleVic
Subject: FW: Heybridge Supplies Delivery
Attachments: 754-MELEN215878_ML_Heybridge_COC_20230308.xlsx

Follow Up Flag: Follow up
Flag Status: Completed

INFO: INTERNAL EMAIL - Sent from your own Eurofins email domain.

Kind Regards,
Savini Suduweli

Phone : +61 3 8564 5051
Mobile : +61 447 222 760
Email : SaviniSuduweli@eurofins.com

#971775
16/3

From: Rodden, Jamie <JAMIE.RODDEN@tetratech.com>
Sent: Friday, 10 March 2023 9:06 AM
To: Savini Suduweli Kondage <SaviniSuduweli@eurofins.com>
Cc: Grinter, Ed <Ed.Grinter@tetratech.com>; Tiddy, Bryden <Bryden.Tiddy@tetratech.com>
Subject: RE: Heybridge Supplies Delivery

CAUTION: EXTERNAL EMAIL - Sent from an email domain that is not formally trusted by Eurofins.
Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Hi Savini,

Please see attached COC for samples as mentioned below.

Please let us know any queries.

Kind regards,

Jamie Rodden | MEarthSci | Environmental Scientist
Direct **+61 39290 7137** | Business **+61 4 5215 4600**| Mobile **+61 408 651 268** | jamie.rodden@tetratech.com

Tetra Tech Coffey | *Leading with Science®*
1/23 West Fyans Street, Newtown | Victoria 3220 | tetratech.com | tetratechcoffey.com

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 5 of ____

TETRA TECH COFFEY

Consigning Office:	Newtown				
Report Results to:	Jamie Rodden	Mobile:	0408651268	Email:	jamie.rodden@tetratech.com
	Bryden Tiddy		0409400219		bryden.tiddy@tetratech.com
	Ed Grinter				ed.grinter@tetratech.com
Invoices to:	Lisa Marnell	Phone:	9406 1000	Email:	

Project No:	754-MELEN215878	Task No:	
Project Name:	Marinus Link - Heybridge	Laboratory:	Eurofins, ALS
Sampler's Name:	Jamie Rodden	Project Manager:	Bryden Tiddy
Quote number (if different to current quoted prices):			
Special Instructions:	Please forward samples QC02, QC04, QC06 and QC08 to ALS. Please relabel HEY_SW3 to HEYSW1		

COPY

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Analysis Request Section: CrS Suite	ASS field Test	B7: TRH/ BTEXN/ PAH/ Metals (8 inc Hg)	R6: Vic EPA Short Screen (Tas EPA Acreen)	TRH C6-C10+BTEX	HOLD	NOTES
	HEY7_0.0-0.2	8.3.2023	AM	S	1Z	Standard		X					
	HEY7_0.5-0.6	8.3.2023	AM	S	1Z	Standard		X					
	QC01	8.3.2023	AM	S	1Z	Standard		X					
	QC02	8.3.2023	AM	S	1Z	Standard		X					Please forward to ALS
	HEY7_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X					
	HEY7_1.4-1.5	8.3.2023	AM	S	1Z	Standard	X						
	HEY8_0.0-0.3	8.3.2023	AM	S	1Z	Standard		X					
	HEY8_0.4-0.5	8.3.2023	AM	S	1Z	Standard		X					
	HYE8_0.6-0.7	8.3.2023	AM	S	1Z	Standard		X					
	HEY8_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X					
	HEY8_1.3-1.4	8.3.2023	AM	S	1Z	Standard	X						
	HEY6_0.1-0.3	8.3.2023	AM	S	1Z	Standard		X					
	QC03	8.3.2023	AM	S	1Z	Standard		X					
	QC04	8.3.2023	AM	S	1Z	Standard		X					Please forward to ALS
	HEY6_0.4-0.5	8.3.2023	AM	S	1Z	Standard		X					
	HEY6_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X					
	HEY6_1.4-1.5	8.3.2023	AM	S	1Z, 1J	Standard	X						

#471775

14/3

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

	HEY5_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X											
	HEY5_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X											
	HEY5_0.9-1.0	8.3.2023	PM	S	1Z	Standard		X											
	HEY5_1.4-1.5	8.3.2023	PM	S	1Z	Standard		X											
	HEY4_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X											
	HEY4_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X											
	HEY4_0.9-1.0	8.3.2023	PM	S	1Z, 1J	Standard	X												
	HEY4_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X												
	HEY3_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X											
	HEY3_0.4-0.5	8.3.2023	PM	S	1Z	Standard	X												
	HEY3_0.9-1.0	8.3.2023	PM	S	1Z	Standard	X												
	HEY3_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X												
	QC05	8.3.2023	PM	S	1Z	Standard	X												
	QC06	8.3.2023	PM	S	1Z	Standard	X												Please forward to ALS
	HEY2_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X											
	HEY2_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X											
	HEY2_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X												
	HEY1_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X											
	HEY1_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X											
	HEY1_0.9-1.0	8.3.2023	PM	S	1Z	Standard	X												
	HEY1_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X												
	HEY_SW2	8.3.2023	PM	W	3p, 1a, 4v	Standard				X									
	HEY_SW3	8.3.2023	PM	W	3p, 1a, 4v	Standard				X									Please relabel as HEY_SW1
	QC09	8.3.2023	PM	W	3p, 1a, 4v	Standard				X									
	QC10	8.3.2023	PM	W	3p, 1a, 4v	Standard				X									Please forward to ALS
	RB01	8.3.2023	PM	W	3p, 1a, 2v	Standard				x									
	TB01	8.3.2023	PM	W	2v	Standard					X								
	SP2_01	8.3.2023	PM	S	1J	Standard				X									
	SP2_02	8.3.2023	PM	S	1J	Standard			x										
	SP2_03	8.3.2023	PM	S	1J	Standard			x										

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CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

COPY

	SP3_01	8.3.2023	PM	S	1J	Standard			x											
	SP8_01	8.3.2023	PM	S	1J	Standard			x											
	SP8_02	8.3.2023	PM	S	1J	Standard			x											
	SP9_01	8.3.2023	PM	S	1J	Standard				X										
	SP9_02	8.3.2023	PM	S	1J	Standard			x											
	SP9_03	8.3.2023	PM	S	1J	Standard			x											
	SP9_04	8.3.2023	PM	S	1J	Standard			x											
	SP5_01	8.3.2023	PM	S	1J	Standard				X										
	SP5_02	8.3.2023	PM	S	1J	Standard			x											
	SP5_03	8.3.2023	PM	S	1J	Standard			x											
	SP10_01	8.3.2023	PM	S	1J	Standard				X										
	SP10_02	8.3.2023	PM	S	1J	Standard			x											
	SP10_03	8.3.2023	PM	S	1J	Standard			x											
	QC07	8.3.2023	PM	S	1J	Standard			x											
	QC08	8.3.2023	PM	S	1J	Standard			x											Please forward to ALS

RELINQUISHED BY		RECEIVED BY		Sample Receipt Advice: (Lab Use Only)
Name:	Date:	Name:	Date:	All Samples Recieved in Good Condition ☐
Coffey	Time:	Company:	Time:	All Documentation is in Proper Order ☐
Name:	Date: →	Name:	Date:	Samples Received Properly Chilled ☐
Company:	Time:	Company:	Time:	Lab. Ref/Batch No.

***Container Type & Preservation Codes:** **P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** Sodium Thiosulfate, **NP** - No Preservative

Count

Price Per test

#97175
[signature]
14/3

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

TETRA TECH COFFEY

Consigning Office:	Newtown				
Report Results to:	Jamie Rodden	Mobile:	408651268	Email:	jamie.rodden@tetratech.com
	Ed Grinter	Mobile:	427202493	Email:	ed.grinter@tetratech.com
	Bryden Tiddy	Mobile:	427202493	Email:	bryden.tiddy@tetratech.com
Invoices to:	Lisa Marnell	Phone:		Email:	lisa.marnell@tetratech.com

Project No:	754-MELEN215878ML	Task No:	301
Project Name:	Taylors Road Landfill	Laboratory:	Eurofins, ALS
Sampler's Name:	Jamie Rodden	Project Manager:	Bryden Tiddy

Quote number (if different to current quoted prices):

Special Instructions:

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)
	HEY7_0.0-0.2	8.3.23	AM	soil	1z	
	HEY7_0.5-0.6					
	QC01					
	QC02					
	HEY7_0.9-1.0					
	HEY7_1.4-1.5				1z, 1J	
	HEY8_0.0-0.3				1z	
	HEY8_0.4-0.5					
	HEY8_0.6-0.7					
	HEY8_0.9-1.0					
	HEY6_0.1-0.3					
	QC03					
	QC04					

Analysis Request Section

Refer to electronic COC

NOTES

#97178

RELINQUISHED BY		RECEIVED BY	
Name: Coffey Jamie Rodden	Date: 8.3.23 Time: 7.30pm	Name:	Date: TAT FAST AR. Time:
Name:	Date: →	Name:	Date: 8/3
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)

- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

***Container Type & Preservation Codes:** P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

Tahir Couier 9/3 11am

Iced 9.3°

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

TETRA TECH COFFEY

Consigning Office:	Newtown				
Report Results to:	Jamie Rodden	Mobile:	408651268	Email:	jamie.rodden@tetratech.com
	Ed Grinter	Mobile:	427202493	Email:	ed.grinter@tetratech.com
	Bryden Tiddy	Mobile:	427202493	Email:	bryden.tiddy@tetratech.com
Invoices to:	Lisa Marnell	Phone:		Email:	lisa.marnell@tetratech.com

Project No:	754-MELEN215878ML	Task No:	301
Project Name:	Taylors Road Landfill	Laboratory:	Eurofins, ALS
Sampler's Name:	Jamie Rodden	Project Manager:	Bryden Tiddy

Quote number (if different to current quoted prices):

Special Instructions:

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Analysis Request Section	NOTES
	HEY6_0.4-0.5	8.3.23	AM	S	12		X Refer to Electronic COC	
	HEY6_0.9-1.0							
	HEY6_1.4-1.5							
	HEY5_0.0-0.2		PM					
	HEY5_0.4-0.5							
	HEY5_0.9-1.0				12, 17			
	HEY5_1.4-1.5				12			
	HEY4_0.0-0.2				12			
	HEY4_0.4-0.5				12, ~~17~~ 12			
	HEY4_0.9-1.0				12			
	HEY4_1.4-1.5							
	HEY3_0.0-0.2							
	HEY3_0.4-0.5							

#97175

Mdh

1/3

RELINQUISHED BY		RECEIVED BY		Sample Receipt Advice: (Lab Use Only)	
Name: Coffey Peter Pgl	Date: Time:	Name: Company:	Date: Time:	All Samples Recieved in Good Condition	☐
Name: Company:	Date: Time: →	Name: Company:	Date: Time:	All Documentation is in Proper Order	☐
				Samples Received Properly Chilled	☐
				Lab. Ref/Batch No.	

*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

TETRA TECH COFFEY

Consigning Office:	Newtown				
Report Results to:	Jamie Rodden	Mobile:	408651268	Email:	jamie.rodden@tetratech.com
	Ed Grinter	Mobile:	427202493	Email:	ed.grinter@tetratech.com
	Bryden Tiddy	Mobile:	427202493	Email:	bryden.tiddy@tetratech.com
Invoices to:	Lisa Marnell	Phone:		Email:	lisa.marnell@tetratech.com

Project No:	754-MELEN215878ML	Task No:	301
Project Name:	Taylors Road Landfill	Laboratory:	Eurofins, ALS
Sampler's Name:	Jamie Rodden	Project Manager:	Bryden Tiddy

Quote number (if different to current quoted prices):

Special Instructions:

Analysis Request Section

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	x Refer to Electronic COC x	NOTES
	HEY3_0.9-1.0							#471775
	HEY3_1.4-1.5							
	QC05							
	QC06							
	HEY2_0.0-0.2							
	HEY2_0.4-0.5							
	HEY2_1.4-1.5							
	HEY1_0.0-0.2							
	HEY1_0.4-0.5							
	HEY1_0.9-1.0							
	HEY1_1.4-1.5							

RELINQUISHED BY		RECEIVED BY		Sample Receipt Advice: (Lab Use Only)	
Name: Coffey Refer Pg 1	Date: Time:	Name: Company:	Date: Time:	All Samples Recieved in Good Condition	☐
Name: Company:	Date: Time:	Name: Company:	Date: Time:	All Documentation is in Proper Order	☐
				Samples Received Properly Chilled	☐
				Lab. Ref/Batch No.	

*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

TETRA TECH COFFEY

Consigning Office:	Newtown				
Report Results to:	Jamie Rodden	Mobile:	408651268	Email:	jamie.rodden@tetratech.com
	Ed Grinter	Mobile:	427202493	Email:	ed.grinter@tetratech.com
	Bryden Tiddy	Mobile:	427202493	Email:	bryden.tiddy@tetratech.com
Invoices to:	Lisa Marnell	Phone:		Email:	lisa.marnell@tetratech.com

Project No:	754-MELEN215878ML	Task No:	301
Project Name:	Taylors Road Landfill	Laboratory:	Eurofins, ALS
Sampler's Name:	Jamie Rodden	Project Manager:	Bryden Tiddy

Quote number (if different to current quoted prices):

Special Instructions:

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)
	HEY_SW2	8.3.23	PM	W	3P, 1A, 4V	
	HEY-SW3					
	QC09				3P, 1A, 2V	
	QC10					
	RB01				2V	
	TB01					

Analysis Request Section

Refer to Electronic COC

NOTES

please change sample name from HEY_SW3 to HEY_SW1

#471775

14/3

RELINQUISHED BY		RECEIVED BY	
Name: Coffey Refer Pg1	Date: Time:	Name: Company:	Date: Time:
Name: Company:	Date: Time:	Name: Company:	Date: Time:

Sample Receipt Advice: (Lab Use Only)

- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

TETRA TECH COFFEY

Consigning Office:	Newtown				
Report Results to:	Jamie Rodden	Mobile:	408651268	Email:	jamie.rodden@tetratech.com
	Ed Grinter	Mobile:	427202493	Email:	ed.grinter@tetratech.com
	Bryden Tiddy	Mobile:	427202493	Email:	bryden.tiddy@tetratech.com
Invoices to:	Lisa Marnell	Phone:		Email:	lisa.marnell@tetratech.com

Project No:	754-MELEN215878ML	Task No:	301
Project Name:	Taylors Road Landfill	Laboratory:	Eurofins, ALS
Sampler's Name:	Jamie Rodden	Project Manager:	Bryden Tiddy

Quote number (if different to current quoted prices):

Special Instructions:

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)
	SP2_01	8.3.23	PM	S	IJ	
	SP2_02					
	SP2_03					
	SP3_01					
	SP8_01					
	SP8_02					
	SP9_01					
	SP9_02					
	SP9_03					
	SP9_04					
	SP5_01					
	SP5_02					

Analysis Request Section

Please refer to Electronic COC

NOTES

#97175

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RELINQUISHED BY		RECEIVED BY	
Name: Refer pg1	Date:	Name:	Date:
Coffey	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)

- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

***Container Type & Preservation Codes:** **P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

TETRA TECH COFFEY

Consigning Office:	Newtown				
Report Results to:	Jamie Rodden	Mobile:	408651268	Email:	jamie.rodden@tetratech.com
	Ed Grinter	Mobile:	427202493	Email:	ed.grinter@tetratech.com
	Bryden Tiddy	Mobile:	427202493	Email:	bryden.tiddy@tetratech.com
Invoices to:	Lisa Marnell	Phone:		Email:	lisa.marnell@tetratech.com

Project No: 754-MELEN215878ML Task No: 301

Project Name: Taylors Road Landfill Laboratory: Eurofins, ALS

Sampler's Name: Jamie Rodden Project Manager: Bryden Tiddy

Quote number (if different to current quoted prices):

Special Instructions:

Analysis Request Section

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	NOTES
	SP5_03	8.3.23	PM	S	1J		Please Refer Electronic COC
	SP10_01	↓	↓	↓	↓		
	SP10_02						
	SP10_03						

#471775

1 of 3

RELINQUISHED BY		RECEIVED BY		Sample Receipt Advice: (Lab Use Only)	
Name: Refer pg 1	Date:	Name:	Date:	All Samples Recieved in Good Condition	☐
Coffey	Time:	Company:	Time:	All Documentation is in Proper Order	☐
Name:	Date: →	Name:	Date:	Samples Received Properly Chilled	☐
Company:	Time:	Company:	Time:	Lab. Ref/Batch No.	

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

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NATA# 1261 Site# 25403

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Girraween
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NATA# 1261 Site# 18217

Canberra
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Tel: +61 2 6113 8091
NATA# 1261 Site# 25466

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Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
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Mayfield West NSW 2304
Tel: +61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Eurofins ARL Pty Ltd

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46-48 Banksia Road
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Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd

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35 O'Rorke Road
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Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Sample Receipt Advice

Company name:	Tetra Tech Coffey Pty Ltd VIC
Contact name:	Bryden Tiddy
Project name:	MARINUS LINK - HYPERBRIDGE
Project ID:	754-MELEN215878
Turnaround time:	5 Day
Date/Time received	Mar 10, 2023 9:06 AM
Eurofins reference	971775

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✗	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
NB	Necessary sampling information not provided, the Laboratory will not be responsible for compromised results should testing be performed outside recommended holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✓	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

SAMPLES OUT OF HOLDING TIME FOR ASS FIELD TESTING. SAMPLE HEY6_0.1-0.3 RECEIVED AS 0.0-0.3. 2 BAGS RECEVIED FOR HEY4_0.4-0.5 AND SAMPLE HEY3_0.4-0.5 NOT RECEIVED. (POSSIBLY 1 IS MISLABELLED) SAMPLE HEY2_0.4-0.5 RECEIVED AS 0.6-0.7 AND SAMPLE HEY1_0.4-0.5 RECEIVED AS 0.4-0.7

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Savini Suduweli on phone : or by email: SaviniSuduweli@eurofins.com

Results will be delivered electronically via email to Bryden Tiddy - bryden.tiddy@coffey.com.

Note: A copy of these results will also be delivered to the general Tetra Tech Coffey Pty Ltd VIC email address.

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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19/8 Lewalan Street
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NATA# 1261 Site# 20794

Newcastle
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NATA# 1261
Site# 25079 & 25289

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NATA# 2377 Site# 2370

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

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Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: Tetra Tech Coffey Pty Ltd VIC
Address: Level 11, 2 Riverside Quay,
Southbank
VIC 3006

Order No.:
Report #: 971775
Phone: 03 9290 7000
Fax:

Received: Mar 10, 2023 9:06 AM
Due: Mar 20, 2023
Priority: 5 Day
Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	HEY7_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033594		X						
2	HEY7_0.5-0.6	Mar 08, 2023		Soil	M23-Ma0033595		X						
3	QC01	Mar 08, 2023		Soil	M23-Ma0033596		X						
4	HEY7_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033597		X						
5	HEY7_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033598			X		X			
6	HEY8_0.0-0.3	Mar 08, 2023		Soil	M23-Ma0033599		X						
7	HEY8_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0033600		X						
8	HEY8_0.6-0.7	Mar 08, 2023		Soil	M23-Ma0033601		X						
9	HEY8_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033602		X						
10	HEY8_1.3-1.4	Mar 08, 2023		Soil	M23-Ma0033603			X		X			
11	HEY6_0.0-0.3	Mar 08, 2023		Soil	M23-Ma0033604		X						
12	QC03	Mar 08, 2023		Soil	M23-Ma0033605		X						

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
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NATA# 1261 Site# 18217

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Tel: +61 2 6113 8091
NATA# 1261 Site# 25466

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NATA# 1261 Site# 20794

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Mayfield West NSW 2304
Tel: +61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

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Company Name: Tetra Tech Coffey Pty Ltd VIC
Address: Level 11, 2 Riverside Quay,
Southbank
VIC 3006

Order No.:
Report #: 971775
Phone: 03 9290 7000
Fax:

Received: Mar 10, 2023 9:06 AM
Due: Mar 20, 2023
Priority: 5 Day
Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
13	HEY6_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0033606		X						
14	HEY6_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033607		X						
15	HEY6_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033608			X		X			
16	HEY5_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033609		X						
17	HEY5_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0033610		X						
18	HEY5_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033611		X						
19	HEY5_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033612		X						
20	HEY4_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033613		X						
21	HEY4_0.4-0.5 (A)	Mar 08, 2023		Soil	M23-Ma0033614		X						
22	HEY4_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033615			X		X			
23	HEY4_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033616			X		X			
24	HEY3_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033617		X						
25	HEY3_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033618			X		X			
26	HEY3_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033619			X		X			

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Received: Mar 10, 2023 9:06 AM
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Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
27	QC05	Mar 08, 2023		Soil	M23-Ma0033620			X		X			
28	HEY2_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033621		X						
29	HEY2_0.6-0.7	Mar 08, 2023		Soil	M23-Ma0033622		X						
30	HEY2_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033623			X		X			
31	HEY1_0.0-0.2	Mar 08, 2023		Soil	M23-Ma0033624		X						
32	HEY1_0.4-0.7	Mar 08, 2023		Soil	M23-Ma0033625		X						
33	HEY1_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0033626			X		X			
34	HEY1_1.4-1.5	Mar 08, 2023		Soil	M23-Ma0033627			X		X			
35	HEY_SW2	Mar 08, 2023		Water	M23-Ma0033628						X		
36	HEY_SW1	Mar 08, 2023		Water	M23-Ma0033629						X		
37	QC09	Mar 08, 2023		Water	M23-Ma0033630						X		
38	RB01	Mar 08, 2023		Water	M23-Ma0033631						X		
39	TB01	Mar 08, 2023		Water	M23-Ma0033632								X
40	SP2_01	Mar 08, 2023		Soil	M23-Ma0033633				X		X		
41	SP2_02	Mar 08, 2023		Soil	M23-Ma0033634				X			X	

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Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
42	SP2_03	Mar 08, 2023		Soil	M23-Ma0033635				X			X	
43	SP3_01	Mar 08, 2023		Soil	M23-Ma0033636				X			X	
44	SP8_01	Mar 08, 2023		Soil	M23-Ma0033637				X			X	
45	SP8_02	Mar 08, 2023		Soil	M23-Ma0033638				X			X	
46	SP9_01	Mar 08, 2023		Soil	M23-Ma0033639				X		X		
47	SP9_02	Mar 08, 2023		Soil	M23-Ma0033640				X			X	
48	SP9_03	Mar 08, 2023		Soil	M23-Ma0033641				X			X	
49	SP9_04	Mar 08, 2023		Soil	M23-Ma0033642				X			X	
50	SP5_01	Mar 08, 2023		Soil	M23-Ma0033643				X		X		
51	SP5_02	Mar 08, 2023		Soil	M23-Ma0033644				X			X	
52	SP5_03	Mar 08, 2023		Soil	M23-Ma0033645				X			X	
53	SP10_01	Mar 08, 2023		Soil	M23-Ma0033646				X		X		
54	SP10_02	Mar 08, 2023		Soil	M23-Ma0033647				X			X	
55	SP10_03	Mar 08, 2023		Soil	M23-Ma0033648				X			X	
56	QC07	Mar 08, 2023		Soil	M23-Ma0033649				X			X	

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Received: Mar 10, 2023 9:06 AM
Due: Mar 20, 2023
Priority: 5 Day
Contact Name: Bryden Tiddy

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Vic EPA Short Screen	Eurofins Suite B7	BTEXN and Volatile TRH
Melbourne Laboratory - NATA # 1261 Site # 1254						X			X	X	X	X	X
Brisbane Laboratory - NATA # 1261 Site # 20794							X	X	X	X			
57	HEY4_0.4-0.5 (B)	Mar 08, 2023		Soil	M23-Ma0033692	X							
Test Counts						1	23	11	28	28	8	13	1

Tetra Tech Coffey Pty Ltd VIC
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NATA Accredited
Accreditation Number 1261
Site Number 20794

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Ed Grinter**

Report **975268-S**
Project name MARINUS LINK - HYPERBRIDGE
Project ID 754-MELEN215878
Received Date Mar 24, 2023

Client Sample ID			**HEY7_0.9-1.0**	**HEY8_0.4-0.5**	**HEY8_0.9-1.0**	**HEY6_0.4-0.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**M23-Ma0059840**	**M23-Ma0059841**	**M23-Ma0059842**	**M23-Ma0059843**
Date Sampled			**Mar 08, 2023**	**Mar 08, 2023**	**Mar 08, 2023**	**Mar 08, 2023**
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.6	5.9	5.2	4.9
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	48	2.7	6.0	22
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.077	0.004	0.010	0.036
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	0.060	0.011	0.011	0.008
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	37	7.1	6.6	5.1
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	N/A	N/A	N/A	N/A
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	N/A	N/A	N/A
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	0.14	< 0.02	0.02	0.04
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	85	< 10	13	27
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	6.4	< 1	< 1	2.1
Extraneous Material						
<2mm Fraction	0.005	g	46	86	73	61
>2mm Fraction	0.005	g	< 0.005	< 0.005	5.7	16
Analysed Material	0.1	%	100	100	93	80
Extraneous Material	0.1	%	< 0.1	< 0.1	7.2	20
Sample Properties						
% Moisture	1	%	15	4.2	5.2	6.5

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Chromium Reducible Sulfur Suite			
Chromium Suite	Brisbane	Mar 27, 2023	6 Week
- Method: LTM-GEN-7070 Chromium Reducible Sulfur Suite			
Extraneous Material	Brisbane	Mar 27, 2023	6 Week
- Method: LTM-GEN-7050/7070			
% Moisture	Brisbane	Mar 24, 2023	14 Days
- Method: LTM-GEN-7080 Moisture			

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Phone: 03 9290 7000
Fax:

Received: Mar 24, 2023 4:33 PM
Due: Mar 29, 2023
Priority: 2 Day
Contact Name: Ed Grinter

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						Chromium Reducible Sulfur Suite	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	HEY7_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0059840	X	X
2	HEY8_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0059841	X	X
3	HEY8_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0059842	X	X
4	HEY6_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0059843	X	X
Test Counts						4	4

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Actual Acidity (NLM-3.2)							
pH-KCL (NLM-3.1)	%	99			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)	%	83			80-120	Pass	
LCS - % Recovery							
Potential Acidity - Chromium Reducible Sulfur							
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)	%	107			80-120	Pass	
LCS - % Recovery							
Extractable Sulfur							
HCl Extractable Sulfur	%	98			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	M23-Ma0059841	CP	pH Units	5.9	5.9	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	M23-Ma0059841	CP	mol H+/t	2.7	2.5	5.5	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	M23-Ma0059841	CP	% pyrite S	0.004	0.004	5.5	30%	Pass	
Duplicate									
Potential Acidity - Chromium Reducible Sulfur				Result 1	Result 2	RPD			
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)	M23-Ma0059841	CP	% S	0.011	0.010	<1	20%	Pass	
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	M23-Ma0059841	CP	mol H+/t	7.1	6.4	9.4	30%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	M23-Ma0059841	CP	% S	N/A	N/A	N/A	30%	Pass	
HCl Extractable Sulfur	M23-Ma0059841	CP	% S	N/A	N/A	N/A	20%	Pass	
Duplicate									
Retained Acidity (S-NAS)				Result 1	Result 2	RPD			
Net Acid soluble sulfur (SNAS) NLM-4.1	M23-Ma0059841	CP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (s-SNAS) NLM-4.1	M23-Ma0059841	CP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (a-SNAS) NLM-4.1	M23-Ma0059841	CP	mol H+/t	N/A	N/A	N/A	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	M23-Ma0059841	CP	% CaCO3	N/A	N/A	N/A	20%	Pass	
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)	M23-Ma0059841	CP	% S	N/A	N/A	N/A	30%	Pass	
ANC Fineness Factor	M23-Ma0059841	CP	factor	1.5	1.5	<1	30%	Pass	
Duplicate									
Net Acidity (Including ANC)				Result 1	Result 2	RPD			
CRS Suite - Net Acidity - NASSG (Including ANC)	M23-Ma0059841	CP	% S	< 0.02	< 0.02	<1	30%	Pass	
CRS Suite - Net Acidity - NASSG (Including ANC)	M23-Ma0059841	CP	mol H+/t	< 10	< 10	<1	30%	Pass	
CRS Suite - Liming Rate - NASSG (Including ANC)	M23-Ma0059841	CP	kg CaCO3/t	< 1	< 1	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-Ma0059843	CP	%	6.5	6.5	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
S01	Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil' multiply 'reported results' x 'wet bulk density of soil in t/m3'
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5
S03	Acid Neutralising Capacity is only required if the pHKCl if greater than or equal to pH 6.5
S04	Acid Sulfate Soil Samples have a 24 hour holding time unless frozen or dried within that period

Authorised by:

Savini Suduweli	Analytical Services Manager
Jonathon Angell	Senior Analyst-Sample Properties
Jonathon Angell	Senior Analyst-SPOCAS

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

RE: Eurofins Test Results, Invoice - Report 971775 : Site MARINUS LINK - HYPERBRIDGE (754-MELEN215878)

Harry Bacalis <HarryBacalis@eurofins.com>

Fri 3/24/2023 4:33 PM

To: Grinter, Ed <Ed.Grinter@tetratech.com>;Tiddy, Bryden <Bryden.Tiddy@tetratech.com>

Cc: Rodden, Jamie <JAMIE.RODDEN@tetratech.com>;Savini Suduweli Kondage <SaviniSuduweli@eurofins.com>;#AU_CAU001_EnviroSampleVic <EnviroSampleVic@eurofins.com>

INFO: INTERNAL EMAIL - Sent from your own Eurofins email domain.

Thanks Ed

Tyrone – 2 DAY TAT – You will need to liaise with Brisbane regarding this one

Kind regards,

Harry Bacalis
Phone: +61 3 8564 5064
Mobile: +61 438 858 924
Email: HarryBacalis@eurofins.com

#971775 268
24/3/23

From: Grinter, Ed <Ed.Grinter@tetratech.com>
Sent: Friday, 24 March 2023 4:28 PM
To: Harry Bacalis <HarryBacalis@eurofins.com>; Tiddy, Bryden <Bryden.Tiddy@tetratech.com>
Cc: Rodden, Jamie <JAMIE.RODDEN@tetratech.com>; Savini Suduweli Kondage <SaviniSuduweli@eurofins.com>; #AU_CAU001_EnviroSampleVic <EnviroSampleVic@eurofins.com>
Subject: RE: Eurofins Test Results, Invoice - Report 971775 : Site MARINUS LINK - HYPERBRIDGE (754-MELEN215878)

CAUTION: EXTERNAL EMAIL - Sent from an email domain that is not formally trusted by Eurofins.

Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Hi Harry,

Could I please get the following samples analysed for the CrS suite on a 48hr TAT:

HEY7_0.9-1.0	Ma 33597
HEY8_0.4-0.5	600
HEY8_0.9-1.0	602
HEY6_0.4-0.5	606

BRIS.

Kind regards,

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

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NATA# 1261
Site# 25079 & 25289

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IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Sample Receipt Advice

Company name:	Tetra Tech Coffey Pty Ltd VIC
Contact name:	Ed Grinter
Project name:	MARINUS LINK - HYPERBRIDGE
Project ID:	754-MELEN215878
Turnaround time:	2 Day
Date/Time received	Mar 24, 2023 4:33 PM
Eurofins reference	975268

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✗	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Savini Suduweli on phone : or by email: SaviniSuduweli@eurofins.com

Results will be delivered electronically via email to Ed Grinter - Ed.Grinter@tetratech.com.

Note: A copy of these results will also be delivered to the general Tetra Tech Coffey Pty Ltd VIC email address.

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

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ABN: 50 005 085 521

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NATA# 1261
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IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: Tetra Tech Coffey Pty Ltd VIC
Address: Level 11, 2 Riverside Quay,
Southbank
VIC 3006

Order No.:
Report #: 975268
Phone: 03 9290 7000
Fax:

Received: Mar 24, 2023 4:33 PM
Due: Mar 29, 2023
Priority: 2 Day
Contact Name: Ed Grinter

Project Name: MARINUS LINK - HYPERBRIDGE
Project ID: 754-MELEN215878

Eurofins Analytical Services Manager : Savini Suduweli

Sample Detail						Chromium Reducible Sulfur Suite	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	HEY7_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0059840	X	X
2	HEY8_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0059841	X	X
3	HEY8_0.9-1.0	Mar 08, 2023		Soil	M23-Ma0059842	X	X
4	HEY6_0.4-0.5	Mar 08, 2023		Soil	M23-Ma0059843	X	X
Test Counts						4	4

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2304527**	Page	: 1 of 11
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: JAMIE RODDEN	Contact	: Graeme Jablonskas
Address	: LEVEL 1 23 WEST FYANS STREET NEWTOWN 3220	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9609
Project	: 754-MELEN215878	Date Samples Received	: 15-Mar-2023 11:40
Order number	: ----	Date Analysis Commenced	: 16-Mar-2023
C-O-C number	: ----	Issue Date	: 23-Mar-2023 16:14
Sampler	: JAMIE RODDEN		
Site	:		
Quote number	: EN/222		
No. of samples received	: 5		
No. of samples analysed	: 5		

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.

Signatories	*Position*	*Accreditation Category*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC 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 Contract 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.

- 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.
- 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, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane 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.
- ASS: EA033 (CRS Suite):Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA033 (CRS Suite): ANC not required because pH KCl less than 6.5
- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC02	QC04	QC06	QC08	----
			Sampling date / time	08-Mar-2023 00:00	08-Mar-2023 00:00	08-Mar-2023 00:00	08-Mar-2023 00:00	----
Compound	CAS Number	LOR	Unit	EM2304527-001	EM2304527-002	EM2304527-003	EM2304527-004	--------
				Result	Result	Result	Result	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	----	**6.2**	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	**5**	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	<0.02	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	----	**0.009**	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	<10	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	**1.5**	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	<0.02	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	**10**	----	----
Liming Rate	----	1	kg CaCO3/t	----	----	<1	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	<0.02	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	**10**	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	<1	----	----
EA037: Ass Field Screening Analysis								
ø pH (F)	----	0.1	pH Unit	**5.5**	**6.2**	----	----	----
ø pH (Fox)	----	0.1	pH Unit	**2.8**	**4.5**	----	----	----
ø Reaction Rate	----	1	-	**3**	**2**	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	----	----	----	**12.2**	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	----	<5	----
Cadmium	7440-43-9	1	mg/kg	----	----	----	<1	----
Chromium	7440-47-3	2	mg/kg	----	----	----	**50**	----
Copper	7440-50-8	5	mg/kg	----	----	----	**18**	----
Lead	7439-92-1	5	mg/kg	----	----	----	**14**	----
Nickel	7440-02-0	2	mg/kg	----	----	----	**29**	----
Zinc	7440-66-6	5	mg/kg	----	----	----	**58**	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	**0.1**	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC02	QC04	QC06	QC08	----
			Sampling date / time	08-Mar-2023 00:00	08-Mar-2023 00:00	08-Mar-2023 00:00	08-Mar-2023 00:00	----
Compound	CAS Number	LOR	Unit	EM2304527-001	EM2304527-002	EM2304527-003	EM2304527-004	--------
				Result	Result	Result	Result	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	----	----	----	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	<10	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	<50	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	<100	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	----	----	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	----	----	<10	----
>C10 - C16 Fraction	----	50	mg/kg	----	----	----	<50	----
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	<100	----
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	----	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	<50	----
EP080: BTEXN								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC02	QC04	QC06	QC08	----
			Sampling date / time	08-Mar-2023 00:00	08-Mar-2023 00:00	08-Mar-2023 00:00	08-Mar-2023 00:00	----
Compound	CAS Number	LOR	Unit	EM2304527-001	EM2304527-002	EM2304527-003	EM2304527-004	--------
				Result	Result	Result	Result	----
EP080: BTEXN - Continued								
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	<0.5	----
^ **Sum of BTEX**	----	0.2	mg/kg	----	----	----	<0.2	----
^ **Total Xylenes**	----	0.5	mg/kg	----	----	----	<0.5	----
Naphthalene	91-20-3	1	mg/kg	----	----	----	<1	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	----	----	----	**90.5**	----
2-Chlorophenol-D4	93951-73-6	0.5	%	----	----	----	**77.4**	----
2.4.6-Tribromophenol	118-79-6	0.5	%	----	----	----	**80.4**	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	----	----	----	**93.3**	----
Anthracene-d10	1719-06-8	0.5	%	----	----	----	**116**	----
4-Terphenyl-d14	1718-51-0	0.5	%	----	----	----	**102**	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	----	----	----	**78.7**	----
Toluene-D8	2037-26-5	0.2	%	----	----	----	**75.5**	----
4-Bromofluorobenzene	460-00-4	0.2	%	----	----	----	**89.2**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC10	----	----	----	----
				Sampling date / time	08-Mar-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2304527-005	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		**0.001**	----	----	----	----
Copper	7440-50-8	0.001	mg/L		**0.004**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.002**	----	----	----	----
Lead	7439-92-1	0.001	mg/L		**0.002**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.009**	----	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	----	----
Tin	7440-31-5	0.001	mg/L		<0.001	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
^ **Total Polychlorinated biphenyls**	----	1	µg/L		<1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC10	----	----	----	----
				Sampling date / time	08-Mar-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2304527-005	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	----	----	----	----
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC10	----	----	----	----
				Sampling date / time	08-Mar-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2304527-005	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		**450**	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		**450**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		**430**	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		**430**	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ Total Xylenes	----	2	µg/L		<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		**76.2**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**78.4**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC10	----	----	----	----
				Sampling date / time	08-Mar-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2304527-005	--------	--------	--------	--------
					Result	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate - Continued									
DEF	78-48-8	0.5	%		**83.3**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**13.6**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**34.0**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**92.4**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**71.8**	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		**83.5**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		**76.8**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**105**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**98.9**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**119**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	41	125
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	117
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	51	127
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

Inter-Laboratory Testing

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

(SOIL) EA037: Ass Field Screening Analysis

(SOIL) EA033-B: Potential Acidity

(SOIL) EA033-C: Acid Neutralising Capacity

(SOIL) EA033-D: Retained Acidity

(SOIL) EA033-A: Actual Acidity

(SOIL) EA033-E: Acid Base Accounting

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2304527**	Page	: 1 of 11
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: JAMIE RODDEN	Contact	: Graeme Jablonskas
Address	: LEVEL 1 23 WEST FYANS STREET NEWTOWN 3220	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9609
Project	: 754-MELEN215878	Date Samples Received	: 15-Mar-2023
Order number	: ----	Date Analysis Commenced	: 16-Mar-2023
C-O-C number	: ----	Issue Date	: 23-Mar-2023
Sampler	: JAMIE RODDEN		
Site	:		
Quote number	: EN/222		
No. of samples received	: 5		
No. of samples analysed	: 5		

ilac-MRA NATA
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*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Layla Hafner	Acid Sulphate Soils - Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Nancy Wang	2IC Organic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC 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: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4935717)									
EM2304346-076	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	41	45	8.5	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	21	23	9.0	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	10	11	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	11	12	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	7	9	18.2	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	24	25	0.0	No Limit
EM2304346-091	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	50	51	2.8	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	26	28	8.7	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	12	12	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	14	15	7.8	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	10	12	21.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	27	28	3.8	No Limit
EA033-A: Actual Acidity (QC Lot: 4945932)									
EM2303971-003	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	2	<2	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	6.4	6.4	0.0	0% - 20%
EM2304031-005	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	8.0	7.9	0.0	0% - 20%
EA033-B: Potential Acidity (QC Lot: 4945932)									
EM2303971-003	Anonymous	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	0.512	0.519	1.3	0% - 20%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA033-B: Potential Acidity (QC Lot: 4945932) - continued									
EM2303971-003	Anonymous	EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	320	324	1.3	0% - 20%
EM2304031-005	Anonymous	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	0.075	0.076	0.0	0% - 50%
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	47	47	0.0	No Limit
EA037: Ass Field Screening Analysis (QC Lot: 4937828)									
EB2307617-001	Anonymous	EA037: pH (F)	----	0.1	pH Unit	5.4	5.4	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	3.3	3.2	0.0	0% - 20%
EM2304527-001	QC02	EA037: pH (F)	----	0.1	pH Unit	5.5	5.6	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	2.8	2.7	0.0	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4933306)									
EM2304498-051	Anonymous	EA055: Moisture Content	----	0.1	%	14.0	14.3	2.4	0% - 50%
EM2304527-004	QC08	EA055: Moisture Content	----	0.1	%	12.2	11.4	6.3	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4935718)									
EM2304346-076	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EM2304346-091	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4934867)									
EM2304498-058	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4932664)									
EM2304346-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EM2304346-037	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4934865)									
EM2304346-072	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit

Sub-Matrix: **SOIL**

				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: 4934865) - continued									
EM2304346-072	Anonymous	EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EM2304498-058	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4932664)									
EM2304346-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EM2304346-037	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4934865)									
EM2304346-072	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EM2304498-058	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 4932664)									
EM2304346-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EM2304346-037	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 4944730)									
EM2304478-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.068	0.063	7.0	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.001	0.0	No Limit

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 (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 4944730) - continued									
EM2304478-001	Anonymous	EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.005	<0.005	0.0	No Limit
EM2304590-003	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.109	0.109	0.0	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.016	0.016	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4944731)									
EM2304527-005	QC10	EG020B-T: Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4942177)									
EM2304104-011	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EM2304342-003	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 4937055)									
EM2304486-002	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EM2304502-019	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4939255)									
EM2304631-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EM2304780-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4939255)									
EM2304631-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EM2304780-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4939255)									
EM2304631-001	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	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		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
EM2304780-002	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	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		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

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: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4935717)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	105	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.23 mg/kg	65.6	50.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	105	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	95.2	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.4 mg/kg	95.0	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	100	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	75.8	70.0	130
EA033-A: Actual Acidity (QCLot: 4945932)								
EA033: pH KCl (23A)	----	----	pH Unit	----	4.4 pH Unit	98.0	91.0	107
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	16 mole H+ / t	120	70.0	124
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity (QCLot: 4945932)								
EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	0.246 % S	105	77.0	121
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4935718)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	85.9	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4934867)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	106	85.7	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	101	81.0	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	107	83.6	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	102	81.3	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	107	79.4	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	114	81.7	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	107	78.3	124
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	110	79.9	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	106	76.9	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	117	80.9	130
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	99.9	70.0	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	102	80.4	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	110	70.2	123
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	96.9	67.9	122
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	97.4	65.8	123
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	100	65.8	127

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4932664)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	82.0	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4934865)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	770 mg/kg	108	75.0	128
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	2860 mg/kg	97.8	82.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1540 mg/kg	99.5	82.4	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4932664)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	80.1	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4934865)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1170 mg/kg	95.8	77.0	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	3830 mg/kg	98.3	81.5	120
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	290 mg/kg	90.2	73.3	137
EP080: BTEXN (QCLot: 4932664)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	84.2	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	84.0	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	82.9	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	85.6	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	88.0	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	86.4	61.8	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020T: Total Metals by ICP-MS (QCLot: 4944730)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	107	89.2	115
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	103	86.4	115
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	103	86.9	112
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	105	86.9	111
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	104	88.3	112
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	104	87.9	113
EG020A-T: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	110	91.2	118
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	109	86.7	117
EG020T: Total Metals by ICP-MS (QCLot: 4944731)								
EG020B-T: Silver	7440-22-4	0.001	mg/L	<0.001	0.02 mg/L	110	83.3	117
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4942177)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	115	73.4	119
EK040P: Fluoride by PC Titrator (QCLot: 4937055)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	99.8	80.8	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4932356)								
EP066: Total Polychlorinated biphenyls	----	1	µg/L	<1	10 µg/L	110	52.0	136
EP068A: Organochlorine Pesticides (OC) (QCLot: 4932354)								
EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	2.5 µg/L	103	50.6	119
EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	2.5 µg/L	97.8	44.2	117
EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	2.5 µg/L	108	53.7	119
EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	2.5 µg/L	106	47.7	117
EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	2.5 µg/L	107	52.5	117
EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	2.5 µg/L	101	46.9	118
EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	2.5 µg/L	94.9	48.0	115
EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	2.5 µg/L	104	51.1	119
EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	2.5 µg/L	104	48.4	120
EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	2.5 µg/L	98.4	50.1	122
EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	2.5 µg/L	104	51.0	118
EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	2.5 µg/L	105	48.4	116
EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	2.5 µg/L	104	49.3	116
EP068: Endrin	72-20-8	0.5	µg/L	<0.5	2.5 µg/L	107	47.1	130
EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	2.5 µg/L	109	51.6	118
EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	2.5 µg/L	107	48.6	122
EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	2.5 µg/L	106	49.4	128
EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	2.5 µg/L	104	49.1	123
EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	2.5 µg/L	106	45.6	126
EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	2.5 µg/L	107	52.8	117
EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	2.5 µg/L	106	47.1	126
EP075(SIM)A: Phenolic Compounds (QCLot: 4932355)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	42.3	17.8	51.1
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	91.2	43.2	107
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	81.6	39.2	98.7
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	76.0	35.5	91.3
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	96.1	34.4	124
EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	93.4	44.4	112
EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	98.3	45.3	115
EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	98.5	44.3	116
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	101	46.6	117
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	104	38.2	122
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	105	43.2	123
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	128	48.1	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4932355)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	95.0	42.8	114

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4932355) - continued								
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	96.6	48.6	119
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	97.0	47.0	117
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	101	49.5	119
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	102	49.4	121
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	99.9	48.4	122
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	105	50.3	124
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	106	50.0	126
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	105	49.4	127
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	104	48.7	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	98.8	54.5	134
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	104	56.1	134
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	104	55.6	135
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	102	54.4	126
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	102	54.5	126
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	102	54.4	126
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4932352)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	4460 µg/L	76.2	47.2	122
EP071: C15 - C28 Fraction	----	100	µg/L	<100	14300 µg/L	90.2	52.9	131
EP071: C29 - C36 Fraction	----	50	µg/L	<50	7300 µg/L	96.3	50.4	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4939255)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	108	66.2	134
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4932352)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	6090 µg/L	81.4	49.1	125
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	19400 µg/L	88.0	51.6	128
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1300 µg/L	79.6	47.2	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4939255)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	108	66.2	132
EP080: BTEXN (QCLot: 4939255)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	105	68.8	127
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	110	72.9	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	106	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	109	75.9	134
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	120	68.3	131

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: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4935717)							
EM2304346-077	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	102	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	94.2	79.7	116
		EG005T: Chromium	7440-47-3	50 mg/kg	106	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	100	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	92.1	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	108	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	85.4	80.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4935718)							
EM2304346-077	Anonymous	EG035T: Mercury	7439-97-6	0.5 mg/kg	96.0	76.0	116
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4934867)							
EM2304498-060	Anonymous	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	93.3	77.2	116
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	104	65.5	136
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4932664)							
EM2304346-005	Anonymous	EP080: C6 - C9 Fraction	----	28 mg/kg	69.5	33.4	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4934865)							
EM2304346-068	Anonymous	EP071: C10 - C14 Fraction	----	770 mg/kg	96.1	71.2	125
		EP071: C15 - C28 Fraction	----	2860 mg/kg	87.6	75.6	122
		EP071: C29 - C36 Fraction	----	1540 mg/kg	89.7	78.0	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4932664)							
EM2304346-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	66.8	30.8	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4934865)							
EM2304346-068	Anonymous	EP071: >C10 - C16 Fraction	----	1170 mg/kg	84.9	72.2	128
		EP071: >C16 - C34 Fraction	----	3830 mg/kg	88.4	76.5	119
		EP071: >C34 - C40 Fraction	----	290 mg/kg	82.6	66.8	138
EP080: BTEXN (QCLot: 4932664)							
EM2304346-005	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	88.0	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	90.6	57.1	131

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4944730)							
EM2304478-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	99.2	82.0	123
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	101	81.8	123

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 4944730) - continued							
EM2304478-001	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	102	78.9	119
		EG020A-T: Copper	7440-50-8	1 mg/L	102	80.4	118
		EG020A-T: Lead	7439-92-1	1 mg/L	103	80.5	121
		EG020A-T: Nickel	7440-02-0	1 mg/L	99.9	80.0	118
		EG020A-T: Zinc	7440-66-6	1 mg/L	99.0	74.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4942177)							
EM2304225-030	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	116	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 4937055)							
EM2304486-005	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	98.5	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4939255)							
EM2304702-001	Anonymous	EP080: C6 - C9 Fraction	----	280 µg/L	87.4	33.9	126
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4939255)							
EM2304702-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	83.6	34.0	122
EP080: BTEXN (QCLot: 4939255)							
EM2304702-001	Anonymous	EP080: Benzene	71-43-2	20 µg/L	109	56.3	133
		EP080: Toluene	108-88-3	20 µg/L	107	60.4	132

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2304527**	Page	: 1 of 10
Client	: **TETRA TECH COFFEY PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: JAMIE RODDEN	Telephone	: +6138549 9609
Project	: 754-MELEN215878	Date Samples Received	: 15-Mar-2023
Site	:	Issue Date	: 23-Mar-2023
Sampler	: JAMIE RODDEN	No. of samples received	: 5
Order number	: ----	No. of samples analysed	: 5

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP066: Polychlorinated Biphenyls (PCB)						
Amber Glass Bottle - Unpreserved						
QC10	16-Mar-2023	15-Mar-2023	**1**	----	----	----
EP068A: Organochlorine Pesticides (OC)						
Amber Glass Bottle - Unpreserved						
QC10	16-Mar-2023	15-Mar-2023	**1**	----	----	----
EP075(SIM)A: Phenolic Compounds						
Amber Glass Bottle - Unpreserved						
QC10	16-Mar-2023	15-Mar-2023	**1**	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
Amber Glass Bottle - Unpreserved						
QC10	16-Mar-2023	15-Mar-2023	**1**	----	----	----
EP080/071: Total Petroleum Hydrocarbons						
Amber Glass Bottle - Unpreserved						
QC10	16-Mar-2023	15-Mar-2023	**1**	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions						
Amber Glass Bottle - Unpreserved						
QC10	16-Mar-2023	15-Mar-2023	**1**	----	----	----

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	1	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	0	1	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	0	1	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	9	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	9	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: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-A: Actual Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033)							
QC06	**08-Mar-2023**	**23-Mar-2023**	07-Mar-2024	✓	**23-Mar-2023**	21-Jun-2023	✓
EA033-B: Potential Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033)							
QC06	**08-Mar-2023**	**23-Mar-2023**	07-Mar-2024	✓	**23-Mar-2023**	21-Jun-2023	✓
EA033-C: Acid Neutralising Capacity							
Snap Lock Bag - frozen on receipt at ALS (EA033)							
QC06	**08-Mar-2023**	**23-Mar-2023**	07-Mar-2024	✓	**23-Mar-2023**	21-Jun-2023	✓
EA033-D: Retained Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033)							
QC06	**08-Mar-2023**	**23-Mar-2023**	07-Mar-2024	✓	**23-Mar-2023**	21-Jun-2023	✓
EA033-E: Acid Base Accounting							
Snap Lock Bag - frozen on receipt at ALS (EA033)							
QC06	**08-Mar-2023**	**23-Mar-2023**	07-Mar-2024	✓	**23-Mar-2023**	21-Jun-2023	✓
EA037: Ass Field Screening Analysis							
Snap Lock Bag - frozen on receipt at ALS (EA037)							
QC02, QC04	**08-Mar-2023**	**20-Mar-2023**	04-Sep-2023	✓	**20-Mar-2023**	04-Sep-2023	✓
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
QC08	**08-Mar-2023**	**----**	----	----	**16-Mar-2023**	22-Mar-2023	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
QC08	**08-Mar-2023**	**17-Mar-2023**	04-Sep-2023	✓	**17-Mar-2023**	04-Sep-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
QC08	**08-Mar-2023**	**17-Mar-2023**	05-Apr-2023	✓	**18-Mar-2023**	05-Apr-2023	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
QC08	**08-Mar-2023**	**17-Mar-2023**	22-Mar-2023	✓	**17-Mar-2023**	26-Apr-2023	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
QC08	**08-Mar-2023**	**16-Mar-2023**	22-Mar-2023	✓	**17-Mar-2023**	22-Mar-2023	✓
Soil Glass Jar - Unpreserved (EP071)							
QC08	**08-Mar-2023**	**17-Mar-2023**	22-Mar-2023	✓	**20-Mar-2023**	26-Apr-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
QC08	**08-Mar-2023**	**16-Mar-2023**	22-Mar-2023	✓	**17-Mar-2023**	22-Mar-2023	✓
Soil Glass Jar - Unpreserved (EP071)							
QC08	**08-Mar-2023**	**17-Mar-2023**	22-Mar-2023	✓	**20-Mar-2023**	26-Apr-2023	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
QC08	**08-Mar-2023**	**16-Mar-2023**	22-Mar-2023	✓	**17-Mar-2023**	22-Mar-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020B-T)							
QC10	**08-Mar-2023**	**22-Mar-2023**	04-Sep-2023	✓	**22-Mar-2023**	04-Sep-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
QC10	**08-Mar-2023**	**----**	----	----	**21-Mar-2023**	05-Apr-2023	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
QC10	**08-Mar-2023**	**----**	----	----	**20-Mar-2023**	05-Apr-2023	✓
EP066: Polychlorinated Biphenyls (PCB)							
Amber Glass Bottle - Unpreserved (EP066)							
QC10	**08-Mar-2023**	**16-Mar-2023**	15-Mar-2023	×	**17-Mar-2023**	25-Apr-2023	✓
EP068A: Organochlorine Pesticides (OC)							
Amber Glass Bottle - Unpreserved (EP068)							
QC10	**08-Mar-2023**	**16-Mar-2023**	15-Mar-2023	×	**17-Mar-2023**	25-Apr-2023	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
QC10	**08-Mar-2023**	**16-Mar-2023**	15-Mar-2023	×	**17-Mar-2023**	25-Apr-2023	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
QC10	**08-Mar-2023**	**16-Mar-2023**	15-Mar-2023	×	**17-Mar-2023**	25-Apr-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
QC10	**08-Mar-2023**	**16-Mar-2023**	15-Mar-2023	×	**16-Mar-2023**	25-Apr-2023	✓
Clear glass VOC vial - HCl (EP080)							
QC10	**08-Mar-2023**	**20-Mar-2023**	22-Mar-2023	✓	**21-Mar-2023**	22-Mar-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
QC10	**08-Mar-2023**	**16-Mar-2023**	15-Mar-2023	×	**16-Mar-2023**	25-Apr-2023	✓
Clear glass VOC vial - HCl (EP080)							
QC10	**08-Mar-2023**	**20-Mar-2023**	22-Mar-2023	✓	**21-Mar-2023**	22-Mar-2023	✓
EP080: BTEXN							
Clear glass VOC vial - HCl (EP080)							
QC10	**08-Mar-2023**	**20-Mar-2023**	22-Mar-2023	✓	**21-Mar-2023**	22-Mar-2023	✓

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: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chromium Suite for Acid Sulphate Soils	EA033	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	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	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	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	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	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	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	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	17	**5.88**	**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	
Laboratory Duplicates (DUP)							
Fluoride by Auto Titrator	EK040P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	1	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	1	**0.00**	**10.00**	×	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*	
Laboratory Duplicates (DUP) - Continued							
Polychlorinated Biphenyls (PCB)	EP066	0	1	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	9	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Fluoride by Auto Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Fluoride by Auto Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite B	EG020B-T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Fluoride by Auto Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	9	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	**6.67**	**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
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
ASS Field Screening Analysis	* EA037	SOIL	In house: Referenced to Acid Sulfate Soils Laboratory Methods Guidelines. As received samples are tested for pH field and pH fox and assessed for a reaction rating.
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. 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)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite B	EG020B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by 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).
Fluoride by Auto Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
Pesticides by GCMS	EP068	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
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)
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)

Preparation Methods	Method	Matrix	Method Descriptions
Drying only	EN020D	SOIL	In house
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

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.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

TETRA TECH COFFEY

Consigning Office: Newtown

Report Results to: Jamie Rodden Mobile: 0408651268 Email: jamie.rodden@tetratech.com

Bryden Tiddy 0409400219 bryden.tiddy@tetratech.com

Ed Grinter ed.grinter@tetratech.com

Invoices to: Lisa Marnell Phone: 9406 1000 Email:

Project No: 754-MELEN215878 Task No:

Project Name: Marinus Link - Heybridge Laboratory: Eurofins, ALS

Sampler's Name: Jamie Rodden Project Manager: Bryden Tiddy

Quote number (if different to current quoted prices):

Special Instructions: Please forward samples QC02, QC04, QC06 and QC08 to ALS. Please relabel HEY_SW3 to HEYSW1

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Analysis Request Section: CrS Suite	ASS field Test	B7: TRH/ BTEXN/ PAH/ Metals (8 inc Hg)	R6: Vic EPA Short Screen (Tas EPA Acreen)	TRH C6-C10+BTEX			HOLD					NOTES
	HEY7_0.0-0.2	8.3.2023	AM	S	1Z	Standard		X											
	HEY7_0.5-0.6	8.3.2023	AM	S	1Z	Standard		X											
	QC01	8.3.2023	AM	S	1Z	Standard		X											
1	QC02	8.3.2023	AM	S	1Z	Standard		X											Please forward to ALS
	HEY7_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X											
	HEY7_1.4-1.5	8.3.2023	AM	S	1Z	Standard	X												
	HEY8_0.0-0.3	8.3.2023	AM	S	1Z	Standard		X											
	HEY8_0.4-0.5	8.3.2023	AM	S	1Z	Standard		X											
	HYE8_0.6-0.7	8.3.2023	AM	S	1Z	Standard		X											
	HEY8_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X											
	HEY8_1.3-1.4	8.3.2023	AM	S	1Z	Standard	X												
	HEY6_0.1-0.3	8.3.2023	AM	S	1Z	Standard		X											
	QC03	8.3.2023	AM	S	1Z	Standard		X											
2	QC04	8.3.2023	AM	S	1Z	Standard		X											Please forward to ALS
	HEY6_0.4-0.5	8.3.2023	AM	S	1Z	Standard		X											
	HEY6_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X											
	HEY6_1.4-1.5	8.3.2023	AM	S	1Z, 1J	Standard	X												

Relinquished by: Emily D 15/03/23 8:00am

Received by: Richard Baez 15/03/23 — 11:40 am

Environmental Division Melbourne
Work Order Reference
EM2304527

Telephone : +61-3-8549 9600

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

COPY

	HEY5_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X																	
	HEY5_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X																	
	HEY5_0.9-1.0	8.3.2023	PM	S	1Z	Standard		X																	
	HEY5_1.4-1.5	8.3.2023	PM	S	1Z	Standard		X																	
	HEY4_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X																	
	HEY4_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X																	
	HEY4_0.9-1.0	8.3.2023	PM	S	1Z, 1J	Standard	X																		
	HEY4_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X																		
	HEY3_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X																	
	HEY3_0.4-0.5	8.3.2023	PM	S	1Z	Standard	X																		
	HEY3_0.9-1.0	8.3.2023	PM	S	1Z	Standard	X																		
	HEY3_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X																		
	QC05	8.3.2023	PM	S	1Z	Standard	X																		
3	QC06	8.3.2023	PM	S	1Z	Standard	X																		
	HEY2_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X																	
	HEY2_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X																	
	HEY2_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X																		
	HEY1_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X																	
	HEY1_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X																	
	HEY1_0.9-1.0	8.3.2023	PM	S	1Z	Standard	X																		
	HEY1_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X																		
	HEY_SW2	8.3.2023	PM	W	3p, 1a, 4v	Standard				X															
	HEY_SW3	8.3.2023	PM	W	3p, 1a, 4v	Standard				X															
	QC09	8.3.2023	PM	W	3p, 1a, 4v	Standard				X															
~~10~~	QC10	8.3.2023	PM	W	3p, 1a, 4v	Standard				X															
	RB01	8.3.2023	PM	W	3p, 1a, 2v	Standard				x															
	TB01	8.3.2023	PM	W	2v	Standard					X														
	SP2_01	8.3.2023	PM	S	1J	Standard				X															
	SP2_02	8.3.2023	PM	S	1J	Standard			x																
	SP2_03	8.3.2023	PM	S	1J	Standard			x																

Please forward to ALS

Please relabel as HEY_SW1

Please forward to ALS

Received by: Richard Baez
15/03/23 – 12:40 pm

relinquished by:
Emily D
15/03/23 8:00am

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

5

COPY

	SP3_01	8.3.2023	PM	S	1J	Standard			x		
	SP8_01	8.3.2023	PM	S	1J	Standard			x		
	SP8_02	8.3.2023	PM	S	1J	Standard			x		
	SP9_01	8.3.2023	PM	S	1J	Standard				X	
	SP9_02	8.3.2023	PM	S	1J	Standard			x		
	SP9_03	8.3.2023	PM	S	1J	Standard			x		
	SP9_04	8.3.2023	PM	S	1J	Standard			x		
	SP5_01	8.3.2023	PM	S	1J	Standard				X	
	SP5_02	8.3.2023	PM	S	1J	Standard			x		
	SP5_03	8.3.2023	PM	S	1J	Standard			x		
	SP10_01	8.3.2023	PM	S	1J	Standard				X	
	SP10_02	8.3.2023	PM	S	1J	Standard			x		
	SP10_03	8.3.2023	PM	S	1J	Standard			x		
	QC07	8.3.2023	PM	S	1J	Standard			x		
5	QC08	8.3.2023	PM	S	1J	Standard			x		Please forward to ALS

RELINQUISHED BY		RECEIVED BY		Sample Receipt Advice: (Lab Use Only)
Name:	Date:	Name:	Date:	All Samples Recieved in Good Condition ☐
Coffey	Time:	Company:	Time:	All Documentation is in Proper Order ☐
Name:	Date: →	Name:	Date:	Samples Received Properly Chilled ☐
Company:	Time:	Company:	Time:	Lab. Ref/Batch No.

***Container Type & Preservation Codes:** **P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** Sodium Thiosulfate, **NP** - No Preservative

Count

Price Per test

relinquished by:
Emily D
15/03/23 8:00am

Received by: Richard Baez - ALS
15/03/23 - 11:40

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

SCANNED

5

TETRA TECH COFFEY

Consigning Office:	Newtown			
Report Results to:	Jamie Rodden	Mobile:	0408651268	Email: jamie.rodden@tetratech.com
	Bryden Tiddy		0409400219	bryden.tiddy@tetratech.com
	Ed Grinter			ed.grinter@tetratech.com
Invoices to:	Lisa Marnell	Phone:	9406 1000	Email:

Project No:	754-MELEN215878	Task No:	
Project Name:	Marinus Link - Heybridge	Laboratory:	Eurofins, ALS
Sampler's Name:	Jamie Rodden	Project Manager:	Bryden Tiddy
Quote number (if different to current quoted prices):			
Special Instructions:	Please forward samples QC02, QC04, QC06 and QC08 to ALS. Please relabel HEY_SW3 to HEYSW1		

Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Analysis Request Section: CrS Suite	ASS field Test	B7: TRH/ BTEXN/ PAH/ Metals (8 inc Hg)	R6: Vic EPA Short Screen (Tas EPA Acreen)	TRH C6-C10+BTEX			HOLD					NOTES
	HEY7_0.0-0.2	8.3.2023	AM	S	1Z	Standard		X											
	HEY7_0.5-0.6	8.3.2023	AM	S	1Z	Standard		X											
	QC01	8.3.2023	AM	S	1Z	Standard		X											
1	QC02	8.3.2023	AM	S	1Z	Standard		X											Please forward to ALS
	HEY7_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X											
	HEY7_1.4-1.5	8.3.2023	AM	S	1Z	Standard	X												
	HEY8_0.0-0.3	8.3.2023	AM	S	1Z	Standard		X											
	HEY8_0.4-0.5	8.3.2023	AM	S	1Z	Standard		X											
	HYE8_0.6-0.7	8.3.2023	AM	S	1Z	Standard		X											
	HEY8_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X											
	HEY8_1.3-1.4	8.3.2023	AM	S	1Z	Standard	X												
	HEY6_0.1-0.3	8.3.2023	AM	S	1Z	Standard		X											
	QC03	8.3.2023	AM	S	1Z	Standard		X											
2	QC04	8.3.2023	AM	S	1Z	Standard		X											Please forward to ALS
	HEY6_0.4-0.5	8.3.2023	AM	S	1Z	Standard		X											
	HEY6_0.9-1.0	8.3.2023	AM	S	1Z	Standard		X											
	HEY6_1.4-1.5	8.3.2023	AM	S	1Z, 1J	Standard	X												

Relinquished by:
Emily D
15/03/23 8:00am

Received by: Richard Baez
15/03/23 — 11:40 am

Environmental Division
Melbourne
Work Order Reference
EM2304527

Telephone : + 61-3-8549 9600

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

5

COPY

	HEY5_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X														
	HEY5_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X														
	HEY5_0.9-1.0	8.3.2023	PM	S	1Z	Standard		X														
	HEY5_1.4-1.5	8.3.2023	PM	S	1Z	Standard		X														
	HEY4_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X														
	HEY4_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X														
	HEY4_0.9-1.0	8.3.2023	PM	S	1Z, 1J	Standard	X															
	HEY4_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X															
	HEY3_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X														
	HEY3_0.4-0.5	8.3.2023	PM	S	1Z	Standard	X															
	HEY3_0.9-1.0	8.3.2023	PM	S	1Z	Standard	X															
	HEY3_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X															
	QC05	8.3.2023	PM	S	1Z	Standard	X															
3	QC06	8.3.2023	PM	S	1Z	Standard	X															Please forward to ALS
	HEY2_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X														
	HEY2_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X														
	HEY2_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X															
	HEY1_0.0-0.2	8.3.2023	PM	S	1Z	Standard		X														
	HEY1_0.4-0.5	8.3.2023	PM	S	1Z	Standard		X														
	HEY1_0.9-1.0	8.3.2023	PM	S	1Z	Standard	X															
	HEY1_1.4-1.5	8.3.2023	PM	S	1Z	Standard	X															
	HEY_SW2	8.3.2023	PM	W	3p, 1a, 4v	Standard				X												
	HEY_SW3	8.3.2023	PM	W	3p, 1a, 4v	Standard				X												Please relabel as HEY_SW1
	QC09	8.3.2023	PM	W	3p, 1a, 4v	Standard				X												
5	QC10	8.3.2023	PM	W	3p, 1a, 4v	Standard				X												Please forward to ALS
	RB01	8.3.2023	PM	W	3p, 1a, 2v	Standard				x												
	TB01	8.3.2023	PM	W	2v	Standard					X											
	SP2_01	8.3.2023	PM	S	1J	Standard				X												
	SP2_02	8.3.2023	PM	S	1J	Standard			x													
	SP2_03	8.3.2023	PM	S	1J	Standard			x													

relinquished by:
Emily D
15/03/23 8:00am

Received by: Richard Baez
15/03/23 – 12:40 pm

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

5

COPY

	SP3_01	8.3.2023	PM	S	1J	Standard			x																						
	SP8_01	8.3.2023	PM	S	1J	Standard			x																						
	SP8_02	8.3.2023	PM	S	1J	Standard			x																						
	SP9_01	8.3.2023	PM	S	1J	Standard				X																					
	SP9_02	8.3.2023	PM	S	1J	Standard			x																						
	SP9_03	8.3.2023	PM	S	1J	Standard			x																						
	SP9_04	8.3.2023	PM	S	1J	Standard			x																						
	SP5_01	8.3.2023	PM	S	1J	Standard				X																					
	SP5_02	8.3.2023	PM	S	1J	Standard			x																						
	SP5_03	8.3.2023	PM	S	1J	Standard			x																						
	SP10_01	8.3.2023	PM	S	1J	Standard				X																					
	SP10_02	8.3.2023	PM	S	1J	Standard			x																						
	SP10_03	8.3.2023	PM	S	1J	Standard			x																						
	QC07	8.3.2023	PM	S	1J	Standard			x																						
	QC08	8.3.2023	PM	S	1J	Standard			x																						

Please forward to ALS

RELINQUISHED BY		RECEIVED BY		Sample Receipt Advice: (Lab Use Only)	
Name:	Date:	Name:	Date:	All Samples Recieved in Good Condition	☐
Coffey	Time:	Company:	Time:	All Documentation is in Proper Order	☐
Name:	Date: →	Name:	Date:	Samples Received Properly Chilled	☐
Company:	Time:	Company:	Time:	Lab. Ref/Batch No.	

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** Sodium Thiosulfate, **NP** - No Preservative

Count

Price Per test

relinquished by:
Emily D
15/03/23 8:00am

Received by : Richard Baez- ALS
15/03/23 - 11:40

APPENDIX G: QC DATA VALIDATION REPORT

DATA QUALITY ASSESSMENT REPORT

PROJECT REFERENCE: 754-MELEN215878ML

REPORT NUMBER: Heybridge_Tasmania_CSASS

LABORATORY REPORTS ASSESSED

Testing Laboratory	Report/Workorder Number
Eurofins Environment Testing	971775, 975268
Australian Laboratory Services	EM2304527

1. QUALITY CONTROL

1.1 INTRODUCTION

The steps in the sampling and analysis process are subject to natural and inherent variability, and this can affect the results produced, and the overall quality of the data sets generated. In order to minimise the effect of this, standard procedures are used for works carried out in the field, and in the laboratory. The use of such procedures represents one aspect of the quality assurance process. To measure the effectiveness of the quality assurance process, quality control samples can be tested, and other quality control tests can be conducted during the analysis of samples taken in the field.

Quality control (QC) samples and tests can be used to assess both the accuracy and the precision of the results produced.

Measures of ACCURACY provide information on how close to the true result is the reported result. For practical reasons, measures of accuracy are usually confined to the laboratory steps in the overall process.

Measures of PRECISION provide information on the variability in the results. Precision can be assessed as:

- "repeatability" or intra-laboratory variation – the degree of variation in a result when the same laboratory analyses a sample (or blind replicate) several times, and;
- "reproducibility" or inter-laboratory variation – the degree of variation in a result when a different laboratory separately analyses a sample.

In addition, blank samples can be used to assess whether extraneous materials and factors have contributed to the results obtained from the sampling and analysis process.

QC testing can be conducted covering all steps of the process (referred to as Field QC in this report), or just one portion of the process, such as the laboratory steps (referred to as Laboratory QC in this report).

1.2 FIELD QUALITY CONTROL

Precision of the sample collection, transport and analysis process is measured by the relative percent difference (RPD) between duplicate results. Acceptance targets for laboratory duplicates are dependent on matrix type, contaminant type and contaminant concentrations.

For groundwater samples, the acceptance targets for a range of contaminants are listed in Table 1-1.

Table 1-1: RPD Acceptance Targets for Contaminant / Analyte Classes

Contaminant/analyte classes	Acceptable RPD for concentrations more than 10 times the LOR	Acceptable RPD for concentrations less than 10 times the LOR
Organic and Inorganic compounds	30%	50%

For rinsate blanks and trip blanks, Tetra Tech Coffey's approach is that the concentration of any contaminant should be less than the LOR in all blank samples.

1.3 LABORATORY QUALITY CONTROL

Laboratories are accredited by the National Association of Testing Authorities, Australia (NATA) on the basis of their ability to provide quantitative evidence of their ability and competence to produce reliable results against recognised benchmarks NATA accredited laboratories are able to demonstrate the ability to produce reliable, repeatable results for a range of parameters within a range of sample matrices. Each laboratory

method used undergoes a validation process before it is adopted by the laboratory and accredited by NATA. As part of the validation process, the precision and accuracy of the method are established.

In addition, laboratories conduct their own quality control testing to indicate their performance on each reported batch of samples. The results of this testing are compared with the validated precision and accuracy.

Precision of results is measured by the Relative Percent Difference (RPD) between replicate samples selected within the laboratory. RPD is calculated in the same way as described above for Field QC.

Accuracy of results is assessed in a number of ways:

- **Reference materials**, with known concentrations of analytes are analysed with the batch of samples. The results of this analysis are compared with the established concentrations in the reference material.
- **Spike additions**. Known amounts of targeted analytes are added to the samples to be analysed, and the spiked samples are processed through the analytical process. The amount of spiked material is measured as the recovery of the added amount reported in the final result.
- **Surrogate spikes**. Known amounts of chemical compounds with similar properties to the targeted analytes are added to the samples to be analysed, and the spiked samples are processed through the analytical process. The amount of spiked material is measured as the recovery of the added amount reported in the final result.

Schedule B(3) of the National Environment Protection Measure (NEPM) for contaminated sites states that, in general, at least 70% recovery should be achievable from a reference method. Additionally, standard methods prepared by international agencies such as the US EPA and APHA, frequently have performance data such as expected spike recovery incorporated within the method. Where these vary from the 70% figure indicated in the NEPM Schedule, they are noted in the discussion of results which follows this introduction.

Based on the above, Tetra Tech Coffey has adopted 70% - 130% as the default acceptable range for spike recovery and surrogates spike recovery results, and as the default acceptance limits for the difference between analysis results and the expected result for reference materials.

2. FIELD SAMPLING PROGRAMME

2.1 PRECISION & ACCURACY

		YES	NO
1.	Was a NATA registered laboratory used?	☒	☐
2.	Did the laboratory perform the requested analysis?	☒	☐
3.	Were the laboratory methods adopted NATA endorsed?	☒	☐
4.	Were the appropriate test procedures followed?	☒	☐
5.	Were the reporting limits satisfactory?	☒	☐
6.	Was the NATA seal on the reports?	☒	☐
7.	Were the reports signed by an authorised person?	☒	☐

COMMENTS

Nil.

Precision/Accuracy of the Laboratory Report		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☒

2.2 SAMPLE HANDLING PROCEDURES

	YES	NO	N/A
1. Were the sample holding times met?	☒ see comment	☐	☐
2. Were the samples in proper custody between the field and laboratory?	☒	☐	☐
3. Were the samples properly and adequately preserved? (This includes chilling the samples where appropriate)	☒	☐	☐
4. Were the samples received by the laboratory in good condition?	☒	☐	☐

Samples were frozen by TTC field staff following collection and refrigerated during transport to the laboratories to ensure holding times did not impact results.

Sample Handling Procedure		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

3. FIELD QA/QC SAMPLING AND PROCEDURES

3.1 FIELD QA/QC SUMMARY

This sampling event occurred on 8/03/2023 and a total of 57 samples were submitted for analysis including primary and QC samples, as summarised in Table C below.

Table C - QA/QC Sampling Summary

Matrix	Sample Type	Number of Samples
Acid Sulfate Soils	Primary Samples	31
	Field Duplicates (at least 1 in 20 samples)	2 pairs
Soil (stockpiles)	Primary Samples	16
	Field Duplicates (at least 1 in 20 samples)	1 pair
Surface Water	Primary Samples	2
	Field Duplicates (at least 1 in 20 samples)	1 pair
QAQC	Equipment Rinsates (at least 1/personnel/day)	1
	Field Blanks (Trip Blank)	1

3.2 FIELD REPLICATES

	YES	NO	N/A
1. Were an adequate number of field replicates analysed for each chemical (min 10%)?	☒	☐	☐
2. Were RPD's for replicate samples within control limits?	☐	☒	☐

Replicate sample result exceeding the adopted control limits are summarised below.

Table 3-1: Replicate RPD exceedance summary – ASS samples

Primary Sample	Replicate	Analyte	RPD Exceedance (%)		Max Concentration (mg/kg)	Explanation Code
			Eurofins	ALS		
HEY3_0.9-1.0	**QC06**	**Chromium Reducible Sulfur**	0	57	**0.009**	**A**

Table 3-2: Replicate RPD exceedance summary – soil stockpile samples

Primary Sample	Replicate	Analyte	RPD Exceedance (%)		Max Concentration (mg/kg)	Explanation Code
			Eurofins	ALS		
SP9_01	**QC07**	**Chromium (III+VI)**	64	21	**120**	**C**
		Copper	62	20	**42**	**C**
		Mercury	67	0	**0.2**	**A**
		Nickel	64	32	**78**	**C**
		Zinc	51	20	**120**	**C**
	QC08	**Nickel**	64	32	**78**	**C**

Table 3-3: Replicate RPD exceedance summary – surface water samples

Primary Sample	Replicate	Analyte	RPD Exceedance (%)		Max Concentration (mg/kg)	Explanation Code
			Eurofins	ALS		
HEY_SW1	**QC09 & QC10**	**Lead**	67	67	**0.002**	**A**

Explanation Code	Acceptance Condition
A	*When low analyte concentrations (<10x LOR) are reported in the primary and corresponding replicate sample, minor differences in reported concentration may be exaggerated in the calculated RPD. As such, the exceedance against adopted RPD criterion for this sample is not considered to indicate poor integrity of results.*
B	*Where calculated replicate RPDs exceed the given criteria, a conservative approach of **adopting the highest reported concentration** for the given sample is taken. In this case the primary sample result is greater than the replicate sample results, and has therefore been retained*
C	*Where calculated replicate RPDs exceed the given criteria, a conservative approach of **adopting the highest reported concentration** for the given sample is taken. In this case the secondary sample result is*

	greater than the replicate sample results however both result are below the adopted criteria, therefore the primary sample result has been retained

COMMENTS

Following a review of the RPD values against the primary analytical results the RPD exceedances are not considered to affect the validity of the results.

Field Replicate Sampling & Analysis		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

3.3 BLANKS AND RINSATES

3.3.1 Trip Blanks

	YES	NO	N/A
1. Were an adequate number of trip blanks collected?	☒	☐	☐
2. Were the trip blanks reported to be free of contaminants?	☒	☐	☐

3.3.2 Equipment Rinsates

	YES	NO	N/A
1. Were an adequate number of equipment rinsates collected?	☒	☐	☐
2. Were the equipment rinsates reported to be free of contaminants?	☒	☐	☐

Blanks and Rinsate Sampling and Analysis		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

4. LABORATORY QUALITY CONTROL PROCEDURES

As noted in Section 1.3, laboratories conduct their own quality control testing to indicate their performance on each reported batch of samples. The following section assesses the adequacy of these procedures.

	YES	NO
1. Were laboratory method blanks free of contamination?	☒	☐
2. Were the spike recoveries within control limits?	☒	☐
3. Were the RPD's of the laboratory duplicates within control limits?	☒	☐
4. Were the surrogate recoveries within laboratory control limits?	☒	☐
5. Did the laboratory meet quality control frequency objectives?	☒	☐

COMMENTS

Nil

Laboratory Internal QA/QC		
Satisfactory ☒	Partially Satisfactory ☐	Unsatisfactory ☐

5. DATA USABILITY

Based on a review of the available field and laboratory data with consideration of the quality control data quality objectives outlined in Section 1.2 and Section 1.3 of this assessment, the following is concluded.

1. Data is directly usable ☒
2. Data is usable with the following corrections/modifications detailed below. ☐
3. Data is not considered to be suitable for use. ☐

Author:
NAME: Ed Grinter
POSITION: Senior Environmental Engineer

Reviewer:
NAME: Bryden Tiddy
POSITION: Principal Environmental Scientist