

APPENDIX A – SITE SUITABILITY STATEMENT

SITE SUITABILITY STATEMENT

This Statement provides a summary of the findings of a Contaminated Land Environmental Audit of the Macquarie Point Development Project – **Lot E and Underground Carpark**, Evans Street, Hobart, in accordance with the following

- Placement of the Auditor on the Register of Interstate Contaminated Land Auditors by the Director, Environment Protection Authority (Tasmania)
- EPA Tasmania 'Register of Interstate Contaminated Land Auditors'
- Macquarie Point Development Corporation Act 2012 (consolidated 2015)

I, David Lam of Coffey Environments Australia Pty Ltd, a person appointed by the Victorian Environment Protection Authority ('EPAV') under the *Environment Protection Act 1970* ('the Act') as an environmental auditor for the purposes of the Act, and also a person placed on the *Register of Interstate Contaminated Land Auditors* by the Director, Tasmania Environment Protection Authority (Tas EPA), having

1. been requested by Mr Greg Cooper on behalf of Macquarie Point Development Corporation (MPDC) to issue a Site Suitability Statement in relation to Lot E and Underground Carpark located at Evans Street, Hobart (as defined in Table 3 and Figure F2 in the attached document: *Lot E and Underground Carpark – Site Environment Management Plan*) ('the site') owned by MPDC.
2. had regard to, among other things,
 - (i) guidelines issued by EPAV for the purposes of conducting Environmental Audits (contaminated land) and guidelines issued by Tas EPA for conduct of a contaminated land audit, noting that EPAV is allowing ongoing reference to pre-existing guidance documents in Environmental Audits commenced prior to 1 July 2021, regardless of changes to legislation from that date
 - (ii) the beneficial uses and protected environmental values that may be made of the site
 - (iii) relevant (Victorian) State environment protection policies/industrial waste management policies, namely
 - SEPP Waters
 - SEPP Ambient Air Quality and Air Quality Management
 - IWMP Prescribed Industrial Waste
 - SEPP Prevention and Management of Contamination of Land
 - (iv) relevant (Tasmanian) State Policy on Water Quality Management

in making a total assessment of the nature and extent of any harm or detriment caused to, or the risk of any possible harm or detriment, which may be caused to any beneficial use/protected environmental values associated with use of the site, by any industrial processes or activity, waste or substance (including any chemical substance), and

3. completed a contaminated land environmental audit report in accordance with Clause 39F of the Macquarie Point Development Corporation Act 2012, a copy of which has been sent to Tas EPA.

HEREBY STATE that I am of the opinion that

The site is suitable for the site uses as follows: residential (including medium to high density), commercial/industrial, recreational/public open space use, access way and transport (roads etc) and other less sensitive uses.

subject to the following conditions:

1. Nature of development: the site shall be developed in accordance with the layout provided in Figure F3 of the attached Site Environment Management Plan (SEMP), with reference to the following details.
 - a. Nominated uses are to be limited to the areas indicated, and the Underground Carpark shall be built within the area nominated, such that assumptions regarding vapour risk remain valid.

- b. Depth of the Underground Carpark is to be such that it does not intersect the watertable. Should the design or changed conditions indicate potential for ingress of groundwater to any part of the underground carpark (including sumps or lift overruns), the SEMP must be reviewed for adequacy and approved by an Environmental Auditor, including any additional mitigation measures which may be required.
 - c. The Underground Carpark must include design, installation and maintenance of ventilation as per Building Code of Australia requirements for exhaust fumes, or other controls as specified in EPA NSW, 2020, to mitigate risks from potential methane infiltration.
 - d. Deep services below 2 m depth from the current surface level must be installed in protective shrouds or in trenches/corridors of clean fill to minimise the risk of contact with residual contamination for maintenance workers.
2. Implementation of SEMP: from the date of issue of this Site Suitability Statement, the owner/occupier of the site must implement and maintain SEMP attached to this Site Suitability Statement (or as modified from time to time), including requiring any parties conducting works or otherwise at risk of exposure to residual contamination at the site to conform to the SEMP. The key features of the SEMP include but are not limited to the following.
 - a. The Site area must be maintained with a hardstand or earthen cap seal or other engineered break layer to prevent direct human access to soil. Where the hardstand or earthen cap or other break layer is breached, such as for construction or maintenance works, it must be reinstated to achieve the same or better prevention of access to soil. Further details of layers or physical barriers must be adopted per Section 4 of the SEMP.
 - b. Garden plantings are to be in above ground planter boxes and not into the soil directly. Any proposal to plant into site soils must be confirmed as suitable by a Site Environmental Auditor.
 - c. Specified requirements must be followed for managing excavated soil and for importation of Fill Material.
 - d. Any subsurface works including for construction of the development or later maintenance must include a site specific workplace health and safety plan as detailed in Section 4 of the SEMP, and allow for potential contaminant exposures.
3. Any (substantive) changes to the SEMP referred to in Conditions 1 and 2 must be prepared for the site by a suitably qualified professional and verified as acceptable by an Environmental Auditor.
4. Groundwater at the site is polluted and must not be used for extractive uses other than environmental monitoring or remediation. Where groundwater is encountered during construction or maintenance works, it must be managed in accordance with the SEMP.

The condition of the site is detrimental or potentially detrimental to some possible beneficial uses/protected environmental values associated with the site, and so requires ongoing management. The site conditions which would need to be addressed so that no management would be necessary in any use scenario include the following.

- Material containing contaminant concentrations above human health-based criteria considered protective of sensitive land uses and above ecologically-based criteria considered protective of ecosystems would need to be removed or remediated.
- Aesthetically impacted materials would need to be removed.
- Groundwater would need to be cleaned up to the extent that all relevant beneficial uses and protected environmental values associated with all extractive uses are protected.

Site Suitability Statement

Macquarie Point Development Project – Lot E and Underground Carpark, Evans Street, Hobart

Other related information

5. This Site Suitability Statement has been adapted from the EPAV Statement of Environmental Audit. The EPAV guidelines for Issue of Certificates and Statements of Environmental Audit (Publication 759.3, December 2015) have been followed so far as reasonably practicable. This Statement varies from the Victorian document in order to suit the site requirements and Tas EPA's Fact Sheet Register of Interstate Contaminated Land Auditors (February 2016).
6. The Auditor has determined that groundwater does not have practicable remediation options and therefore is assessed to have been cleaned up to the extent practicable.
7. Groundwater at the site is polluted with respect to use for Drinking Water, Irrigation, Stock Watering, Industrial use, and Primary Contact Recreation. Groundwater is not considered to preclude Ecosystem Protection at a point of discharge to a surface water, or Buildings and Structures.
8. Groundwater monitoring wells present on and adjacent to the site may be retained, where necessary, to assist in groundwater characterisation of the balance of the Macquarie Point Redevelopment Project. Within 12 months of cessation of use, the groundwater monitoring wells are to be decommissioned in accordance with the requirements of "Minimum Construction Requirements for Water Bores in Australia", published by the Land and Water Biodiversity Committee [Third Edition, February 2012].
9. Some fragments of asbestos containing materials have been identified during investigations on the site (with fibre bundles associated with a fragment at one location), and bonded asbestos cement (AC) fragments may remain within the soil and be uncovered during excavation works, with potential for associated fines/fibres. Such AC fragments are not anticipated to represent a health risk to occupiers of the completed development. It is noted that the SEMP attached to this Site Suitability Statement lists asbestos as a contaminant requiring management for any subsurface works. If encountered during future development or use of the site, any fragments should be handled and disposed in accordance with the relevant regulations.
10. Not all land uses for which the land is considered suitable by this audit may be allowed under the existing zoning of the Sullivans Cove Planning Scheme 1997.

This Site Suitability Statement forms part of contaminated land audit report (Coffey Environments Australia Pty Ltd, Contaminated Land Audit Report, Macquarie Point Development Project – Lot E and Underground Carpark, ref. 754-MELEN225720-R03). Further details regarding the condition of the site may be found in the contaminated land audit report.

DATED 23 July 2021



Signed:
David Lam

ENVIRONMENTAL AUDITOR

(Listed on the Tasmanian *Register of Interstate Contaminated Land Auditors*)

Attachments:

1. *Lot E and Underground Carpark - Site Environment Management Plan*

Tetra Tech Coffey
754-MELEN225720-R03
23 July 2021

Lot E and Underground Carpark - Site Environment Management Plan

Macquarie Point Development Project



Lot E and Underground Carpark - Site Environment Management Plan

Macquarie Point Development Project

Client: Macquarie Point Development Corporation

ABN: 92 657 409 841

Prepared by

AECOM Australia Pty Ltd

Level 10, Tower Two, 727 Collins Street, Melbourne VIC 3008, Australia

T +61 3 9653 1234 F +61 3 9654 7117 www.aecom.com

ABN 20 093 846 925

01-Apr-2021

Job No.: 60598077

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Quality Information

Document Lot E and Underground Carpark - Site Environment Management Plan

Ref 60598077

Date 01-Apr-2021

Prepared by Supriya Lath

Reviewed by Robert Crowe and Todd Mitchell

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	23-Mar-2021	Draft	Paul Carstairs Technical Director - Environment	
0	1-Apr-2021	Final	Paul Carstairs Technical Director - Environment	

Table of Contents

1.0	Introduction	7
1.1	Purpose	7
1.2	Applicability	7
1.3	Training and Induction	8
1.4	Responsibility	8
	1.4.1 Emergency Contacts	9
1.5	Lot E and UGC Area Site Environment Management Plan Revision	9
1.6	Lot E and UGC Area Site Environment Management Plan Distribution	10
2.0	Lot E and UGC Area Details and Background	11
2.1	Site Environmental Audit	11
2.2	Lot E and UGC Area Details	11
	2.2.1 Surrounding Land Uses	13
2.3	Proposed Development Plan	14
2.4	Lot E and UGC Area History	15
	2.4.1 Former Roundhouse	16
	2.4.2 Former Roundhouse Refuelling Area	17
2.5	Lot E and UGC Area Site Conditions	17
	2.5.1 Features	17
	2.5.2 Geology	17
	2.5.3 Hydrogeology	18
2.6	Lot E and UGC Area Subsurface Features	18
2.7	Lot E and UGC Area Chemicals of Potential Concern	19
2.8	Proposed Future Land Use	20
3.0	Lot E and UGC Area Nature and Extent of Contamination	21
3.1	Identified Soil Impacts	21
	3.1.1 Shallow Lead Impacted Soil	22
	3.1.2 Asbestos in the Lot E and UGC Area	23
3.2	Identified Groundwater Impacts	23
3.3	LNAPL Impacts	24
3.4	Identified Soil Vapour Impacts	24
3.5	Remediation Activities	25
	3.5.1 Soil Remediation Completed	25
	3.5.2 LNAPL and Groundwater Remediation	25
4.0	Lot E and UGC Area Management of Potential Human Health Risks	27
4.1	Overview	27
4.2	Regulatory Requirements	27
4.3	Preventative Exposure Measures	27
4.4	Physical Barriers	28
	4.4.1 Current Status of Physical Barriers	29
4.5	Chemical Exposure	29
4.6	Work Health and Safety Plan	29
5.0	Lot E and UGC Area Management of Potential Environmental Impacts	32
5.1	Soil Management	32
	5.1.1 Consideration of Known Existing Soil Impacts and Subsurface Infrastructure	32
	5.1.2 Management of Excavated Material	32
	5.1.3 Reinstatement or Disposal of Soils	33
	5.1.4 Off-Site Soil Disposal	33
	5.1.5 Importation of Fill Material	33
	5.1.6 Reinstatement of Physical Barriers	33
	5.1.7 Materials Tracking	33
5.2	Groundwater Management	34
	5.2.1 Groundwater Monitoring Wells	34
5.3	Asbestos	34
5.4	Dust and Odour Control	35

	5.5	Stormwater and Sediment Management	35
	5.6	Noise Control	36
	5.7	Unexpected Conditions	36
6.0		Implementation	37
	6.1	General	37
	6.2	Inspection	37
	6.3	Environmental Incident Management and Recording	37
	6.4	Record Keeping	38
	6.5	Corrective Actions	38
	6.6	Document Revision	38
7.0		References	40
8.0		Limitations	42
Figures			
Appendix A			
		Induction Register	A
Appendix B			
		Summary of Chemicals of Potential Concern	B
Appendix C			
		Materials Tracking Sheet	C

Acronyms

AECOM	AECOM Australia Pty Ltd
ACM	Asbestos Containing Material
AHD	Australian Height Datum
ASC NEPM	Assessment of Site Contamination, National Environment Protection Measure
AST	Aboveground Storage Tank
bgl	Below ground level
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
BTEXN	Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene
CEMP	Construction Environment Management Plan
CoPC	Chemicals of Potential Concern
DSI	Detailed Site Investigation
EPA	Environment Protection Authority
GME	Groundwater Monitoring Event
ha	Hectare
HIL	Health Investigation Level
HSE	Health, Safety and Environment
LPG	Liquified Petroleum Gas
MPDC	Macquarie Point Development Corporation
OCP	Organochlorine Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PEV	Protected Environmental Value
PPE	Personal Protective Equipment
RC	Remediation Criteria
SEMP	Site Environment Management Plan
SVOC	Semi-Volatile Organic Compounds
SWL	Standing water level
SWMS	Safe Work Method Statement
TDS	Total Dissolved Solids
TRH	Total Recoverable Hydrocarbons
UST	Underground Storage Tank
VENM	Virgin Excavated Natural Material
VOC	Volatile Organic Compounds
WHSP	Work Health and Safety Plan

1.0 Introduction

The Macquarie Point Development Corporation (MPDC) has engaged AECOM Australia Pty Ltd (AECOM) to prepare a Site Environment Management Plan (SEMP) for the Lot E and Underground Carpark (UGC) Area (the Site), which forms part of the broader Macquarie Point site in Hobart, Tasmania (the MPDC site). The MPDC site location is shown on **Figure F1** in the **Figures** section.

1.1 Purpose

This SEMS has been developed by AECOM on behalf of MPDC for implementation at the Lot E and UGC Area, located in the central western portion of the broader MPDC site. Details of the Lot E and UGC Area are provided in **Section 2.2**.

The purpose of this SEMS is to identify residual contamination at the Lot E and UGC Area, and to provide an overview of appropriate management measures to address potential human health and environmental risks associated with subsurface contamination, and to maintain compliance with relevant environmental management requirements, and related safety management requirements.

The SEMS:

- Documents:
 - The current contamination status of the Lot E and UGC Area.
 - Environmental management measures (including contaminant management associated with intrusive works such as excavation/disposal of soil, dust and odour control, stormwater and sediment management, noise control and groundwater management).
 - Responsibilities for implementation of the SEMS and for managing identified environmental issues in accordance with the SEMS.
- Defines:
 - Preventative exposure measures for intrusive works (e.g. subsurface excavation) undertaken at the Lot E and UGC Area.
 - Roles and responsibilities for the Lot E and UGC Area owner/managers and occupiers/contractors undertaking intrusive works.
- Provides a framework for the implementation of measures so that human health risk to the Lot E and UGC Area users is low and acceptable where the existing preventative exposure measures remain in place (i.e. physical barriers such as concrete paving, asphalt, etc.).

All intrusive work and any work that may change the risk profile to receptors at the Lot E and UGC Area Site while this SEMS is in place should follow the guidance provided in this SEMS.

1.2 Applicability

This SEMS applies to the management of contaminated soil, groundwater and soil vapour at the Lot E and UGC Area, as defined in **Section 2.2** and shown on **Figure F2** in the **Figures** section.

The following parties should be provided with a copy of the SEMS, prior to undertaking any activities within the Lot E and UGC Area:

- The Lot E and UGC Area Site Owner or Manager (and delegates).
- Workers who undertake intrusive work at the Lot E and UGC Area during which they may be exposed and/or come into contact with contaminated soil and/or groundwater.

It is noted that this SEMS is an active document, which is to be updated as conditions at the Lot E and UGC Area change (e.g. development changes, changes to the known contamination status, etc.). If activities to be undertaken at the Lot E and UGC Area are not covered in this SEMS, the Lot E and UGC Area Site Owner or Manager should update the SEMS to include those activities. Any significant

amendment to this SEMP should be reviewed by a suitably qualified and experienced Environmental Auditor prior to implementation.

1.3 Training and Induction

The appropriate Lot E and UGC Area representative (i.e. the Lot E and UGC Area Site Owner, Manager or delegates) is to ensure the health, safety and environment (HSE) requirements outlined in this SEMP are met during works.

All persons conducting intrusive work at the Lot E and UGC Area including (but not limited to) Lot E and UGC Area occupiers, tenants and maintenance workers, will be required to be trained and inducted to this SEMP. All workers must sign the induction form (provided in **Appendix A**) to acknowledge an understanding of the content of this SEMP and completion of the induction.

AECOM notes that this training/ induction recommendation is limited to those personnel and contractors who are undertaking intrusive works at the Lot E and UGC Area. It is not the intention that this document be applied to passive users of the Lot E and UGC Area such as those using it for the purposes of short-term commercial activities (e.g. market holders), car parking, pedestrian thoroughfare or visitors engaging in public uses of the area.

Training should be structured to ensure that relevant workers understand their obligation to exercise due diligence in relation to environmental matters. The following items should be presented in the Lot E and UGC Area induction:

- General overview of the work to be conducted
- Overview of Lot E and UGC Area contamination issues
- Familiarisation with Lot E and UGC Area environmental controls
- Chemicals of Potential Concern (CoPC) and associated exposure risks
- Hazard identification and prevention
- Personal Protective Equipment (PPE).

Records of all training should be maintained and include:

- Name of the individual receiving training
- When the individual was trained
- Name of trainer
- A general description of the training content.

It should be noted that this SEMP does not preclude the need for a Safe Work Method Statement (SWMS) for each task, but rather should be included as part of the general training for working at the Lot E and UGC Area.

1.4 Responsibility

The distribution and implementation of this SEMP will be the responsibility of the Lot E and UGC Area Site Owner/ Manager. The Lot E and UGC Area Site Owner/ Manager may at times delegate responsibility for individual items or tasks to maintenance contractors and other persons. However, the Lot E and UGC Area Site Owner/ Manager retains the overall responsibility for the implementation of this SEMP during any intrusive or maintenance works and ongoing use of the Lot E and UGC Area.

All contractors, including workers engaged in any intrusive or maintenance works will be responsible for adhering to the management measures described herein.

Table 1 below provides a summary of the key roles and responsibilities associated with the implementation of this SEMP.

Table 1 Roles and Responsibilities

Role	Key Responsibilities
Lot E and UGC Area Site Owner/Manager (or delegate)	• Provide a full copy of the SEMP to Lot E and UGC Area occupiers/contractors undertaking intrusive works and discuss as part of the Lot E and UGC Area induction process. • Manage and/or enforce the SEMP for Lot E and UGC Area occupiers/contractors undertaking intrusive works. • Implement and complete corrective actions as required. • Complete and keep up to date all necessary registers and records as required in the SEMP. • Undertake reviews and revision of the SEMP every three years (or more frequently, as deemed appropriate based on-Site activities or changes). • Review evidence of compliance to this SEMP every three years (or more frequently, as deemed appropriate). • Undertake visual inspections of existing controls, such as hardstand areas every three years. • Review and revise the SEMP to reflect changes that occur at the Lot E and UGC Area.
Lot E and UGC Area Occupiers/Contractors Undertaking Intrusive Works	• Implement the requirements of the SEMP. • Complete all necessary registers and records as required in the SEMP. • Complete all activities at the Lot E and UGC Area in a safe and environmentally responsible manner. • Implement a Work Health and Safety Plan (WHSP) and ensure that suitable PPE is worn, and monitoring is undertaken, where required, for tasks that involve intrusive works. • Ensure all contractors comply with the requirements of the SEMP.

1.4.1 Emergency Contacts

Emergency contacts are listed in **Table 2** below.

Table 2 Emergency Contacts

Position	Name	Telephone
Emergency Response	Fire, Ambulance, Police	000
Facility Officer	Natalie French – MPDC	0409 189 262
Site Operations Officer	Steve Burns – MPDC	0487 982 698
Chief Operations Officer	Greg Cooper – MPDC	0400 165 638
Reception	MPDC	03 6166 4000

1.5 Lot E and UGC Area Site Environment Management Plan Revision

This SEMP will remain in place indefinitely, and will require revision:

- In the event that the Lot E and UGC Area undergoes further remediation, or land use changes.
- Following changes to the conditions at the Lot E and UGC Area (i.e. following development in the event that the current physical barriers are altered).
- In response to additional data to inform the understanding of the contamination status of the Lot E and UGC Area.

Regardless of the above-listed considerations, this SEMP should be reviewed (and updated if required) every three years. It is recommended that a suitably qualified environmental practitioner be engaged to review evidence of compliance to this SEMP, including records of works at the Lot E and UGC Area Site and compliance with the conditions of implementation contained within **Section 6.0** of this SEMP. A visual inspection of the Lot E and UGC Area Site should be conducted as part of this review, as described in **Section 6.2**.

1.6 Lot E and UGC Area Site Environment Management Plan Distribution

As noted in **Section 1.4**, the SEMP and all updated revisions are to be provided to the following stakeholders:

- Current Lot E and UGC Area Site Owner / Manager (and delegates)
- Lot E and UGC Area Site Occupiers / Contractors undertaking intrusive works at the Lot E and UGC Area.

2.0 Lot E and UGC Area Details and Background

2.1 Site Environmental Audit

In conjunction with the amendment of the *Macquarie Point Development Corporation Act 2012*, MPDC has engaged an Auditor, David Lam of Coffey Environments (the Auditor). David Lam is included on the Director of the Tasmanian Environment Protection Authority (EPA) Register of Interstate Contaminated Land Auditors and is considered suitably qualified by EPA to undertake an Environmental Audit to review the progress of environmental assessment, remedial planning and execution works at the MPDC site.

The role of the Auditor is to ensure that the works are carried out in compliance with local Tasmanian legislation and guidelines with consideration given to the requirements of the Victorian EPA Environmental Audit framework in the absence of an Audit scheme in Tasmania. The overarching outcome required for the Environmental Audit is a MPDC site suitability statement (i.e. sign off) confirming the suitability of the MPDC site for intended future uses.

Due to the planned schedule for development of the Site, and the proposed future land uses, an Auditor suitability statement is sought for the area referred to as the Lot E and UGC Area, defined in **Section 2.2**.

To inform the outcomes of the Environmental Audit, Detailed Site Investigations (DSIs) have been completed by AECOM for areas referred to as Audit Area 2 and Audit Area 5, which included the Lot E and UGC Area, and has included soil, groundwater and soil vapour investigations. The findings of the DSIs are provided in the AECOM documents titled *Audit Area 2 – Detailed Site Investigation, Macquarie Point Development Project* (AECOM, 2020a) and *Audit Area 5 – Detailed Site Investigation, Macquarie Point Development Project* (AECOM, 2021b). More detail on the Audit Areas is contained in **Section 2.2**.

The original drafts of these DSIs were prepared during early to mid-2019, and only considered Site data available up until the end of 2018. Additional assessment and remediation works were undertaken and completed after the issue of the DSIs, and it was noted in the text where works were progressed which had not been incorporated into the DSIs. All available assessment and remediation data, including those not incorporated in the DSIs, were included in the CUTEP-like assessment that followed, for the Auditor's consideration, and presented in the report titled *Lot E and Underground Carpark - Clean Up to the Extent Practicable Report* (AECOM, 2021b). This report has been submitted to the Auditor but has not yet received endorsement at the time of preparation of this report and not considered necessary to have been finalised for the purpose of this SEMP.

The DSI and CUTEP reports identified concentrations of CoPC in soil, groundwater and soil vapour above the adopted Tier 1 screening criteria for applicable soil and groundwater protected environmental values (PEVs) at the Lot E and UGC Area and surrounding buffer zone. In addition, concentrations of CoPC were reported above the Site Derived Remediation Criteria (RC) in soil for Residential uses, Commercial / Light Industrial uses, and Maintenance Workers, and in groundwater for Residential uses. Remediation of soil impacts was conducted between December 2019 and November 2020 and is summarised in **Section 3.5.1**. Light Non-aqueous phase liquid (LNAPL) and groundwater remediation undertaken at the Site are summarised in **Section 3.5.2**.

Further details of identified impacts within the Lot E and UGC Area are contained in **Section 3.0**, and within **Appendix B**.

On the basis of these findings, the DSI and CUTEP reports recommended the implementation of a SEMP to manage potential human health and environmental risks associated with subsurface contamination identified. This recommendation is supported by the Environmental Auditor, and implementation of a SEMP is a requirement of the Lot E and UGC Area site suitability statement.

2.2 Lot E and UGC Area Details

The Site was historically divided into seven sub-areas, or Audit Areas (Audit Area 1 – Audit Area 7), for the purpose of assessment as shown on **Figure 1**. The location of these audit areas was based on the nature of identified contamination, historic activity, and the intended future uses of each area at that time. It is noted that as remediation and development works on Site progress these areas may be

modified or further divided (for example, Audit Area 4 has been split into Audit Area 4 East and Audit Area 4 West). However, for the purpose of this assessment the initial division of seven areas will be used to describe different areas of the Site.



Figure 1 Designated Audit Areas

The Lot E and UGC Area comprises of sections of Audit Area 2 and Audit Area 5. Lot E and UGC Area details are provided in **Table 3** below.

Table 3 Lot E and UGC Area Details

Item	Description
Site Identification	Lot E and UGC Area
Title Details	The Lot E and UGC Area comprises a portion of the land title 113521/1 (formerly CT 114462/1), which forms part of the overall MPDC site. Copies of the land title are included in the DSIs (AECOM, 2019 and AECOM, 2020a) and the CUTEP report (AECOM, 2021b).
Site Layout	Figure F2 in the Figures section shows the current Site layout. The majority of the Lot E and UGC Area is flat, with a slight slope from the northwest to the east. A retaining wall is present to the east of the cycleway, in the eastern and south eastern portion of the Lot E and UGC Area, where the surface level drops approximately 1.5 m in elevation. The surface of the Lot E and UGC Area currently covered with a combination of asphalt, concrete and gravel surfacing, as well as backfill and clean fill material from previous soil remediation works. The SEMP covers the entirety of the Lot E and UGC Area.

Item	Description																					
Lot E and UGC Area Site Boundary	The boundary of the Lot E and UGC Area is defined by the coordinates provided below as GDA94 Zone 55 as shown on Figure F2 .																					
	<table><tr><th>ID</th><th>Easting</th><th>Northing</th></tr><tr><td>1</td><td>527402.73</td><td>5252581.61</td></tr><tr><td>2</td><td>527594.76</td><td>5252575.29</td></tr><tr><td>3</td><td>527533.10</td><td>5252460.97</td></tr><tr><td>4</td><td>527525.31</td><td>5252464.73</td></tr><tr><td>5</td><td>527518.94</td><td>5252453.17</td></tr><tr><td>6</td><td>527366.79</td><td>5252536.64</td></tr></table>	ID	Easting	Northing	1	527402.73	5252581.61	2	527594.76	5252575.29	3	527533.10	5252460.97	4	527525.31	5252464.73	5	527518.94	5252453.17	6	527366.79	5252536.64
	ID	Easting	Northing																			
	1	527402.73	5252581.61																			
	2	527594.76	5252575.29																			
	3	527533.10	5252460.97																			
	4	527525.31	5252464.73																			
	5	527518.94	5252453.17																			
6	527366.79	5252536.64																				
Site Area	1.73 hectares (ha) [17,300 m²]																					
Current Site Owners	State of Tasmania (Crown Land)																					
Local Government Authority	Hobart City Council																					
Current Zoning ⁽¹⁾	The Sullivans Cove Planning Scheme 1997 notes that the portion of land defined as the Lot E and UGC Area is a Mixed Use Area.																					
Current Uses	The following is noted with regard to current uses and features of the Lot E and UGC Area: • The surface of the Lot E and UGC Area is currently covered with a combination of asphalt, concrete and gravel surfacing, as well as backfill and clean fill material from previous soil remediation works. • A cycleway (refer to Figure F2 in the Figures section), directed from the northeast of the Site to the south of the Site, transects the eastern portion of the Lot E and UGC Area, with another cycleway proposed (refer to Figure F3 in the Figures section) to be constructed to the west of this cycleway. • A bunded storage shed located in the south-eastern portion of the Lot E and UGC Area. • The area is typically unoccupied but has been subject to intermittent uses including public events and carparking. It is currently vacant following remediation works undertaken between December 2019 and November 2020, which have been summarised in Section 3.5.1. • An office building with a car park is located at the south-western corner of the Lot E and UGC Area.																					

Notes: 1. Sullivans Cove Planning Scheme 1997. Hobart City Council. Approved by the Resource Planning and Development Commission on 15 December 1998 and came into operation on 21 December 1998. Includes all approved amendments up until 30 October 2019.

2.2.1 Surrounding Land Uses

The current and proposed future land uses for the area surrounding the Lot E and UGC Area are summarised in **Table 4** below. **Figure F3** in the **Figures** section shows the Lot E and UGC Area and the surrounding area, as well as the proposed development plan for these areas.

Table 4 Lot E and UGC Area – Surrounding Land Uses

Direction from the Site	Current Land Use	Proposed Future Land Use
North	The Lot E and UGC Area is bound to the north by Audit Area 4 West, which is currently occupied by the Northern Vehicular Access roadway.	Audit Area West: Residential (medium to high density), Commercial (including visitor accommodation, retail), Recreation Open Space (public use areas), Transport (roads, light rail, cycleway and access way)
East	The remaining sections of Audit Area 2 and Audit Area 5 that are not included in the Lot E and UGC Area lie to the east, including the Goods Shed Annexe area. Audit Area 7 lies further east, which is currently vacant and not in use. Soil remediation including excavation of impacted soil and removal of remnant pipelines (Fuel Line and Oil Line) have been conducted in 2020 in these areas (AECOM, 2020b).	- Audit Areas 2, 5 and 7: Retail and Commercial (including Arts and Institutional) - Audit Area 5: Commercial (including visitor accommodation, retail), Recreation Open Space (public use areas)
West	The Lot E and UGC Area is bound to the west by Davey Street, the Royal Engineers Building and commercial properties beyond.	It is noted that proposed development plan (refer to Figure F3) is not applicable to the area to the west as it is located beyond the MPDC site boundary. While the future use of this area is not known, commercial use is likely to continue.
South	The Lot E and UGC Area is bound to the south by a vacant section of Audit Area 5 not included in this CUTEP assessment. Audit Area 6, located further south, contains the existing cycleway and a building called the Longhouse, which is used for commercial purposes. The south-eastern boundary of the Lot E and UGC Area adjoins the north-western corner of Audit Area 1 which comprises the Goods Shed, which is occupied by the Corporation's offices and has used for public events	- Audit Area 1: Retail and Commercial incorporating the Goods Shed - Audit Areas 5 and 6: Mixed use (public, education, commercial and retail), Recreation Open Space (public use areas)

2.3 Proposed Development Plan

The following development, as determined by the *Macquarie Point – Master Development Plan 2020-30* (MPDC, 2015) and shown on **Figure F3**, is proposed for the Lot E and UGC Area:

- Mixed Use, including residential use (medium to high density) above the first floor, and commercial/institutional uses on the ground floor.
- Open Space Use
- Access Link, for pedestrian and light vehicle traffic

- The Underground Carpark will be constructed beneath the Mixed Use and part of the Open Space Use areas.

More specifically:

- The entire footprint will be covered with either hardstand and/or an engineered break layer, which will be specified in the Site Environmental Management Plan (SEMP) which shall be implemented to provide a framework for ongoing maintenance and management of the Lot E and UGC Area during future use.
- Development will allow for mixed land use activities, including:
 - Residential, including medium to high density. It is noted that ground floor residential will not be included in future development plans in the Lot E and UGC Area.
 - Commercial, including visitor accommodation, retail and arts and institutional.
 - Public Open Space, including parklands and construction of an Access Link (cycleway, walkway) which may be used by pedestrians and light vehicles.
- The construction of an Underground Carpark beneath the Mixed Use area and a portion of the Open Space area in the Lot E and UGC Area. The carpark design is currently planned to consist of:
 - A single level carpark excavated to a depth of 2.5 to 3.5 m below ground level (m bgl). The base of the carpark will be located approximately 1.5 m above groundwater.
 - The carpark between 0.5 to 1 m above the current surface area, with an open ventilation space present surrounding the structure.
 - Any conduits or services which run beside or beneath the carpark at a depth of >2 m bgl will be installed in protective shrouds or in trenches/corridors of clean fill and no contact with soil beneath the carpark (i.e. for maintenance works) is expected as part of future carpark usage.
 - The residential and commercial building in the Mixed Use area, and an Open Space use area, will be located above the carpark.

Final carpark design will be determined by a Site developer. Any significant changes to the proposed design should be reviewed by a qualified environmental consultant and approved by an Environmental Auditor and will require update of this SEMP.

2.4 Lot E and UGC Area History

Historically, the Lot E and UGC Area has been subject to a number of activities:

- Land reclamation and filling from circa 1850s to the early 1900s. The source of material used as fill is not clear.
- Railyards and freight handling, include fuel and chemical storage and locomotive maintenance. Two key areas, the former Roundhouse and Roundhouse Refuelling Area, are discussed in more detail below.
- A Slaughter Yard located at the former Roundhouse location which was operation between 1920 and 1909.
- A Drill Yard adjacent to the Royal Engineers Building. Sheds around the Drill Yard were used for the storage of arms.

Areas adjacent to the Lot E and UGC Area were also subject to land reclamation and used as part of the Slaughter Yard, Drill Yard, and for rail and freight activities, as well as:

- The Goods Shed Annexe, a mechanics workshop for painting and repair of shipping containers to the east.
- A former Concrete Batching Plant and Main Workshop used for locomotive maintenance to the north.

- The former Hobart Gasworks operated between 1857 and 1978 to the south for the supply of town gas to the City of Hobart.

Further details on the activities previously undertaken within and around the Lot E and UGC Area are available in AECOM 2020a, 2021a and 2021b.

2.4.1 Former Roundhouse

The Former Roundhouse is a predominant feature of the Lot E and UGC Area and extends into Audit Area 6 (refer to **Figure F4** in the **Figures** Section). Key details are as follows:

- The Roundhouse was a locomotive maintenance facility featuring a large turntable in the centre. Rail tracks entered the area from the north east via the Former Roundhouse Refuelling Area.
- Subsurface features included various pits and concrete-lined service trenches. Investigations at the Roundhouse Area in 2020 (AECOM, 2020d) encountered the following:
 - The central turntable pit remains in-situ; the pit wall was constructed of concrete, with the inner face of the walls lined with steel plate. The base is concrete and inclines from the outer edge (~2 m bgl) towards the central plinth (~2.7 m bgl), which is constructed of heavily reinforced concrete and is encountered ~1.9 m bgl. The turntable area was filled with large blocks of reinforced concrete demolition rubble, which was removed as part of an archaeological survey in early 2021 and will be disposed off-Site.
 - Former servicing bays in the subsurface consisted of concrete trenches (approximately 0.9 m wide, 0.75 m deep and 20 m long) of thickness between 0.25 to 0.30 m. A thin layer of compacted grease/dirt (<0.002 m thick) was in the base of some trenches.
 - The total diameter of the Roundhouse is approximately 102 m.

Plate 1 below presents a schematic of the Roundhouse structure (AECOM, 2017a).

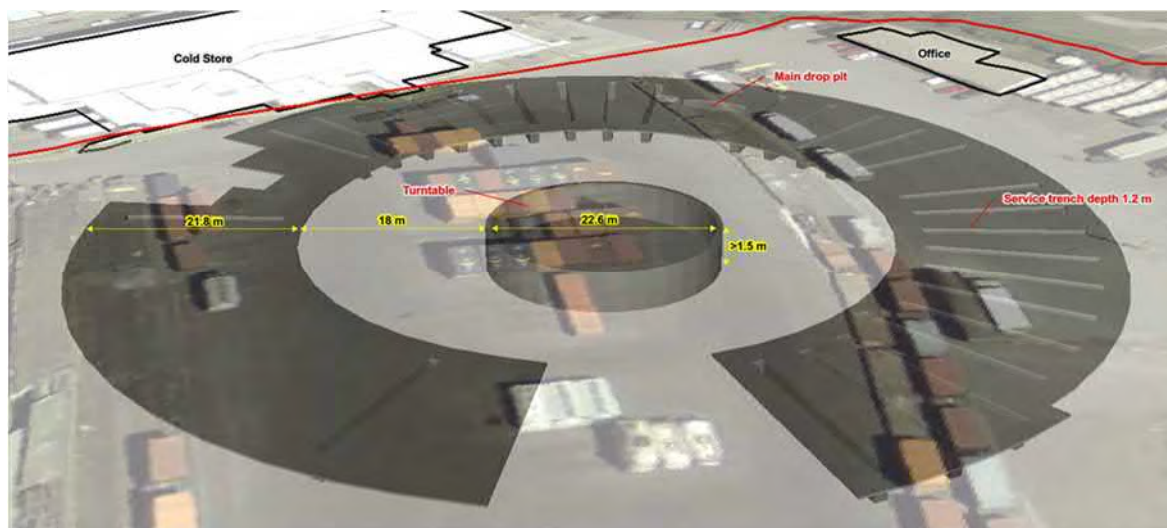


Plate 1 Roundhouse Schematic (AECOM, 2017a)

Dismantling of the Roundhouse began in the early 1980s. Anecdotal information indicates that pits and service trenches were backfilled with building rubble including asbestos. Isolated fragments of Asbestos Containing Material (ACM) have been encountered in fill, but no areas of large quantities of ACM have been encountered in investigations to date. At the time of inspections undertaken by AECOM (2014 – 2020), the following was noted regarding the Former Roundhouse:

- Ground surface coverage consists of a combination of concrete and asphalt; no obvious surface staining or odours have been observed.
- Minor ground subsidence is evident in the vicinity of the Roundhouse. The subsidence is likely to be a result of the consolidation of backfill in the Former Roundhouse infrastructure.

The Corporation engaged Austral Tasmania Pty Ltd (Austral) to assess the archaeological significance of the Roundhouse in early 2021. As part of works, the central Roundhouse turntable pit was excavated and material within removed. Excavated soil has been stockpiled separately for future disposal, and the Roundhouse turntable will remain open short term prior to future development of the area.

2.4.2 Former Roundhouse Refuelling Area

The Former Roundhouse Refuelling Area is a predominant feature of the Lot E and UGC Area (refer to **Figure F4** in the **Figures** Section), to the northeast of the Roundhouse. Key details are as follows:

- This was the main refuelling station for locomotives until the late 1980s. Four aboveground storage tanks (ASTs) serviced separate locomotive and tanker refuelling areas. An underground diesel fuel line entered the area in the east (refer **Figure F5**). Point source contamination from fuel handling and storage activities has resulted in fuel-related impacts in soil and groundwater.
- The refuelling area was decommissioned in the late 1980s, following which it was resurfaced with hardstand. No information is available regarding the decommissioning of the fuel infrastructure.

At the time of inspections undertaken by AECOM (2015 – 2020), the following was noted regarding the Former Roundhouse Refuelling Area:

- Surface coverage consisted of a combination of concrete, asphalt and Virgin Excavated Natural Material (VENM) following soil remediation in this area (AECOM, 2020b).
- No obvious surface staining or odours observed.

2.5 Lot E and UGC Area Site Conditions

2.5.1 Features

The majority of the Lot E and UGC Area is flat, with a slight slope from the northwest to the east. A retaining wall is present to the east of the cycleway, in the eastern and south eastern portion of the Lot E and UGC Area, where the surface level drops approximately 1.5 m in elevation. The surface of the Lot E and UGC Area currently covered with a combination of asphalt, concrete and gravel surfacing, as well as backfill and clean fill material from previous soil remediation works.

Site inspections undertaken by AECOM as part of the previous environmental investigations noted the following:

- No obvious surface staining or odours were evident
- No evidence of underground storage tanks (USTs).
- Asbestos containing materials (ACM) [as fragments] were identified on the surface at Audit Area 2 during Site works conducted by AECOM in 2019, however no asbestos fibres were identified during analytical testing of the soil samples (AECOM, 2020a). No potential ACM fragments have been observed at the surface of Audit Area 5. Five small isolated fragments of ACM were encountered during investigations of the Roundhouse area in 2020 (AECOM, 2020d), but no areas of bulk ACM were observed. Further details regarding ACM identified within the Lot E and UGC Area are provided in **Section 3.1.1**.

2.5.2 Geology

Previous intrusive investigations have identified that the Lot E and UGC Area is underlain by fill material extending to a maximum depth of 7.5 m bgl. Fill material consists of silty sands with dolerite gravels and cobbles with a range of anthropogenic materials including occasional rubble, brick, concrete, glass, ceramics and metal fragments, timber/wood, coal, coke slag and ash.

Fill material is underlain by natural sands, clays, gravels and dolerite bedrock.

Table 5 below summarises the typical lithology encountered beneath the Lot E and UGC Area.

Table 5 Lithology Summary

Material Description	(m bgl)
Fill: Gravel, clays, sands, concrete, rubble, glass, brick, ceramics, ash/coal/coke/slag, timber/wood, metal	0 – 7.5
Alluvial/ Marine Deposits: Silty sands	3.2 – 9.0
Slope Deposits: Clays, gravels, cobbles and boulders	4.5 - 10
Bedrock: Fractured Dolerite	0.3 +

2.5.3 Hydrogeology

The River Derwent is located approximately 230 m northeast of the north-eastern boundary of the Lot E and UGC Area at its closest point at the Hobart Rivulet outfall, and Sullivans Cove is located approximately 230 m south-southwest of the south-eastern boundary of the Lot E and UGC Area.

Based on investigations completed to date, both the Lot E and UGC Area and the broader MPDC site are underlain by a single aquifer unit extending to greater than 25 m bgl (the maximum depth assessed). Groundwater beneath Lot E and UGC Area is generally encountered in fill material, extending into the underlying natural sediments and fractured dolerite bedrock.

The groundwater standing water levels (SWL) measured in monitoring wells beneath the Lot E and UGC Area have ranged between 1.700 m bgl (i.e. 4.338 m AHD) at BH1_PS in July 2016 to 5.365 m bgl (i.e. 0.308 m AHD) at MW140 in November 2019 (AECOM, 2021b). The groundwater monitoring well network is presented in **Figure F6** in the **Figures** section.

Groundwater flow within the Lot E and UGC Area has been inferred to be in a generally southerly and easterly direction towards the River Derwent.

2.6 Lot E and UGC Area Subsurface Features

Table 6 below provides a summary of known current and former subsurface features that may present contaminant source risks or influence subsurface hydrogeology/contaminant transport mechanisms within or adjacent to the Lot E and UGC Area. The locations of these subsurface features are presented in **Figure F5** in the **Figures** section. Further details are available in AECOM, 2017b.

Note this is not an exhaustive list of all subsurface features and other features, such as underground services. The potential exists for other abandoned services to be present which are not on any records, and the origin and purpose of which remains unknown. The potential exists for unidentified pipe networks to be discovered during excavation works.

Table 6 Subsurface Feature Summary

Feature	Comment
Lot E and UGC Area	
Historical Sewer	A Historical Sewer main reportedly traversed through the eastern portion of Audit Area 2 and the central portion of Audit Area 5, to the west of the existing Sewer (Main Hobart Pipeline). The depth is unclear. It is not known if any infrastructure from this sewer remains present in the subsurface.
Sewer (Main Workshop)	A former sewer pipe (Main Workshop Sewer; 50 mm diameter) is understood to have run from the Main Workshop (Audit Area 4) through Audit Area 2 to the Sewer (Main Hobart Pipeline). The depth is unknown.

Feature	Comment
Stormwater Pipelines/ Infrastructure	- Major on-Site stormwater network collecting stormwater in three main pipes combining in a central pit in Audit Area 2. Field observations suggest the stormwater infrastructure has been filled with rock/gravel. Two concrete stormwater pits were identified in Audit Area 2 during Site inspections, at depths of approximately 2.1 and 3.6 m bgl. - Majority of the stormwater at the Site is discharged east through the Site Sump in Audit Area 7, and leaves Site through the eastern Site boundary.
Former Roundhouse	Refer to the discussion provided in Section 2.4.1.
Former Fuel/Oil Transfer Lines	A former diesel pipeline, which entered Audit Area 2 from the east/northeast, was removed in 2020. Details of the removal and remediation and validation of its former location is reported in AECOM, 2020b.
Area Adjacent to the Lot E and UGC Area	
Sewer (Main Hobart Pipeline)	Traverses from the northeast to the south of the MPDC site, through the centre of Audit Area 5. Likely to be in contact with the water table for the entire section within the MPDC site. The invert depth ranges from 0.15 m - 0.88 m Australian Height Datum (AHD), and is ~0.5 m AHD within Audit Area 5.
Sea Walls	Sea walls were historically used during land reclamation. In August 2015, GHD completed further investigations; a number of timber seawalls were excavated along the southern and eastern MPDC site boundaries (AECOM, 2017b).

2.7 Lot E and UGC Area Chemicals of Potential Concern

Based on the historical land uses at and surrounding the Lot E and UGC Area, the CoPC that have been identified are summarised in **Table 7** below. It is noted that no ongoing potential contaminating land uses have been identified within the Lot E and UGC Area.

Table 7 Chemicals of Potential Concern

Former Land Use/ Potential Contaminating Activity	Chemicals of Potential Concern	Potential Impacted Media
Lot E and UGC Area		
Land Reclamation	Heavy metals ¹ , TRH, PAH, BTEX, phenolic compounds, SVOC, VOC, OCP, cyanide, ammonia, asbestos	- Soil - Groundwater - Soil vapour
Freight Handling	Heavy metals ¹ , TRH, PAH, BTEX, phenolic compounds, SVOC, VOC	
Railyards	Heavy metals ² , TRH, PAH, BTEX, phenolic compounds	
Fuel Storage and Locomotive Fuelling	Lead, TRH, PAH, BTEX	
Slaughter Yard	Heavy metals ³ , ammonia, nitrate, sulphate	

Former Land Use/ Potential Contaminating Activity	Chemicals of Potential Concern	Potential Impacted Media
Roundhouse (Locomotive maintenance and refuelling)	TRH, BTEXN, PAHs, phenolic compounds, chlorinated hydrocarbons, SVOC, VOC	
Fuel and Oil Transfer	Lead, TRH, PAH, BTEX, phenolic compounds	
Sewer (Main Hobart Pipeline)	Heavy metals ⁴ , TRH, PAH, BTEX, VOC, SVOC, nitrate, ammonia, faecal coliforms, E. Coli	
Area Adjacent to the Lot E and UGC Area		
Land Reclamation	Heavy metals ¹ , TRH, PAH, BTEX, phenolic compounds, SVOC, VOC, OCP, cyanide, ammonia, asbestos	• Soil • Groundwater • Soil vapour
Freight Handling	Heavy metals ¹ , TRH, PAH, BTEX, phenolic compounds, SVOC, VOC	
Fuel Storage and Locomotive Fuelling	Lead, TRH, PAH, BTEX	
Mechanics Workshop and Truck Wash (Goods Shed Annexe)	Heavy metals ² , TRH, PAH, BTEX, phenolic compounds	
Slaughter Yard	Heavy metals ³ , ammonia, nitrate, sulphate	

Notes: SVOC – Semi-Volatile Organic Compounds; VOC - Volatile Organic Compounds; OCP – Organochlorine Pesticides; BTEX – Benzene, Toluene, Ethylbenzene and Xylenes; BTEXN – Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene; TRH – Total Recoverable Hydrocarbons; PAH – Polyaromatic Hydrocarbons; E. coli – Escherichia coli; 1 – aluminium, arsenic, cadmium, chromium, copper, lead, nickel, manganese and zinc; 2 - lead and arsenic; 3 - aluminium, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, vanadium and zinc; 4 - aluminium, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, vanadium and zinc.

A review of historical activities undertaken at the Site has previously identified that SVOCs and VOCs may be CoPC associated and rail activities and freight handling, and to a lesser degree with land reclamation (chlorinated compounds were not widely used until circa 1940s, after the Site had been reclaimed). With the exception of BTEX, PAH and phenols, previous soil and groundwater analytical results have not identified other SVOCs and VOCs of concern.

2.8 Proposed Future Land Use

Based on the *Master Development Plan* (MPDC, 2015), it is understood that the Lot E and UGC Area is intended to be developed for a mix of uses comprising:

- Mixed Use, including residential use (medium to high density) above the first floor, and commercial/institutional uses on the ground floor.
- Open Space Use
- Access Link, for pedestrian and light vehicle traffic
- The Underground Carpark will be constructed beneath the Mixed Use and part of the Open Space Use areas.

The proposed development layout of the Lot E and UGC Area and the larger Site is shown on **Figure F3** in the **Figures** section.

3.0 Lot E and UGC Area Nature and Extent of Contamination

Historical activities undertaken within the Lot E and UGC Area have resulted in the presence of residual contamination within soil and groundwater. Multiple phases of soil, groundwater, LNAPL and soil vapour investigations have been undertaken to assess the nature and extent of contamination. The following sections provide an overview of identified soil, groundwater, LNAPL and soil vapour impacts at the Lot E and UGC Area.

Soil, groundwater and LNAPL remediation works have been undertaken at the Site, as discussed in **Section 3.5**. The *Remediation Validation Report 2020* (AECOM, 2020b) and the *Goods Shed Remediation Validation Report* (AECOM, 2021c) contain details of the soil remediation and validation works completed, and the excavated areas can be seen on **Figure F6** in the **Figures** section. The *Assessment of LNAPL Remediation End-Points* (AECOM, 2020e) report contains a detailed assessment LNAPL remediation conducted. It is noted that validation and auditor approval of remediation is still pending, and this SEMP may require update when this has been completed.

3.1 Identified Soil Impacts

Within the Lot E and UGC Area and the surrounding buffer zone, fill material typically consisted of sand and gravel with occasional anthropogenic material including coal, coke, slag, ceramics, glass, metal fragments, wire, timber/wood, bone, rubber and general building rubble including brick, concrete and pipes noted.

Concentrations of a combination of CoPC including PAHs [naphthalene, benzo(a)pyrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, sum of PAHs], TRHs [TRH >C₁₀-C₁₆, TRH >C₁₆-C₃₄, TRH >C₃₄-C₄₀, aliphatic TRH >C₁₀-C₁₂, aromatic TRH >C₁₀-C₁₂, aliphatic TRH >C₁₂-C₁₆, aromatic TRH >C₁₂-C₁₆, TRH C₆-C₁₀ (minus BTEX) (F1), TRH >C₁₀-C₁₆ (minus Naphthalene) (F2)] and metals (arsenic, cadmium, chromium, copper, lead, nickel, zinc) in soil were reported above the adopted Tier 1 criteria for the following PEVs and Site Derived RC for the Lot E and UGC Area:

- Human Health – Direct Contact – Residential (low, and medium/high density), Recreation/ Open Space, and Commercial/ Industrial land uses.
- Human Health – Vapour Intrusion – Residential and Commercial/ Industrial land uses.
- Maintenance of Modified and Highly Modified Ecosystems.
- Aesthetics.
- Remediation Criteria – Residential (slab-on-grade with unknown construction or multi-storey building, low rise slab-on-grade, and building with basement), Commercial (slab-on-grade with unknown construction or multi-storey building, and working within a basement) and Maintenance Workers.

Table 8 below provides the range of concentrations of CoPC (or general CoPC groups) identified within the Lot E and UGC Area that have been reported above the adopted Tier 1 criteria and Site Derived RC.

Table 8 Summary of Soil Analytical Results

CoPC	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)
Arsenic	<2	576
Cadmium	<0.4	29
Chromium	<2	314
Copper	<5	2,280
Lead	<5	20,100

CoPC	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)
Nickel	3	86
Zinc	8	55,70
TRH >C10-C16	<50	15,500
TRH >C16-C34	<100	15,500
TRH >C34-C40	<100	2,920
Aliphatic TRH >C10-C12	<10	504
Aromatic TRH >C10-C12	<10	114
Aliphatic TRH >C12-C16	<10	2,790
Aromatic TRH >C12-C16	<10	1,170
TRH C6-C10 (minus BTEX) (F1)	<10	114
TRH >C10-C16 (minus Naphthalene) (F2)	<50	15,500
Naphthalene	<0.5	39.7
Benzo(a)pyrene	<0.05	156
Benz(a)anthracene	<0.5	157
Benzo(b)fluoranthene	0.9	4.6
Benzo(k)fluoranthene	<0.5	64.7
Dibenz(a,h)anthracene	<0.5	20
Indeno(1,2,3-cd)pyrene	<0.5	66.2
Sum of PAHs	<0.5	1,810

3.1.1 Shallow Lead Impacted Soil

The presence of shallow lead-impacted soil has been identified at some locations within the Lot E and UGC Area at depths <2.0 m bgl, with some isolated impacts also noted at depths >2.0 m bgl. As a result, there is potential for Intrusive Maintenance workers within the Lot E and UGC Area to come in contact with these soils. Two sample locations – SV12 (soil at 1.0 m bgl) and UC07 (soil at 2.0 m bgl) reported exceedances of the Maintenance Workers Site Derived RC by greater than 250%. However, based on the overall statistical assessment of shallow lead impacts in this area conducted against the Maintenance Workers Site Derived RC, remediation of these impacts is not considered as required (AECOM, 2021b). It is further noted that these locations will be excavated and removed as part of the Underground Carpark installation.

In the event that construction of the Underground Carpark takes place, any services or conduits that will be installed within soil at a depth of >2.0 m bgl must be installed in protective shrouds or in trenches/corridors of clean fill to prevent contact with Site soil.

Maintenance Workers should use appropriate PPE (i.e. dust masks and gloves) to reduce potential exposure to lead in soil. Soil management requirements are discussed in **Section 5.1**.

3.1.2 Asbestos in the Lot E and UGC Area

Anecdotal information indicates that Former Roundhouse pits and service trenches were backfilled with building rubble including asbestos, although only minor ACM has been encountered as isolated fragments during investigations conducted to date, including two isolated ACM fragments at Audit Area 2 and five small isolated ACM fragments at Audit Area 5 in the Roundhouse Area. Under current and proposed future development while the Site is maintained with hardstand or an engineered break, potential ACM within the soil does not have a complete source-pathway-receptor linkage to Site users. However, the potential from ACM to be present should be considered in future works which may disturb soil in this area and managed as discussed in **Section 5.3**.

3.2 Identified Groundwater Impacts

Groundwater Monitoring Events (GMEs) have been routinely conducted for monitoring groundwater wells located within the Lot E and UGC Area since January 2015.

Since 2015, groundwater samples have reported concentrations of a combination of CoPC including total dissolved solids (TDS), metals (arsenic, copper, iron, lead, manganese, zinc), inorganics (ammonia, sodium, boron), TRH [TRH C₁₀-C₃₆ fraction (sum), TRH >C₁₀-C₄₀ fraction (sum), TRH C₁₀-C₁₆ fraction (sum) (minus naphthalene)] and PAHs [naphthalene, benz(a)anthracene, benzo(a)pyrene, anthracene, phenanthrene, fluoranthene] above the following adopted Tier 1 assessment criteria for groundwater PEVs and Site Derived RC:

- Drinking water (health and aesthetics)
- Recreation (primary and secondary contact)
- Maintenance of Ecosystems (90% ecosystem protection level)
- Irrigation
- Vapour Intrusion (from groundwater)
- Remediation Criteria – Residential (unknown construction or multi-storey building)

Table 9 below provides a range of concentrations of CoPC (or general CoPC groups) identified within the Lot E and UGC Area that have been reported above the adopted Tier 1 criteria and Site Derived RC.

Table 9 Summary of Groundwater Analytical Results

CoPC	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)
Total Dissolved Solids	40	5,420
Arsenic	<0.001	0.032
Copper	<0.001	0.011
Iron	<0.05	6.72
Lead	<0.001	0.017
Manganese	0.002	5.47
Zinc	<0.001	0.063
Ammonia (as N)	<0.01	8.43
Sodium	3.7	363
Boron	<0.05	0.78
TRH C ₁₀ -C ₃₆ fraction (sum)	<0.050	4.05

CoPC	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)
TRH >C10-C40 fraction (sum)	<0.100	3.95
TRH C10-C16 fraction (minus naphthalene) [F2]	<0.050	2.01
Naphthalene	<0.001	0.0015
Benz(a)anthracene	<0.001	0.0014
Benzo(a)pyrene	<0.0005	0.0011
Anthracene	<0.001	0.0054
Phenanthrene	<0.001	0.016
Fluoranthene	<0.001	0.0069

3.3 LNAPL Impacts

Environmental investigations completed within the Lot E and UGC Area and in the adjacent areas to date have historically identified three Light Non-Aqueous Phase Liquid (LNAPL) plumes in or adjacent to the Lot E and UGC Area, referred to as LNAPL Plume A1, LNAPL Plume A2 and LNAPL Plume A3. The locations of the LNAPL plumes are presented in **Figure F2** in the **Figures** section.

The LNAPL is understood to comprise predominantly diesel fuel, as well as fuel oils associated with diesel engine operation (e.g. lubricants, engine oils). The probable source of LNAPL is historic locomotive refuelling activities during operation the Roundhouse Refuelling Area.

Measurable LNAPL has been noted in the Lot E and UGC Area ranging in thickness from 0.001 cm at MW138 and MW139 (located in Audit Area 5 within the extent of LNAPL Plume A2) to 29.1 cm at MW137 (located in Audit Area 5, near the eastern boundary of the Lot E and UGC Area).

Measurable LNAPL has not been identified at Plume A3 since July 2017 and is not considered to be a key ongoing contaminant source at the Site. The LNAPL plumes appear to be stable and not increasing.

3.4 Identified Soil Vapour Impacts

Soil vapour monitoring events have been conducted across the Site between 2015 and 2019, including at soil vapour wells within and immediately adjacent to the Lot E and UGC Area, at locations where concentrations of VOCs and SVOCs in soil or groundwater were in excess of the Tier 1 vapour intrusion criteria selected, or in the vicinity of the LNAPL plumes (refer to **Figure F2** and **Figure F6**) to enable assessment of potential risks posed by soil vapour to potential future users of this area.

Assessment of potential vapour intrusion risks associated with the LNAPL plumes undertaken in *Soil Vapour and Indoor Air Investigations 2019* (AECOM, 2020f) surmised that soil vapour impacts associated with the LNAPL plumes do not present an unacceptable risk to the planned future uses of the MPDC site and the Lot E and UGC Area.

Soil vapour investigations identified methane exists in potentially hazardous concentrations in the subsurface within the Lot E and UGC Area (at SV12, SV27S and SV27D) as well as the surrounding area (at SV14 and SV16) [AECOM, 2020f]. The risk from soil methane in the area assessed has been calculated as CS2 – Low Risk, as defined by *Guidelines for the Assessment and Management of Sites Impacted by Hazardous Ground Gases* (EPA NSW, 2020), and appropriate mitigation measures should be included in future building design in this area.

It is noted in the CUTEP report that if the Underground Carpark is ventilated in accordance with Building Code of Australia (BCA) requirements to deal with exhaust fumes, it should also provide sufficient protection from methane infiltration as per EPA NSW, 2020. If the Underground Carpark is

not designed and constructed to BCA standards, methane protection measures should be advised by a qualified environmental consultant and approved by an Environmental Auditor.

3.5 Remediation Activities

3.5.1 Soil Remediation Completed

In order to realise the planned future uses for the Lot E and UGC Area and address the identified exceedances of the Site RC previously identified in this area in the DSIs for Audit Area 2 (AECOM, 2020a) and Audit Area 5 (AECOM, 2019), excavation of identified areas of impacted soil was conducted between December 2019 and November 2020.

Excavation was undertaken in accordance with the remediation work plans (AECOM, 2020g and AECOM, 2020h), technical specifications (AECOM, 2020i and AECOM, 2020j) and the sampling, analysis and quality plan documents (AECOM, 2020k and AECOM, 2020l) prepared for the works.

The works conducted were intended to remove the identified soil impacts and remnant infrastructure in the following areas:

- Lead impacted soil in the Former Roundhouse Refuelling Area.
- Disused Fuel Line in Audit Area 2.
- Remnant infrastructure in the Goods Shed Annexe area.

The following remediation and validation works were conducted to remove soil impacts:

- Uncovering and removal of ~ 50 m of the former Fuel Line which extended north from Audit Area 2 into Audit Areas 4 and 7.
- Removal of the Mechanic Pit, TIT and Truck Wash from the Goods Shed Annexe.
- Impacted soil surrounding identified lead impacts, the Fuel Line, and the Goods Shed Annexe infrastructure was removed to a general depth of ~2 m bgl, with ~2,000 m² of the Site surface excavated in the Lot E and UGC Area and 500 m² in the surrounding buffer zone.
- The excavated areas were backfilled with a mixture of imported VENM and soil excavated from road construction in Audit Area 4. A portion of the excavation in Audit Area 2 had a 300 mm layer of VENM placed over it and remains partially open as it is within the footprint of the Underground Carpark.

The *Remediation Validation Report 2020* (AECOM, 2020b) and the *Goods Shed Remediation Validation Report* (AECOM, 2021c) contain details of the soil remediation works completed, and the excavated areas can be seen on **Figure F6** in the **Figures** section.

The extent of excavation conducted is considered suitable to remove impacted soil and remnant infrastructure and fulfil the soil remediation requirements for the proposed future Site uses of the Lot E and UGC Area. It is noted that soil impacts which exceed the RC and remnant infrastructure remain present in other areas of the MPDC site, but remediation of these locations is not considered required prior to development of Lot E and the UGC Area.

3.5.2 LNAPL and Groundwater Remediation

Prior to AECOM commencing LNAPL delineation and remediation activities in 2015, some historic LNAPL remediation was undertaken at LNAPL Plume A2 by Sinclair Knight Merz (SKM), which included active skimming in 2000 to recover ~5,000 L of LNAPL, and after one year, a passive system to recover ~25 L.

Following this, further soil and groundwater investigations were undertaken AECOM to assess the nature and extent of LNAPL impact. A remediation feasibility appraisal was undertaken, and an assessment of potential remediation pathways for groundwater impacts associated with the LNAPL plumes was prepared as part of the *LNAPL Remediation Action Plan* (the RAP) (AECOM, 2017c). Total Fluids Extraction (TFE) was identified as the most practicable LNAPL remediation method, and a framework for implementation of TFE on the MPDC site was presented.

The RAP established the following LNAPL End-Points:

1. LNAPL recovery rates have reached asymptotic levels, and demonstrate marginal recovery rates, such as less than 5% of initial recovery volumes. Further recoverability of residual LNAPL is demonstrated to be impractical within the constraints of the adopted technology, reasonable timeframes and with consideration of the net environmental benefit.
2. The residual LNAPL plume is shown to be stable or decreasing, including demonstration that LNAPL is not observed in wells where LNAPL has historically been absent.
3. No unacceptable risks to current and future human-health or environmental receptors based on the proposed future land uses

A detailed assessment of LNAPL impacts and remediation conducted at the MPDC site has been reported in the *Assessment of LNAPL Remediation End-Points* (AECOM, 2020e). This report concluded that LNAPL Remediation End Points 1, 2 and 3 had been achieved on the basis of the following:

- Further recovery of LNAPL is considered to be impractical.
- The LNAPL plumes are sufficiently stable.
- Based on the current development plan for the Site, no unacceptable risks to current or future human or ecological receptors from LNAPL appears to be present, assuming that a SEMP or similar is implemented in order to minimise and manage potential risks for any interactions between groundwater, LNAPL and future Site users.

On this basis, further LNAPL remediation is not practicable or required. It is noted that AECOM, 2020f has been submitted to the Auditor and updated on the basis of the comments received but has not yet received endorsement at the time of preparation of this report.

While LNAPL present in the Lot E and UGC Area, restoration of groundwater PEVs is not practicable, and groundwater management will be required as discussed in **Section 5.2**.

4.0 Lot E and UGC Area Management of Potential Human Health Risks

4.1 Overview

The following sections provide details of measures to be implemented to manage potential human health risk. Intrusive works and general maintenance activities should be undertaken in accordance with a Site-specific WHSP developed with reference to the requirements of the Tasmania *Work Health and Safety Act 2012* and *Work Health and Safety Regulations 2012*, and task-specific SWMS.

This SEMP provides a framework for soil and groundwater management measures associated with intrusive works such as the excavation and/ or disposal of soil and importation of fill material, as well as the requirements and maintenance of barriers designed to mitigate direct and indirect contact with contaminated soils.

As previously noted, should any activities need to occur on the Lot E and UGC Area Site that are not currently covered in the SEMP, then the Lot E and UGC Area Site Owner/ Manager should update the SEMP to include these activities. Alternatively, should the requirement for a more specific application be determined, a Construction Environment Management Plan (CEMP) may be required which addresses the proposed tasks and how the works shall comply with the general requirements of the SEMP. It is likely that a CEMP will be required during any future construction or development programs at the Lot E and UGC Area.

4.2 Regulatory Requirements

The following is a list of appropriate legislative and regulatory guidelines that have been considered in the production of this SEMP:

- National Environment Protection Council, *National Environment Protection (Assessment of Site Contamination) Measure 1999* (as amended in May 2013) [ASC NEPM]
- Tasmanian Government *Environmental Management and Pollution Control (Waste Management) Regulations 2020*
- Tasmania Environment Protection Authority (2018) Information Bulletin No. 105, *Classification and Management of Contaminated Soil for Disposal* (EPA Bulletin 105).

4.3 Preventative Exposure Measures

Preventative exposure measures provided in this SEMP can be categorised as follows:

- **Physical Barriers** including:
 - Placement/maintenance of a permanent barrier (i.e. concrete, asphalt, clean soil etc.) to mitigate unrestricted access/exposure to the underlying contamination (as described in **Section 4.4**).
 - Inclusion of protective shrouds or corridors of clean fill around conduits or services at a depth of >2.0 m below the current surface height (i.e. if services are installed surrounding the proposed Underground Carpark).
- **Engineered Controls:** If construction of the proposed Underground Carpark proceeds, it should include installation and maintenance of ventilation in the Underground Carpark to BCA requirements for exhaust fumes, or other controls as specified in EPA NSW, 2020, to prevent potential methane infiltration as described in **Section 3.4**.
- **Administrative Measures** such as:
 - Management plans/documents (such as this SEMP) that provide control of the activities and/or use of the Lot E and UGC Area.
 - Planning controls.

- Lot E and UGC Area Site inductions.
- **Personal Protective Equipment (PPE)** to mitigate exposure to potentially harmful chemicals in soil, groundwater and soil vapour during intrusive works.

In some cases it may be necessary to employ multiple preventative exposure measures, beyond the SEMP, that act as a contingency (or 'fail-safe'). For example, two physical barriers (e.g. concrete and plastic marker layer), or a physical barrier (concrete) combined with an administrative barrier (management plan).

This SEMP is the primary administrative measure for the management of potential human health risks and provides guidance with respect to:

- Subsurface excavation works.
- WHSP and SWMS prepared by any contractors or maintenance workers engaged to undertake works at the Lot E and UGC Area, particularly for intrusive earthworks.
- Groundwater management.

4.4 Physical Barriers

The following is to be considered with regard to the management of potential human health risks at the Lot E and UGC Area:

- Lot E and UGC Area should be maintained with hardstand or an earthen cap to prevent direct human access to soil and groundwater. In the event that the existing hardstand is partly or wholly removed, and/or changes to the configuration and/or penetrations are made, the following would be required:
 - Further assessment to evaluate potential impact to future users.
 - Reinstatement of hardstand, or placement of an earthen cap.
 - The following minimum design barrier shall be installed, unless otherwise agreed to with a suitably qualified Site Environmental Auditor, noting that consideration will need to be given to the intended use of the hardstand area during the design process to ensure the hardstand is suitable for the anticipated loads (e.g. light or heavy vehicles):
 - *Layer 1:* Orange mesh para-webbing (or similar) placed as an indicator barrier over exposed soils to alert the Lot E and UGC Area Site users/ maintenance workers.
 - *Layer 2:* Sub-grade/ base material (minimum 0.2 m) certified as 'Fill Material' in accordance with Tasmanian EPA Bulletin 105 and be geotechnically suitable.
 - *Layer 3:* Surface covering such as concrete or asphalt at a thickness suitable for the intended use (e.g. light or heavy vehicles). Asphalt shall be a minimum 30 mm thickness to allow for longevity of the barrier.
- Landscaped areas and gardens should be established in above ground planter boxes on hardstand and not directly over exposed soil. In the event that gardens are proposed in-ground, the following barrier system shall be installed:
 - *Layer 1:* Orange mesh para-webbing (or similar) placed as an indicator barrier over exposed soils to alert the Lot E and UGC Area Site users.
 - *Layer 2:* Earthen cover (minimum 0.5 m) certified as 'Fill Material' in accordance with EPA Bulletin 105.
 - *Layer 3:* Surface coverage (comprising shallow-rooted vegetation).

Allowance may be made for the establishment of deep-rooted vegetation; however, the barrier thickness may need to be increased, or the design modified. In-ground garden designs should be confirmed with a suitably qualified Site Environmental Auditor.

- Groundwater from beneath the Lot E and UGC Area should not be extracted for any purpose other than environmental monitoring, assessment, or remediation.

4.4.1 Current Status of Physical Barriers

Modifications of the land use and/or the configuration of the Lot E and UGC Area may result in a potential human health risk due to exposure to contamination in the subsurface. This includes (but is not limited to) the following:

- Construction of new buildings.
- Modification of existing buildings.
- Any subsurface excavation works.
- Modification of the existing surface profile (specifically with respect to excavation and/or levelling of soil on any part of the Lot E and UGC Area).
- Modification of the existing surface coverings (e.g. replacing a concrete area with turf).

The Site surface is presently covered with a mixture of concrete, asphalt, gravel, as well as backfill and clean fill material from previous soil remediation works. Areas of excavated soil and infrastructure have been backfilled with a mixture of imported VENM and reused material from Audit Area 4, which was approved by the Site Auditor prior to placement. A section of excavation remains open in Audit Area 2, which is anticipated to be included in the Underground Carpark footprint. A layer of 300 mm of VENM is present on the excavation as an interim measure to prevent contact with the soil.

Section 5.0 provides further guidance with respect to conducting excavation works at the Lot E and UGC Area. It is critical that in the event that the existing physical barriers are modified or removed during any future works, then they must be reinstated to a minimum of the same standard/quality that exists at that location currently.

Reinstatement requirements for physical barriers should be in accordance with the Auditor-endorsed SEMP when attached to a Site Suitability Statement. In the event that variation from the barrier requirements within the SEMP are required, the suitability of the proposed barriers should be confirmed with a suitably qualified Site Environmental Auditor prior to implementation.

4.5 Chemical Exposure

The following compounds have been identified as CoPC in soils, groundwater and soil vapour that may pose a potential human health risk:

- Heavy metals
- TDS, ammonia, sodium, boron
- PAHs
- TRHs
- LNAPL
- Asbestos in some areas of the Lot E and UGC Area (see **Section 3.1.2**).

A summary of the potential symptoms of exposure is provided in **Appendix B**. Potential exposure to these CoPC should be managed through the implementation of measures provided in a Site-specific WHSP (refer **Section 4.6**).

4.6 Work Health and Safety Plan

It is recognised that from time to time it may be necessary to undertake subsurface works at the Lot E and UGC Area for maintenance, gardening or construction purposes, and that such activities may increase the potential for exposure to contaminated materials.

Intrusive works increase the exposure to potentially impacted materials, and therefore protective measures are to be adopted prior to work commencing.

Any works conducted on the Lot E and UGC Area Site should be undertaken in accordance with applicable Work, Health and Safety (WHS) Regulations and a WHSP. The WHSP should provide

guidance with respect to the minimum PPE requirements where workers are likely to contact potentially contaminated materials. Specific SWMS for each task to be performed should also be included in the WHSP.

This SEMP only provides guidance with respect to the minimum PPE requirements where workers are likely to contact contaminated soils (and potentially contaminated groundwater). The levels of protection and the procedures specified in this section are related to contamination issues only, and do not represent a WHSP for the Lot E and UGC Area.

ANY COMPANY/CONTRACTOR ENGAGED TO CONDUCT SUBSURFACE WORKS AND/OR EARTHWORKS AT THE LOT E AND UGC AREA MUST PREPARE A LOT E AND UGC AREA SITE-SPECIFIC WHSP COVERING THEIR WORKERS AT THE LOT E AND UGC AREA SITE.

The following is an overview of WHS considerations for any intrusive works that may be undertaken at the Lot E and UGC Area:

- Evaluation of hazards at the Lot E and UGC Area, and the risks associated with these hazards
- Definition of risk control measures
- Identification of the PPE required
- Details on work practices and restrictions, assessment of anticipated protection levels, controls on access to work area and decontamination
- Supervision of work practices
- The notification of accidents and other matters
- Environmental monitoring protocols
- Risk assessment methods.

The WHSP should address the following:

- All incidents and/or near misses pertaining to works carried out at the Lot E and UGC Area should be reported immediately to the Lot E and UGC Area Site Owner/Manager.
- Development of SWMS pertaining to the works to be undertaken including PPE to be worn by Lot E and UGC Area Site workers. The typical minimal level of PPE required for intrusive works includes:
 - Neck to toe high visibility clothing
 - Hard hat when working with plant equipment (i.e. excavator or similar)
 - Protective gloves (Note: Impervious gloves are to be worn if there is potential for contact with potentially contaminated soil and/or groundwater. Gloves should be checked regularly for wear and tear and replaced when necessary).
 - Sunscreen
 - Steel-toed boots
 - Other appropriate PPE as directed by the worker's Site Safety representative. This may include:
 - Safety glasses
 - Disposable coveralls
 - A first-aid kit, with eye wash bottle and manual should also be available.
- Detail regarding appropriate ventilation of the work area.
- Dust suppression measures to reduce the potential for exposure of personnel to dust.
- Methods for eliminating dermal contact with contaminated material, including:

- maintaining good personal hygiene (including washing hands and face with soap and water [or other suitable cleansing agent] before and after starting works)
- prohibiting smoking, eating and drinking in the working area.
- First aid and emergency procedures.

5.0 Lot E and UGC Area Management of Potential Environmental Impacts

5.1 Soil Management

The following measures should be undertaken if any soil excavation or ground disturbance occurs at the Lot E and UGC Area. Refer to **Section 4.6** for recommended minimum PPE requirements.

5.1.1 Consideration of Known Existing Soil Impacts and Subsurface Infrastructure

Any subsurface works which occur in the Lot E and UGC Area should consider the known existing soil impacts and infrastructure which are present within the Lot E and UGC Area, which include:

- Shallow lead-impacted soil with the Lot E and UGC Area (discussed in **Section 3.1.1**)
- Potential buried ACM fragments in the Lot E and UGC Area (discussed in **Section 3.1.2** and in **Section 5.3**).
- LNAPL impacts present in the Lot E and UGC Area, associated with LNAPL Plumes A1, A2 and A3 (as discussed in **Section 3.2** and **Section 3.5.2**).
- Potentially hazardous subsurface soil gas methane concentrations identified within the Lot E and UGC Area and appropriate mitigation measures to be included in future building design in this area (as discussed in **Section 3.4**)
- Realignment of the Main Hobart Pipeline, proposed to pass along the eastern boundary of the Lot E and UGC Area (as discussed in **Section 2.8**).
- Other subsurface infrastructure (noted on **Table 6** in **Section 2.6**).

5.1.2 Management of Excavated Material

In the event soil needs to be excavated, excavated materials shall be stockpiled in a designated area and must be labelled as contaminated, until the material is reinstated to the excavation which it was removed from, or contamination status is assessed by sampling and analysis for off-Site disposal (refer to **Section 5.1.4**).

The stockpiling area is to be on hardstand or high-density polyethylene (HDPE) sheeting. Stockpiles should be appropriately managed to prevent the loss of suspect soils as dust (via wind erosion), or stormwater runoff.

This may involve:

- Covering, or spraying the stockpiles to keep the soil damp to mitigate wind erosion.
- Construction of silt fences and other measures to capture and prevent runoff from the area.

Stockpiling for an extended period of time should be avoided in order to mitigate potential environmental impacts such as dust and odour generation, and stormwater and sediment run off.

Soils with potentially high levels of contamination encountered during excavation work must be separated and stockpiled from other non-odorous, visibly clean soils, and assessed by a suitably experienced environmental practitioner. Soils which should be separated in this way may be identified by one or more of the following attributes:

- Containing coke, ash, coal tar, ACM fragments, or other visually evident contamination
- Highly odorous (i.e. putrescible, aromatic or hydrocarbon odours)
- Visibly stained (i.e. hydrocarbon staining or other)
- Soil which appears to have been in contact with groundwater
- Soil excavated from the areas of identified soil impacts noted in **Section 3.1**.

5.1.3 Reinstatement or Disposal of Soils

Following completion of earthworks, stockpiled soil should be either reinstated (where appropriate) or disposed off-Site in accordance with the requirements in EPA Tasmania's *Information Bulletin No. 105 - Classification and Management of Contaminated Soil for Disposal* (IB105). Refer to **Section 5.1.4** for further details regarding soil disposal.

The following is noted regarding the reinstatement of soils at the Lot E and UGC Area:

- Soil to be reinstated should be returned to the excavation in the order in which it was removed.
- Where a trench has been excavated for utility installation, the trench should be backfilled with validated fill material (refer to **Section 5.1.5**) to reduce potential risks to future utility workers.
- Details regarding the reinstatement of hardstand is provided in **Section 5.1.6**.

5.1.4 Off-Site Soil Disposal

Where off-site disposal of soil to landfill is proposed, sampling and analysis of excavated soil will be required by a suitably experienced environmental practitioner.

Analysis should be undertaken for the identified CoPC for the Lot E and UGC Area (refer to **Section 2.7**), including an assessment of leachability of select CoPC as per IB105. If it is suspected that other contaminants may be present (e.g. asbestos), these should be included in the analytical suite.

All off-Site disposal of soil is to be conducted in accordance with IB105. The following is noted:

- Soil samples are to be collected at a rate of 1 sample per 25 m³. Should deviations from the minimum sampling density be required (e.g. where large volumes of material are to be disposed of off-site), approval is to be sought from EPA prior to classification of the material.
- Assessment of soil stockpiles should be undertaken by a suitably qualified environmental consultant. Assessment should consider the material as a whole. At the professional judgement of the environmental consultant undertaking the assessment, it may be appropriate to include assessment of the statistical significance of soil impacts in excess of criteria. One possible approach for assessing this risk is detailed in Appendix B2 of the ASC NEPM.
- Based on the classification of the soil, approval from EPA and the receiving facility may be required prior to transport.
- Trucks transporting contaminated soil must be appropriately licenced and comply with relevant Tasmanian EPA guidance for transportation.

It is noted that IB105 is subject to periodic review, hence this section should be updated in accordance with any changes that result from such reviews.

5.1.5 Importation of Fill Material

Any soil to be imported to the Lot E and UGC Area is to comply with the requirements as documented in IB105 or subsequent advice from EPA Tasmania. In addition, consideration should be given to the ASC NEPM Health Investigation Level (HIL) criteria, including HIL B for High-Density Residential land use, HIL C for Recreational land use, or HIL D for Commercial/Industrial land use (this will be dependent on where the material is proposed to be placed and the corresponding land use scenario).

The person responsible for importing fill should ensure that the supplier provides adequate documentation to certify the soil as *Fill Material*. Note that if adequate documentation is not provided, a suitably experienced environmental practitioner may be required to undertake an appraisal of the material which may include soil sampling and laboratory analysis.

5.1.6 Reinstatement of Physical Barriers

Hardstand and other physical barriers shall be reinstated to meet the requirements discussed in **Section 4.4**.

5.1.7 Materials Tracking

Tracking records should be maintained to record the origin, contamination status, and fate of soils and other materials which are excavated, imported or removed from the Site. A materials tracking system

will monitor and control each of the different phases of material handling that may occur, including, but not limited to, the following:

- Excavation
- Temporary stockpiling of excavated materials
- Transport of contaminated stockpile materials from the stockpile to landfill (if required)
- Placement and compaction of suitable backfill within excavations
- Transport of imported material for backfilling purposes.

The materials tracking system should provide detailed information about the location and quantity of materials from excavation to final destination. An example template for recording this information is included in **Appendix C**.

5.2 Groundwater Management

As noted in **Section 2.5.3**, groundwater SWLs measured in monitoring wells beneath the Lot E and UGC Area have ranged between 1.700 m bgl (i.e. 4.338 m AHD) at BH1_PS in July 2016 to 5.365 m bgl (i.e. 0.308 m AHD) at MW140 in November 2019 (AECOM, 2021b).

Groundwater at the Lot E and UGC Area is not to be extracted for any use other than for environmental monitoring, assessment, or remediation purposes.

It is noted that groundwater may be encountered during deep excavation works. If groundwater is encountered during works, the following requirements should be in place when managing:

- Groundwater which ponds in excavations and needs to be removed should be done so by a licensed waste contractor, or alternatively treated and disposed to sewer under a Trade Waste Agreement specific to the Lot E and UGC Area (subject to regulatory approval).
- Groundwater is not to be disposed to the ground surface.
- No extracted groundwater is to be discharged to stormwater or sewer without approval from the appropriate authorities (i.e. establishment of a Trade Waste Agreement).
- LNAPL is known to be present on groundwater in some areas of the Site as described in **Section 3.3** and shown on **Figure F2**. Any works which may encounter groundwater in or near areas where LNAPL is known present should be conducted by staff or contractors suitable qualified works near fuel liquids and should consider:
 - Atmospheric monitoring for potentially hazardous or flammable vapours.
 - Controls on ignition sources in and surrounding the work zone.
 - Management plans for containment, handling and appropriate disposal of any LNAPL and impacted groundwater extracted.

It is noted that groundwater management requirements will be stipulated as part of conditions provided in the Auditor's site suitability statement.

5.2.1 Groundwater Monitoring Wells

Figure F6 in the **Figures** section shows the locations of groundwater monitoring wells within and surrounding the Lot E and UGC Area. As far as reasonably practicable, all existing groundwater monitoring wells are to be maintained, or replaced if damaged/destroyed, in order to enable future groundwater monitoring.

It is noted that no Site-specific ongoing groundwater monitoring is currently proposed for the Lot E and UGC Area, however monitoring may be undertaken as part of wider groundwater monitoring programs

5.3 Asbestos

Potential ACM fragments have previously been observed at the surface of the Lot E and UGC Area and have been encountered in the fill material during test pitting and trenching activities undertaken in

the Former Roundhouse area as discussed in **Section 3.1.1**. No areas of bulk ACM have been observed, although it is noted that they may be present

The ACM fragments previously identified have been collected and disposed of by the MPDC or a licensed subcontractor.

An Asbestos Register has been prepared for the MPDC site, and this register should be referred to prior to undertaking works within the Lot E and UGC Area.

In the event that potential ACM is encountered in soils during intrusive works, all activities are to cease immediately in the immediate work area. A suitably experienced environmental practitioner should be consulted to provide advice regarding the removal and management of ACM in soils prior to works re-commencing.

5.4 Dust and Odour Control

This section is applicable to works associated with subsurface excavation and soil movement. It is expected that normal operation of the Lot E and UGC Area for its current use, or intended future use, will not require the implementation of dust and odour controls.

Measures that can be undertaken to assist with mitigating issues associated with dust and odours are as follows:

- Minimise movement of vehicles on exposed areas
- Minimise excavation and movement of soils
- Dampen down vehicle tracks with water
- Trucks transporting soil around and off-Site should have their loads covered with tarpaulins (or similar) to prevent the emission of dust and/or odour
- Dampen down exposed soil in excavations, or in stockpiles, to minimise dust generation
- Dampen down exposed soil, stockpile, or loads, with an environmentally appropriate odour suppressant solution
- Avoid excavating soil on windy days, due to the increased likelihood of dust and odour generation and transport
- Cover exposed soil (i.e. stockpiles) with netting, matting or plastic sheeting if necessary, to minimise generation of dust and odours.

5.5 Stormwater and Sediment Management

This section is applicable to works associated with subsurface excavation and soil movement. It is expected that normal operation of the Lot E and UGC Area for its current use, or intended future use, will not require the implementation of stormwater and sediment management.

Measures that can be undertaken to assist with mitigating issues associated with stormwater and sediment management are as follows:

- Prior to the commencement of excavation works, existing stormwater drainage should be identified, and appropriate measures undertaken to segregate potential stormwater runoff from the work area and the stormwater drainage system. This may involve the placement of sediment control devices around stormwater drains and stockpiles, as required. Sediment control devices may include (but not be limited to) hay bales, sand-bags and other temporary materials for bunding.
- Stormwater drains and gutters are to be inspected regularly (at least monthly) during excavation works.
- Install drainage and/or grade soil surfaces to minimise pooling of water on exposed soils.
- Cover stockpiles during heavy rain. Ideally, stockpiles should be covered prior to the rainfall event to minimise runoff of sediment laden water, and potential contamination migration.

- To avoid tracking potentially contaminated soil from the work area into uncontaminated areas, ensure vehicles are free from excess soil when leaving the work area.
- Establish a vehicle wash down area (if necessary).
- Clean-up spilt soil, or soil dropped from vehicles on access roads on and near to the Lot E and UGC Area and the MPDC site.
- Stormwater and surface water entering open excavations is to be minimised by redirecting water away from these areas and collecting it as appropriate. Collect stormwater within the work area and allow suspended solids to settle before disposal in accordance with Tasmanian EPA and local Water Authority requirements.
- Appropriate measures are to be undertaken to ensure that no vehicle wash water leaves the MPDC site or enters the stormwater system. Wash water is to be collected and reticulated or disposed of in accordance with applicable Tasmanian EPA and local Water Authority requirements.
- No water is to be discharged to stormwater or sewer without approval from the appropriate authorities (i.e. establishment of a Trade Waste Agreement). In the absence of an approved permission to discharge to stormwater or sewer, licensed waste contractors should be used to remove waste water from the Lot E and UGC Area.

5.6 Noise Control

This section is applicable to works associated with subsurface excavation and soil movement. It is expected that normal operation of the Lot E and UGC Area for its current use, or intended future use, will not require the implementation of noise controls.

Measures that can be undertaken to assist with mitigating noise issues are as follows:

- Minimise noisy activities such as use of excavators, construction equipment and vehicles.
- As a minimum, avoid noisy activities before 7 am and after 8 pm, Monday to Friday, and before 9 am and after 8 pm on weekends and public holidays, or as per operating hours stipulated by local council. No unacceptable noise from the Lot E and UGC Area or the MPDC site should be discernible from the nearest residence during the relevant timeframes.
- Maintain vehicles and equipment in good working order.
- Ensure all noise emissions comply with the *Tasmanian Environmental Protection Policy (Noise) 2009* and *Tasmanian Environmental Management and Pollution Control (Miscellaneous Noise) Regulations 2016*.

5.7 Unexpected Conditions

Should unexpected conditions be encountered during works at the Lot E and UGC Area (e.g. identification of visually contaminated soils, or potential ACM), all work in the subject area is to cease and a suitably experienced environmental practitioner is to be contacted immediately.

An inspection is to be undertaken to assess potential risk to human health and the environment to determine further action(s) required. Changes in expected conditions may require the adoption of a higher level of HSE protection to mitigate potential risk, and this SEMP will require update to reflect any such changes.

6.0 Implementation

6.1 General

The SEMP is an active document, which needs to be considered by all parties/stakeholders planning to undertake intrusive work at the Lot E and UGC Area. Any parties carrying out intrusive or below ground works at the Lot E and UGC Area shall satisfy themselves that suitable safety and environmental controls have been implemented as part of their proposed works program.

Should any activities by the Lot E and UGC Area Site Owner, or with the Lot E and UGC Area Site Owner/ Manager's consent, need to occur at the Lot E and UGC Area that is not currently covered in the SEMP, then the Lot E and UGC Area Site Owner/Manager should update the SEMP to include these activities as discussed in **Section 6.6**. Alternatively, as stated in **Section 4.1**, a CEMP may be required which specifically addresses the proposed tasks and how the works shall comply with the general requirements of the SEMP.

6.2 Inspection

Visual inspections of the Lot E and UGC Area, which includes assessing the condition of the hardstand and landscaped areas, should be undertaken by the Lot E and UGC Area Site Owner/Manager (or delegate) every three years.

If significant works are undertaken, or breaches or damages to surface protections are detected, inspection of the affected area should be undertaken at the time of works, and at the completion of modifications of the area, or repairs to damaged surface coverings.

Where excavations have taken place, and excavations have been backfilled, the surface is to be reinstated as described in **Section 4.4**. An inspection of the reinstated areas is to be undertaken by the Lot E and UGC Area Site Owner/Manager (or delegate) to confirm that the hardstand or landscaped area has been reinstated to the minimum standard.

Where this has not been undertaken, corrective actions will be required to reduce the risk to an acceptable level to such an extent that it no longer presents an unacceptable risk to human health or the environment.

A register of the completion of visual inspections and documentation associated with works completed subsequent to inspections identifying the need for corrective actions should be maintained.

The register of inspections should include (but not be limited to) the following:

- Time and date of the inspection and/or incident
- Details:
 - of all areas inspected, and if any part of the Lot E and UGC Area could not be accessed
 - of any known excavation works which have taken place in the Lot E and UGC Area since the last inspection
 - of any visual indications of changes to surface conditions, including photographs taken during inspection
 - regarding the cause (suspected or known) of the breach
 - associated with works undertaken in the reinstatement of surface conditions
 - of any systems or procedures implemented to prevent similar breaches or deteriorations in the future.

6.3 Environmental Incident Management and Recording

All works at the Lot E and UGC Area should be conducted with a pre-prepared SWMS, or an equivalent control such as a Job Safety Analysis (JSA) or similar safety document, which details risks and control measures for the Lot E and UGC Area Site.

Controls within safety documentation should also consider environmental risks including containment of contaminant releases and impacts if they occur.

All environmental incidents should be recorded, and if an incident or potential incident is likely to cause on- or off-Site impacts to people or the environment, the Lot E and UGC Area Site Owner/Manager should be immediately notified.

Environmental incidents, accidents or mishaps include:

- An accident (actual environmental impact)
- A near miss ('near miss' where no environmental impact occurred)
- A dangerous occurrence (event posing a risk to the environment or damage of property).

Records shall be kept of all environmental incidents, hazardous situations, unusual events and the corrective action taken. A representative of the Lot E and UGC Area Site Owner/Manager will investigate the cause of any emergency so that necessary changes in work practices can be made to prevent the incident recurring.

6.4 Record Keeping

The Lot E and UGC Area Site Owner/Manager (or delegate) will be responsible for keeping documents relating to the implementation of the SEMP, including (but not limited to):

- SEMP maintenance registers (including superseded versions of the SEMP, Lot E and UGC Area Site inspection documents, permits and correspondence between, and training records of, people who have been inducted onto the SEMP).
- The outcomes of additional environmental assessments (if completed).

The Lot E and UGC Area Occupier and Contractors will be responsible for keeping documents relating to the following:

- Materials Tracking
- Unexpected Finds
- Incidents
- Inspections.

6.5 Corrective Actions

In the event that the Lot E and UGC Area Site conditions result in an accidental or unintentional risk to human health or the environment without implementation of appropriate exposure minimisation measures, isolation of the affected area should be undertaken, and steps taken by the most suitable and effective means to mitigate exposure to receptors (human or environmental) in the Lot E and UGC Area or the surrounding areas.

Following the incident or accident, a documented review of the incident should be undertaken by the Lot E and UGC Area Site Owner/Manager (or delegate). The review should be tasked with identifying the cause of the incident and providing recommendations on alternative procedures or systems to be implemented at the Lot E and UGC Area and/or within the SEMP to prevent/minimise the likelihood of the incident reoccurring.

Corrective actions should be completed in a manner and timing as directed by the Lot E and UGC Area Site Owner/Manager.

6.6 Document Revision

A review of the SEMP should be undertaken every three years, or earlier if a significant change in Lot E and UGC Area use or conditions occur, by the Lot E and UGC Area Site Owner/ Manager (with input from specialist professionals where required), and should consider:

- Any non-compliances with the SEMP that have not been rectified

- Means of improving environmental compliance
- Legislation or guidelines that impact any part of the SEMP
- Proposed changes in the way the Lot E and UGC Area is used, or any changes in the surrounding land use which may impact upon exposure pathways.

The SEMP should be updated as necessary, based on the results of reviews of the SEMP. The Quality Information table at the front of this document must be updated in the revision table at the front of this document.

7.0 References

- AECOM (2017a) *Macquarie Point Development Project – Site Remediation Strategy Update 2017*, AECOM Australia Pty Ltd, June 2017
- AECOM (2017b) *Macquarie Point Development Project – Preferential Pathway Assessment*, AECOM Australia Pty Ltd, 22 August 2017
- AECOM (2017c) *Macquarie Point Development Project - LNAPL Remediation Action Plan*, AECOM Australia Pty Ltd, 30 May 2017
- AECOM (2020a), *Audit Area 2 – Detailed Site Investigation, Macquarie Point Development Project*, AECOM Australia Pty Ltd, 17 December 2020
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- AECOM (2020d) *Roundhouse Test Pit and Trench Investigation 2020, Macquarie Point Development Project*, AECOM Australia Pty Ltd, 26 June 2020
- AECOM (2020e), *Assessment of LNAPL Remediation End-Points, Macquarie Point Development Project*, AECOM Australia Pty Ltd, 20 November 2020
- AECOM (2020f), *Soil Vapour and Indoor Air Investigations 2019, Macquarie Point Development Project*, AECOM Australia Pty Ltd, 22 October 2020
- AECOM, (2020g) *Audit Area 2 and Audit Area 7 – Remediation Work Plan*, AECOM Australia Pty Ltd, 12 March 2020
- AECOM, (2020h) *Pipeline Remediation – Remediation Work Plan*, AECOM Australia Pty Ltd, 16 June 2020
- AECOM, (2020i) *Audit Area 2 and Audit Area 7 – Technical Specification*, AECOM Australia Pty Ltd, 3 April 2020
- AECOM, (2020j) *Diesel and Oil Pipeline Removal – Technical Specification*, AECOM Australia Pty Ltd, 16 January 2020
- AECOM, (2020k) *Audit Area 2 and Audit Area 7 Remediation – Sampling, Analysis and Quality Plan*, AECOM Australia Pty Ltd, 25 March 2020
- AECOM, (2020l) *Sampling, Analysis and Quality Plan – Diesel and Oil Pipeline Remediation*, AECOM Australia Pty Ltd, 16 June 2020
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- AECOM (2021c), *Goods Shed Annexe Remediation Validation Report*, AECOM Australia Pty Ltd, 22 January 2021
- Austral (2013) *Macquarie Point Development Project, Historical Summary*, Austral Tasmania Pty Ltd, 15 January 2013
- EPA NSW (2020), *Assessment and management of hazardous ground gases*, NSW Environment Protection Authority, May 2020
- Macquarie Point Development Corporation (MPDC) (2015), *New Territory from Old Ground – Macquarie Point Strategic Framework and Masterplan 2015-2030*. Retrieved from <https://www.macquariepoint.com/publications/documents> on 3 May 2019
- National Environment Protection Council, *National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM) Site Characterisation* [as amended 2013]

Tasmanian Environment Protection Authority, 2018. *Information Bulletin No. 105 (IB105), Classification and Management of Contaminated Soil For Disposal*

Tasmanian Government *Environmental Management and Pollution Control (Waste Management) Regulations 2020*

Tasmanian Government *Environmental Protection Policy (Noise) 2009*

Tasmanian Government *Environmental Management and Pollution Control (Miscellaneous Noise) Regulations 2016*

8.0 Limitations

This document was prepared for the purpose described herein and as agreed to by AECOM and the Macquarie Point Development Corporation.

This document was prepared for the sole use of the Macquarie Point Development Corporation, the only intended beneficiaries of our work. AECOM accepts no duty of care or liability to any third parties who may use or rely on this report, other than as expressly agreed by AECOM. Without limiting the foregoing sentence in any way, in no circumstances will AECOM be liable to any third party whether that liability arises in contract, tort (including negligence or breach of statutory duty) or otherwise for any loss whatsoever arising out of or in any way related to this report.

For the purposes of this report, AECOM has relied upon previous detailed investigations carried out and a review of available reports. It is assumed by AECOM that all relevant information and reports have been provided by those persons from whom it has been requested and that such information provided is accurate. AECOM does not assume any liability for misrepresentation of items not visible, accessible or present at the Site during Site inspections.

This report is not intended as a substitute for legal advice, nor is it an exhaustive review of the Site conditions. AECOM makes no warranties about the condition of the Site or the operations occurring at the Site.

From a technical perspective, the subsurface environment at any Site may present substantial uncertainty. It is a heterogeneous, complex environment, in which small subsurface features or changes in geologic conditions can have substantial impacts on water and chemical movement. Uncertainties may also affect source characterisation assessment of chemical fate and transport in the environment, assessment of exposure risks and health effects and remedial action performance.

There is no investigation that is thorough enough to preclude the presence of material, which presently or in the future, may be considered hazardous at the Site. Because regulatory evaluation criteria change from time to time, concentrations of contaminants presently considered low may, in the future, fall under different regulatory standards that may require a change in action.

Any advice, opinions or recommendations contained in this document should be read and relied upon only in the context of the document as a whole and are considered current to the date of this document. AECOM believes that its opinions are reasonably supported by the testing and analysis that have been done and that those opinions have been developed according to the professional standard of care for the environmental consulting profession in this area at this time. That standard of care may change and new methods and practices of exploration, testing, analysis and remediation may develop in the future, which might produce different results. AECOM's professional opinions contained in this document are subject to modification if additional information is obtained through further investigation, observations, or testing and analysis during any future assessment or remedial activities.

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Figures

Figures

Figure F1 Site Location

Figure F2 Current Site Layout

Figure F3 Proposed Development Layout

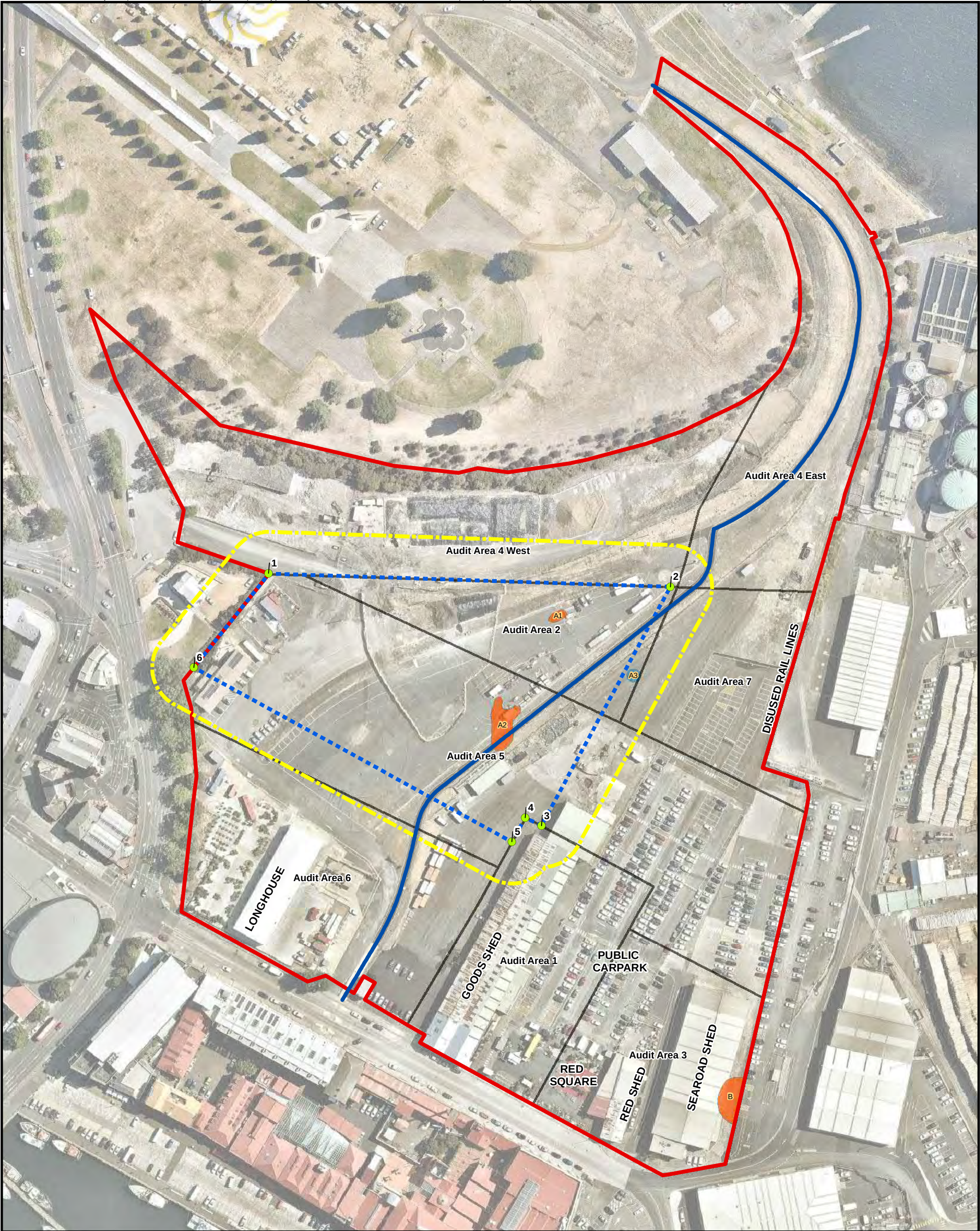
Figure F4 Previous Site Uses

Figure F5 Subsurface Features

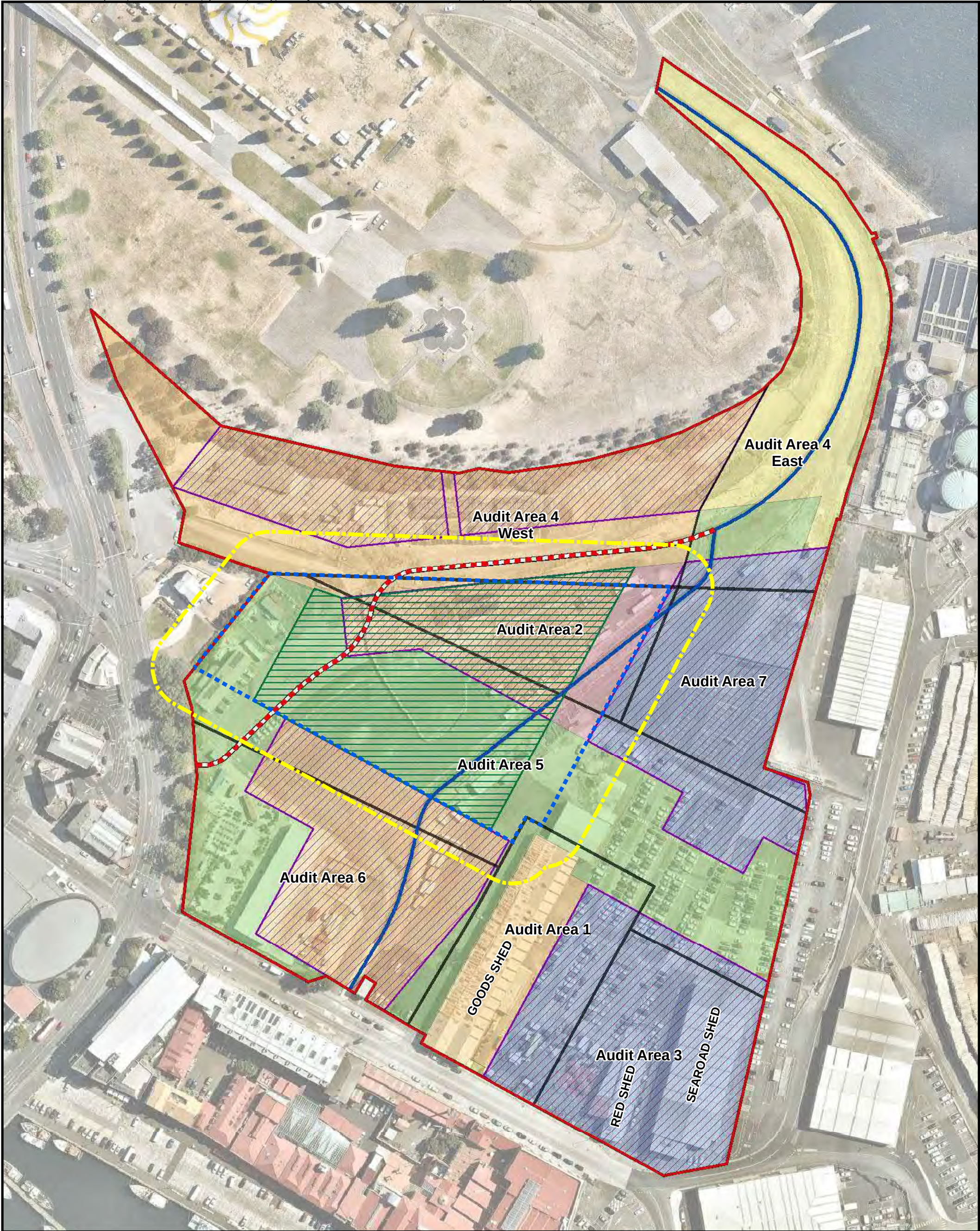
Figure F6 Assessment Locations



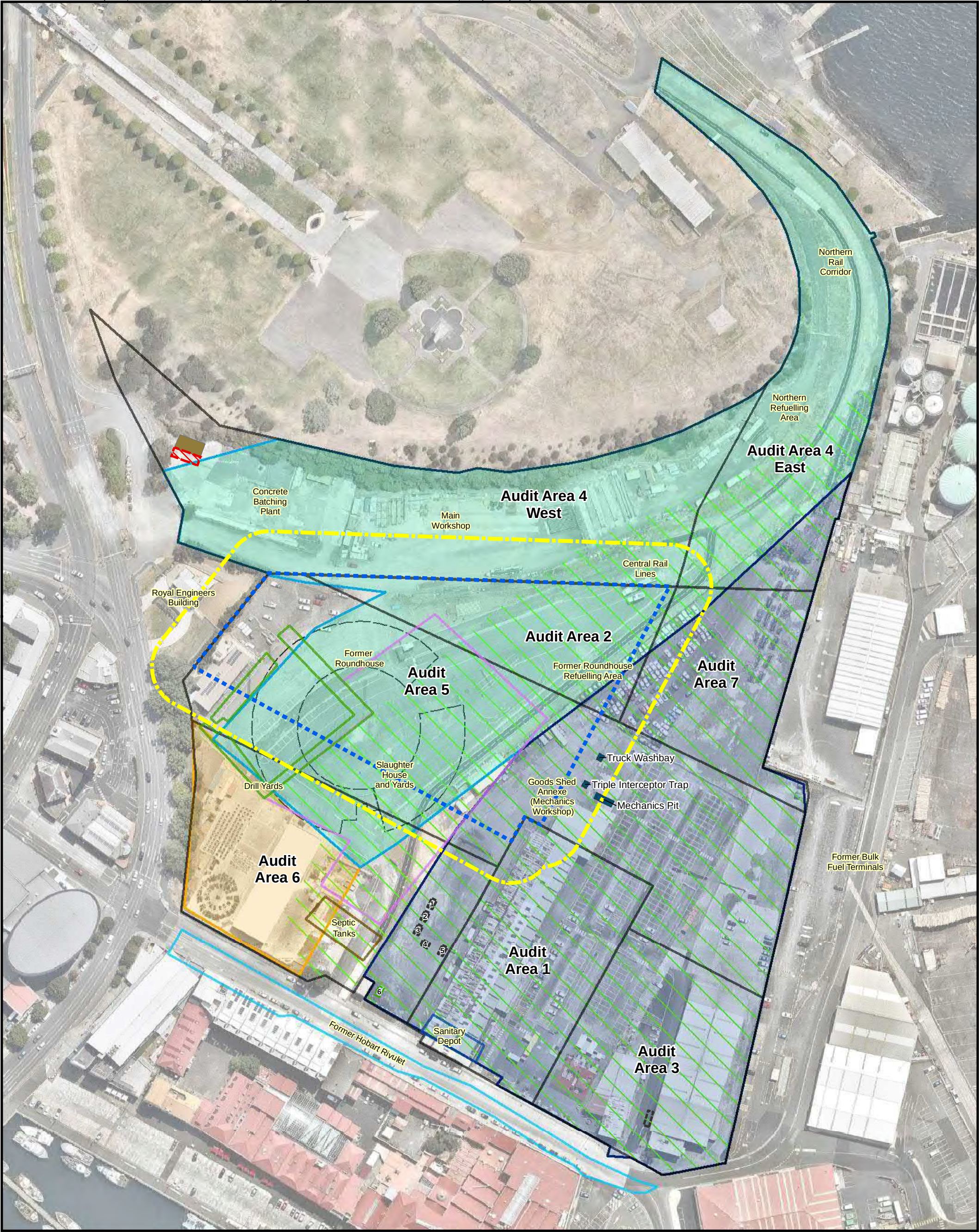
PROJECT ID 60321835 CREATED BY JB LAST MODIFIED PK 16 MAR 2021 AECOM www.aecom.com DATUM GDA 1994, PROJECTION MGA ZONE 55 0 100 200 400 metres 1:10,000 (when printed at A3)	LEGEND Site Boundary	SITE LOCATION <table><tr><td data-bbox="1455 2712 1913 2890"> Macquarie Point Development Corporation Lot E and Underground Carpark – Site Environment Management Plan 41 Evans Street, Hobart, TAS, 7001 </td><td data-bbox="1913 2712 2039 2890"> Figure F1 </td></tr></table>		Macquarie Point Development Corporation Lot E and Underground Carpark – Site Environment Management Plan 41 Evans Street, Hobart, TAS, 7001	Figure F1
Macquarie Point Development Corporation Lot E and Underground Carpark – Site Environment Management Plan 41 Evans Street, Hobart, TAS, 7001	Figure F1				



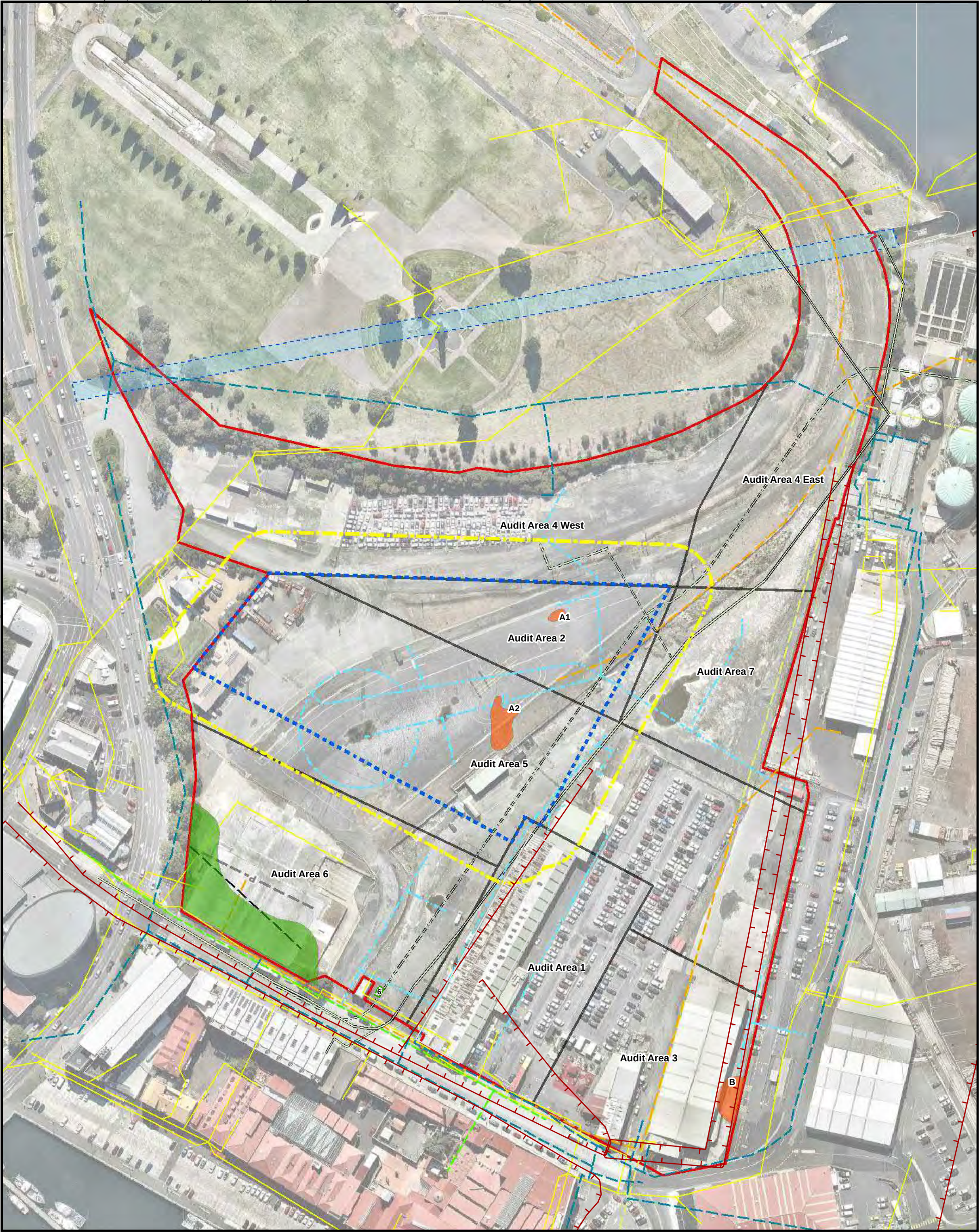
PROJECT ID 60321835 CREATED BY PK LAST MODIFIED PK 16 Mar 2021 AECOM www.aecom.com DATUM GDA 1994, PROJECTION MGA ZONE 55 0 25 50 100 metres 1:1,675 (when printed at A3)	Legend - Vertices Location - Lot E and Underground Carpark CUTEP Boundary 20 m Buffer Zone - Proposed Audit Areas - Site Boundary - Inferred Extent of LNAPL Plume - Historical Inferred Extent of LNAPL Plume - Existing Cycleway	CURRENT SITE LAYOUT Macquarie Point Development Corporation Lot E and Underground Carpark – Site Environment Management Plan Macquarie Point, Hobart, TAS	Figure F2
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PROJECT ID 60321835 CREATED BY PK LAST MODIFIED PK 16 Mar 2021 AECOM www.aecom.com DATUM GDA 1994, PROJECTION MGA ZONE 55 0 25 50 100 metres (when printed at A3) 1:1,675	Legend Lot E and Underground Carpark CUTEP Boundary 20 m Buffer Zone Underground Carpark Footprint Site Boundary Building Parcels Proposed Audit Proposed Cycleway Existing Cycleway Land Use Art and Institutional Open Space Mixed Use Access Link Transport/Vehicle Areas	PROPOSED DEVELOPMENT PLAN Macquarie Point Development Corporation Lot E and Underground Carpark – Site Environment Management Plan Macquarie Point, Hobart, TAS	Figure F3
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PROJECT ID 60321835 CREATED BY DJB LAST MODIFIED PK 19 Mar 2021 AECOM www.aecom.com DATUM GDA 1994, PROJECTION MGA ZONE 55 0 12.5 25 50 metres 1:1,675 (when printed at A3)	Legend <table><tr><td> Lot E and Underground Carpark CUTEP Boundary</td><td> Drill Yards</td><td> Truck Wash/ Settling Pits</td></tr><tr><td> 20 m Buffer Zone</td><td> Former Hobart Rivulet</td><td> Potential Petroleum Storage Tanks</td></tr><tr><td> Audit Area Boundary</td><td> Sanitary Depot</td><td> Known UST Location</td></tr><tr><td> Reclaimed Land</td><td> Septic Tanks</td><td> Previous UST Location</td></tr><tr><td> Freight Handling</td><td> Slaughter House and Yards</td><td></td></tr><tr><td> Rail Yards</td><td> Historic Infrastructure</td><td></td></tr><tr><td> Gas Works</td><td></td><td></td></tr></table>	Lot E and Underground Carpark CUTEP Boundary	Drill Yards	Truck Wash/ Settling Pits	20 m Buffer Zone	Former Hobart Rivulet	Potential Petroleum Storage Tanks	Audit Area Boundary	Sanitary Depot	Known UST Location	Reclaimed Land	Septic Tanks	Previous UST Location	Freight Handling	Slaughter House and Yards		Rail Yards	Historic Infrastructure		Gas Works			PREVIOUS SITE USES Macquarie Point Development Corporation <i>Lot E and Underground Carpark – Site Environment Management Plan"</i> Macquarie Point, Hobart, TAS	Figure F4
Lot E and Underground Carpark CUTEP Boundary	Drill Yards	Truck Wash/ Settling Pits																						
20 m Buffer Zone	Former Hobart Rivulet	Potential Petroleum Storage Tanks																						
Audit Area Boundary	Sanitary Depot	Known UST Location																						
Reclaimed Land	Septic Tanks	Previous UST Location																						
Freight Handling	Slaughter House and Yards																							
Rail Yards	Historic Infrastructure																							
Gas Works																								



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DATUM GDA 1994, PROJECTION MGA ZONE 55
0 12.5 25 50
metres
1:1,675 (when printed at A3)

Legend

Site Boundary	Pipeline	Lot E and Underground Carpark CUTEP Boundary
Sea Wall	Tar pipeline	20 m Buffer Zone
Stormwater pipeline	Naval oil pipeline	Audit Areas
Sewer (Main Hobart Pipeline)	Oil pipeline	Inferred Extent of LNAPL Plume
Former Sewer pipeline	Diesel pipeline	Inferred Extent of Tar and Gross Tar Impact
TasGas pipeline	Water pipeline	Known UST Location
	Telecommunication Cables	

SUBSURFACE FEATURES

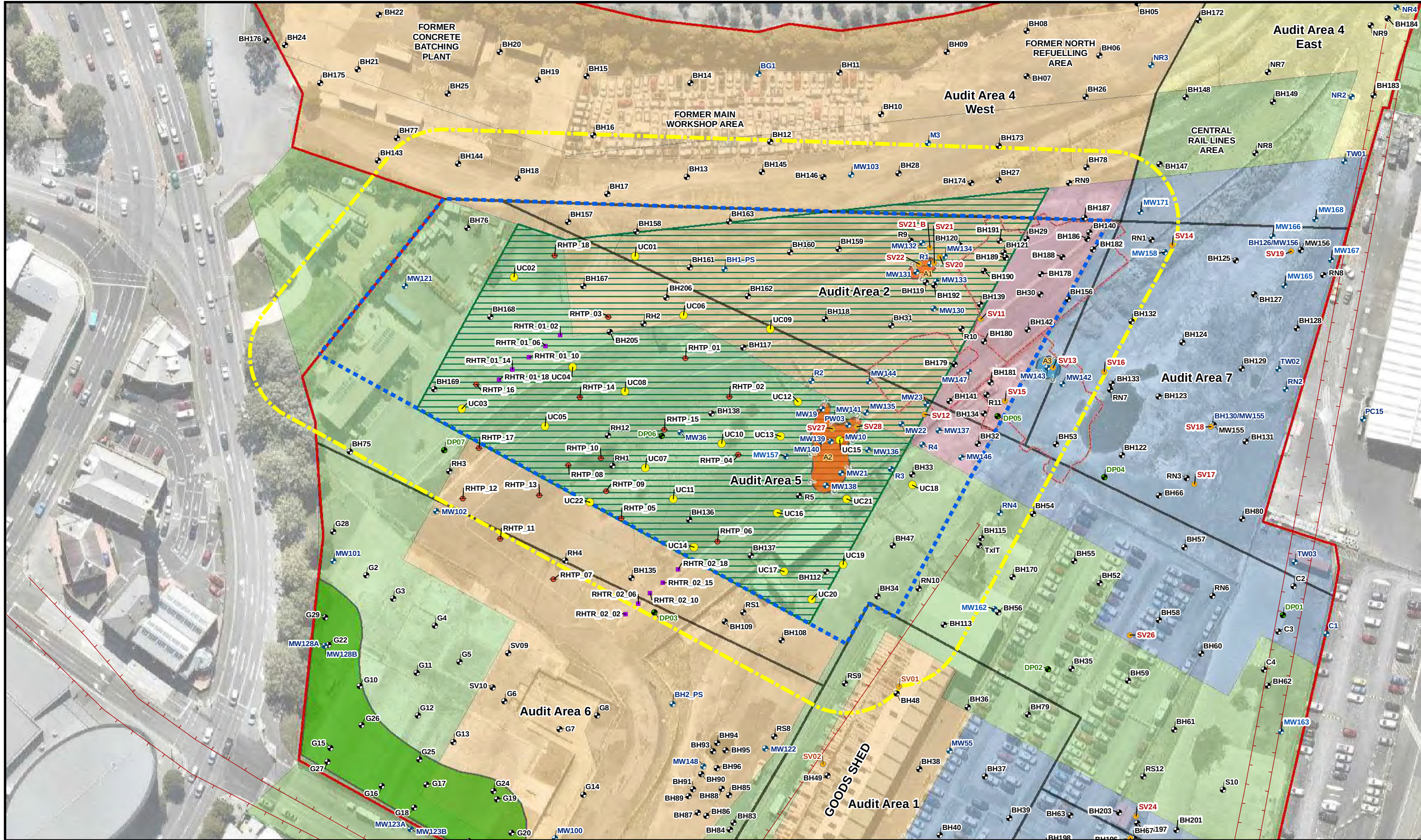
Macquarie Point Development Corporation

Lot E and Underground Carpark – Site Environment Management Plan

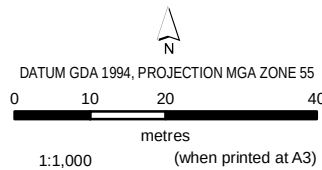
Macquarie Point, Hobart, TAS

Figure

F5



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Legend

- Groundwater Well
- Vapour Probes
- Geotechnical Borehole
- Soil Bores/Test Pits
- Test Pit (Underground Carpark)
- Test Pit (Roundhouse Investigation)
- Trench (Roundhouse Investigation)
- Sea Wall
- Site Boundary
- Lot E and Underground Carpark CUTEP Boundary
- 20 m Buffer Zone
- Audit Areas
- Excavation Extent

- Inferred Extent of LNAPL Plume
- Inferred Extent of Tar and Gross Tar Impact
- Historical Inferred Extent of LNAPL Plume

Land Use

- Art and Institutional Area
- Open Space Area
- Mixed Use Area
- Access Link
- Transport/Vehicle Areas

ASSESSMENT LOCATIONS

Macquarie Point Development Corporation

Lot E and Underground Carpark –
Site Environment Management Plan

Macquarie Point, Hobart, TAS

Figure

F6

Appendix A

Induction Register

Table 1 Site Induction Form

[illegible]

Appendix B

Summary of Chemicals of Potential Concern

Summary of Chemicals of Potential Concern

The following information has been compiled from the June 1997 National Institute of Occupational Health and Safety (NIOSH) *Pocket Guide to Chemical Hazards*, 1998 American Conference of Governmental Industrial Hygienists (ACGIH) *Guide to Occupational Exposure Values*, Agency for Toxic Substances & Disease Registry (ATSDR), the Australia Government Asbestos Safety and Eradication Agency, and representative material safety data sheets (MSDS).

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are formed as a result of the incomplete burning of organic material. The most common health effects associated with PAHs are linked to its carcinogenic effects. The primary route of exposure to PAHs during this project is contact with contaminated soils which can lead to entry through ingestion, inhalation (dust) or open wounds. This necessitates the use of appropriate protective clothing and proper decontamination procedures.

Total Petroleum Hydrocarbons (TPH)

TPH is a term used to describe several hundred chemical compounds that originate from crude oil. The compounds in various TPH fractions can affect the body in different ways. Health effects include central nervous system depression, irritation of the throat, skin, eyes, and stomach, breathing difficulties, in addition to impacts on blood, immune system, liver, spleen, kidneys, developing foetus, and lungs. The primary route of exposure to TPH during this project will be through handling tar impacted material. Appropriate PPE must be worn at all times while handling TPH contaminated material.

Heavy Metals

Large amounts of heavy metals may cause acute or chronic toxicity (poisoning). Heavy metal toxicity can result in damaged or reduced mental and central nervous function, lower energy levels, and damage to blood composition, lungs, kidneys, liver, and other vital organs. Heavy metals may enter the human body through ingestion, inhalation, or absorption through the skin. Appropriate protective equipment must be worn and proper decontamination procedures must be adhered to.

Total Dissolved Solids (TDS)

TDS consist of inorganic salts and small amounts of organic matter that are dissolved in water. **TDS** comprise sodium, potassium, calcium, magnesium, chloride, sulfate, bicarbonate, carbonate, silica, organic matter, fluoride, iron, manganese, nitrate, nitrite and phosphates. No health effects have been associated specifically with or directly attributable to high TDS concentrations, although the health effects of individual components of TDS must be considered separately. Indirectly, high TDS water, being less palatable, might discourage consumers from drinking tap water, leading to use of potentially less healthy water (from alternative sources, natural or manufactured) and/or other less healthy drinks.

Sodium

Sodium is a natural component of water and essential to human life. The guideline value for sodium in drinking water is based on aesthetic considerations (taste threshold); while high sodium may be likely to give water a salty taste, it is unlikely to present a health concern. When consumed, sodium is readily absorbed by the body. It is present in all body tissues and fluids and its concentration is maintained by the kidney. High concentrations give rise to the sensation of thirst. Excessive sodium intake, usually via diet, can aggravate chronic congestive heart failure and increase blood pressure. Reduced sodium intake can reduce the blood pressure of some individuals with hypertension.

Boron

Boron can occur in drinking water through the natural leaching of boron-containing minerals, or by contamination of water sources. Boron compounds are used in glass manufacture, cleaners, wood and leather preservatives, and as agricultural fertilisers, herbicides and insecticides. Boron, as soluble borate (borax) or boric acid, is rapidly and completely absorbed after ingestion. It is widely distributed throughout the body and up to 90% is excreted unchanged in urine. Ingestion of high doses, or long-term occupational exposure to boron can cause gastrointestinal disturbances, skin eruptions, and central nervous system stimulation and depression. Tests for mutagenicity using bacteria and mammalian cells have been mostly negative. Appropriate PPE must be worn while handling boron contaminated material.

Ammonia

The guideline value for ammonia in drinking water is based on aesthetic considerations (e.g. causing corrosion of copper pipes and fittings or nuisance growths of microorganisms); no health-based guideline value is set for ammonia. Ammonia, an important metabolite in humans. Only an extremely small proportion of the ammonia absorbed in the intestinal tract originates directly from food or water. The major part is formed in the gut as a by-product of the breakdown of food. Almost all ammonia is absorbed. It is then transported to the liver and used mostly in the urea cycle. Ammonia has a toxic effect on humans only if the intake becomes higher than the detoxification capacity of the body. Ammonia and ammonium chloride have shown mutagenicity in some tests with bacteria and animal cells. Appropriate PPE must be worn while handling ammonia contaminated material.

Asbestos Containing Material (ACM)

Asbestos is a naturally occurring mineral fibre which is strong, flexible, and can insulate from heat and electricity. Because of these properties, historically asbestos has been commonly used in the construction of homes and buildings and is understood to have been used in roofing material as bonded asbestos at Macquarie Point. It can be encountered as friable (generally crumbling material with potential to generate fibres) or non-friable (bonded). Asbestos is a known carcinogen and exposure to asbestos fibres can lead to a number of diseases, including pleural disease, asbestosis, lung cancers, and mesothelioma. In the event that potential asbestos containing material (ACM) is encountered in soils during intrusive works, all activities are to cease immediately in the work area. A suitably experienced occupational hygienist should be consulted to provide advice regarding the removal and management of ACM in soils prior to works re-commencing.

Appendix C

Materials Tracking Sheet

Materials Tracking Register

Name / Representative	
Company /Organisation	
Description of Works	
Page No.	of

Table 1 Materials Tracking Register

Date	Origin ¹	Approximate Volume (m ³)	Sampled (Y/N)	Destination ²	Notes / Comments ³

Notes: 1. Include a description of the location where the soil was excavated and a grid location (where possible); 2. This may be off-Site disposal, placement in stockpile, re-use on the Site. Provide a description of the location where soils are to be re-used and/or stored, and a grid location (where possible); 3. Include soil type, any odours or other indicators of contamination and sampling undertaken.

The table provided above is an example of a soil materials tracking register for simple earthworks. Large scale earthworks may require a different tracking system. The completed form should be returned to the Site Manager (or delegate) and retained on file for reference.