DEVELOPMENT APPLICATION

PDPLANPMTD-2025/055412

PROPOSAL: Secondary Residence (Single Dwelling)

LOCATION: 2 Old Coach Road, Cambridge

RELEVANT PLANNING SCHEME: Tasmanian Planning Scheme - Clarence

ADVERTISING EXPIRY DATE: 19 November 2025

The relevant plans and documents can be inspected at the Council offices, 38 Bligh Street, Rosny Park, during normal office hours until 19 November 2025. In addition to legislative requirements, plans and documents can also be viewed at www.ccc.tas.gov.au during these times.

Any person may make representations about the application to the Chief Executive Officer, by writing to PO Box 96, Rosny Park, 7018 or by electronic mail to clarence@ccc.tas.gov.au. Representations must be received by Council on or before 19 November 2025.

To enable Council to contact you if necessary, would you please also include a day time contact number in any correspondence you may forward.

Any personal information submitted is covered by Council's privacy policy, available at www.ccc.tas.gov.au or at the Council offices.

City of Clarence
38 Bligh St Rosny Park
PO Box 96
Rosny Park TAS, 7018

03 6217 9500
clarence@ccc.tas.gov.au
ccc.tas.gov.au

Application for Development / Use or Subdivision

Use this form to obtain planning approval for developing or using land, including subdividing it into smaller lots or lot consolidation.

Proposal: Proposed Ancillary Dwelling

Location: 2 Old Coach Road Cambridge

Personal Information Removed

City of Clarence
38 Bligh St Rosny Park
PO Box 96
Rosny Park TAS, 7018

03 6217 9500
clarence@ccc.tas.gov.au
ccc.tas.gov.au

Is the property on the Tasmanian Heritage Register? Yes ☐ No ☒

If yes, we recommend you discuss your proposal with Heritage Tasmania prior to lodgement as exemptions may apply which may save you time on your proposal.

If you had pre-application discussions with City of Clarence, please provide planner's name:
Owners have had discussions with Dominic

Current use of site: Residential

Does the proposal involve land administered or owned by the Crown or Council? Yes ☐ No ☒

Declaration

- I have read the Certificate of Title and Schedule of Easements for the land and am satisfied that this application is not prevented by any restrictions, easements or covenants.
- I authorise the provision of a copy of any documents relating to this application to any person for the purposes of assessment or public consultation. I agree to arrange for the permission of the copyright owner of any part of this application to be obtained. I have arranged permission for Council's representatives to enter the land to assess this application
- I declare that, in accordance with Section 52 of the Land Use Planning and Approvals Act 1993, that I have notified the owner of the intention to make this application. Where the subject property is owned or controlled by Council or the Crown, their signed consent is attached.
- I declare that the information in this declaration is true and correct.

Acknowledgement

- I acknowledge that the documentation submitted in support of my application will become a public record held by Council and may be reproduced by Council in both electronic and hard copy format in order to facilitate the assessment process; for display purposes during public consultation; and to fulfil its statutory obligations. I further acknowledge that following determination of my application, Council will store documentation relating to my application in electronic format only.

Personal Information Removed

Please refer to the development/use and subdivision checklist on the following pages to determine what documentation must be submitted with your application.

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Development/use or subdivision checklist

Mandatory Documents
This information is required for the application to be valid. We are unable to proceed with an application without these documents.

- ☐ Details of the location of the proposed use or development.
- ☐ A copy of the current Certificate of Title, Sealed Plan, Plan or Diagram and Schedule of Easements and other restrictions for each parcel of land on which the use or development is proposed.
- ☐ Full description of the proposed use or development.
- ☐ Description of the proposed operation. May include where appropriate: staff/student/customer numbers; operating hours; truck movements; and loading/unloading requirements; waste generation and disposal; equipment used; pollution, including noise, fumes, smoke or vibration and mitigation/management measures.
- ☐ Declaration the owner has been notified if the applicant is not the owner.
- ☐ Crown or Council consent (if publically-owned land).
- ☐ Any reports, plans or other information required by the relevant zone or code.
- ☐ Fees prescribed by the City of Clarence.

Application fees (please phone 03 6217 9550 to determine what fees apply). An invoice will be emailed upon lodgement.

Additional Documents
In addition to the mandatory information required above, Council may, to enable it to consider an application, request further information it considers necessary to ensure that the proposed use or development will comply with any relevant standards and purpose statements in the zone, codes or specific area plan, applicable to the use or development.

- ☐ Site analysis and site plan, including where relevant:
  - Existing and proposed use(s) on site.
  - Boundaries and dimensions of the site.
  - Topography, including contours showing AHD levels and major site features.
  - Natural drainage lines, watercourses and wetlands on or adjacent to the site.
  - Soil type.
  - Vegetation types and distribution, and trees and vegetation to be removed.

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- Location and capacity of any existing services or easements on/to the site.
- Existing pedestrian and vehicle access to the site.
- Location of existing and proposed buildings on the site.
- Location of existing adjoining properties, adjacent buildings and their uses.
- Any natural hazards that may affect use or development on the site.
- Proposed roads, driveways, car parking areas and footpaths within the site.
- Any proposed open space, communal space, or facilities on the site.
- Main utility service connection points and easements.
- Proposed subdivision lot boundaries.

☐ Where it is proposed to erect buildings, detailed plans with dimensions at a scale of 1:100 or 1:200 showing:

- Internal layout of each building on the site.
- Private open space for each dwelling.
- External storage spaces.
- Car parking space location and layout.
- Major elevations of every building to be erected.
- Shadow diagrams of the proposed buildings and adjacent structures demonstrating the extent of shading of adjacent private open spaces and external windows of buildings on adjacent sites.
- Relationship of the elevations to natural ground level, showing any proposed cut or fill.
- Materials and colours to be used on rooves and external walls.

☐ Where it is proposed to erect buildings, a plan of the proposed landscaping showing:

- Planting concepts.
- Paving materials and drainage treatments and lighting for vehicle areas and footpaths.
- Plantings proposed for screening from adjacent sites or public places.

☐ Any additional reports, plans or other information required by the relevant zone or code.

This list is not comprehensive for all possible situations. If you require further information about what may be required as part of your application documentation, please contact City of Clarence Planning team on (03) 6217 9550.

RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
123192	1
EDITION	DATE OF ISSUE
5	21-Jun-2025

SEARCH DATE : 27-Aug-2025
SEARCH TIME : 11.24 AM

DESCRIPTION OF LAND

City of CLARENCE
Lot 1 on Sealed Plan 123192
Derivation : Part of 1956 Acres Gtd. to G. Stokell, Whole of Lot26987 Gtd. to R. Hall.
Prior CTs 45483/1 and 44017/3

SCHEDULE 1

C321136 & N262281 DEAN ROSS SMITH and ANITA JANE SMITH as tenants in common in equal shares Registered 21-Jun-2025 at 12.01 PM

SCHEDULE 2

Reservations and conditions in the Crown Grant if any
SP 44017 COUNCIL NOTIFICATION under Section 468(12) of the Local Government Act 1962
D83774 BURDENING EASEMENT: a ventilation easement (appurtenant to Lot 1 on Plan 199191 and Lot 1 on Sealed Plan 6803) over the land marked Ventilation Easement 'C' 1.50 Wide on Sealed Plan 123192 Registered 24-Jun-2013 at noon
D83775 BENEFITING EASEMENT: a ventilation easement over the lands marked Ventilation Easement 'A'and 'B' 1.50 Wide on Sealed Plan 123192 Registered 24-Jun-2013 at noon
E417434 MORTGAGE to National Australia Bank Limited Registered 21-Jun-2025 at 12.02 PM

UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

OWNER THE ROYAL SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS TAS INC JE & LA WATSON
FOLIO REFERENCE CT45483-1
CT 44017-3
GRANTEE WHOLE OF LOT 26987, 4A 2R 21P GTD TO ROBERT HALL AND PART OF 1956 ACRES GTD TO GEORGE STOKELL (&160 ACRES)

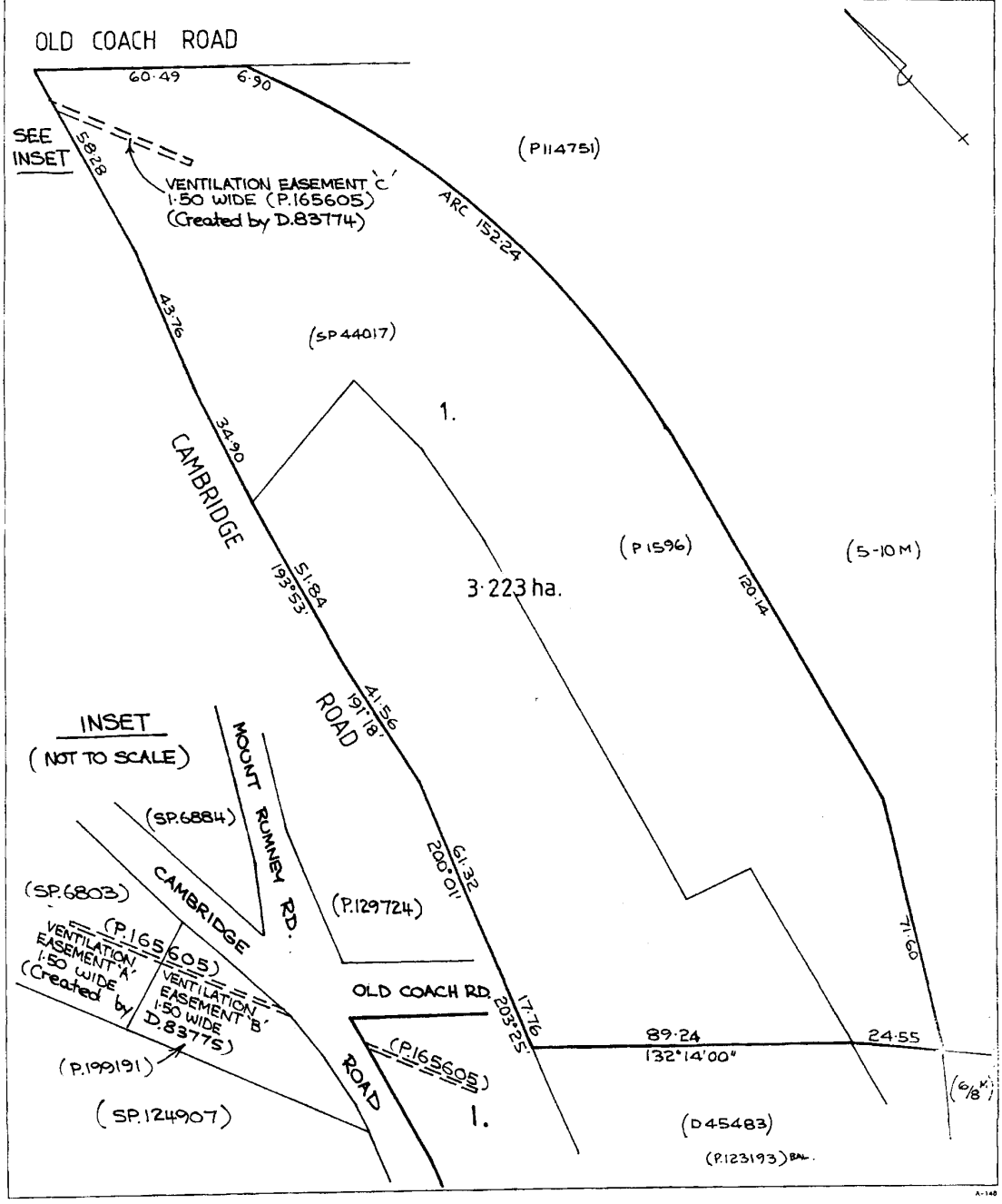
PLAN OF SURVEY

BY SURVEYOR N.D.LEARY OF GRIGGS LEARY & CO PTY LTD 295 ELIZABETH STREET HOBART
LOCATION
CITY OF CLARENCE
SCALE 1: 1000 LENGTHS IN METRES

REGISTERED NUMBER
SP 123192

APPROVED
EFFECTIVE FROM 3 - JUN 1996
Recorder of Titles

MAPSHEET MUNICIPAL CODE No.	LAST UPI No.	LAST PLAN No.	ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN
107	1410841 1400104	SP.44017. D 45483	



SHEET No.	DRAWING TITLE	ISSUE	DATE
A00	Cover Sheet	A	4/09/2025 10:58 AM
A01	Proposed Site Plan	A	4/09/2025 10:58 AM
A02	Proposed Floor Plan	A	4/09/2025 10:58 AM
A03	Elevations	A	4/09/2025 10:58 AM
A04	Flood Depth Projections	A	4/09/2025 10:58 AM
A05	Landslip Overlay	A	4/09/2025 10:58 AM

Development Application

Issue: A - Development Application

Sunday, 7 September 2025

SPECTURA
STUDIO

Proposed Secondary Residence

2 Old Coach Road Cambridge TAS 7170

Scale 1:1000
10 0 10 20 30 40 50 60 70 80 90 100m

SITE DETAILS

ADDRESS: 2 Old Coach Road Cambridge TAS 7170
LOT/DP: 123192/1
COUNCIL: City of Clarence
ZONING: Rural Living

SITE COVERAGE:

Existing Residence:	137m²
Existing Outbuildings:	121.70m²
Proposed Secondary Residence:	57.46m²
TOTAL:	**316.16m²**
TOTAL SITE AREA:	**31880m²**
Site Coverage Total	1%

NOTE:
ALL DIMENSIONS TO BE VERIFIED ONSITE BY BUILDING CONTRACTOR AND PHYSICALLY LOCATE ALL UNDERGROUND SERVICES AND THEIR LOCATION IN RELATION TO PROPOSED WORKS.
WRITTEN DIMENSIONS PREFERENCED OVER SCALED DIMENSIONS.
DISCREPENCIES TO BE REFERRED TO THE BUILDING DESIGNER BEFORE PROCEEDING.

ISSUE LIST

No.	DESCRIPTION	DATE
A	Development Application	7/09/2025

PROJECT
Proposed Prefabricated Dwelling

PROJECT ADDRESS:
123192/1
2 Old Coach Road Cambridge TAS 7170

CLIENT
Dean & Anita Smith

SHEET SIZE **A3**

A01

N

Proposed Site Plan

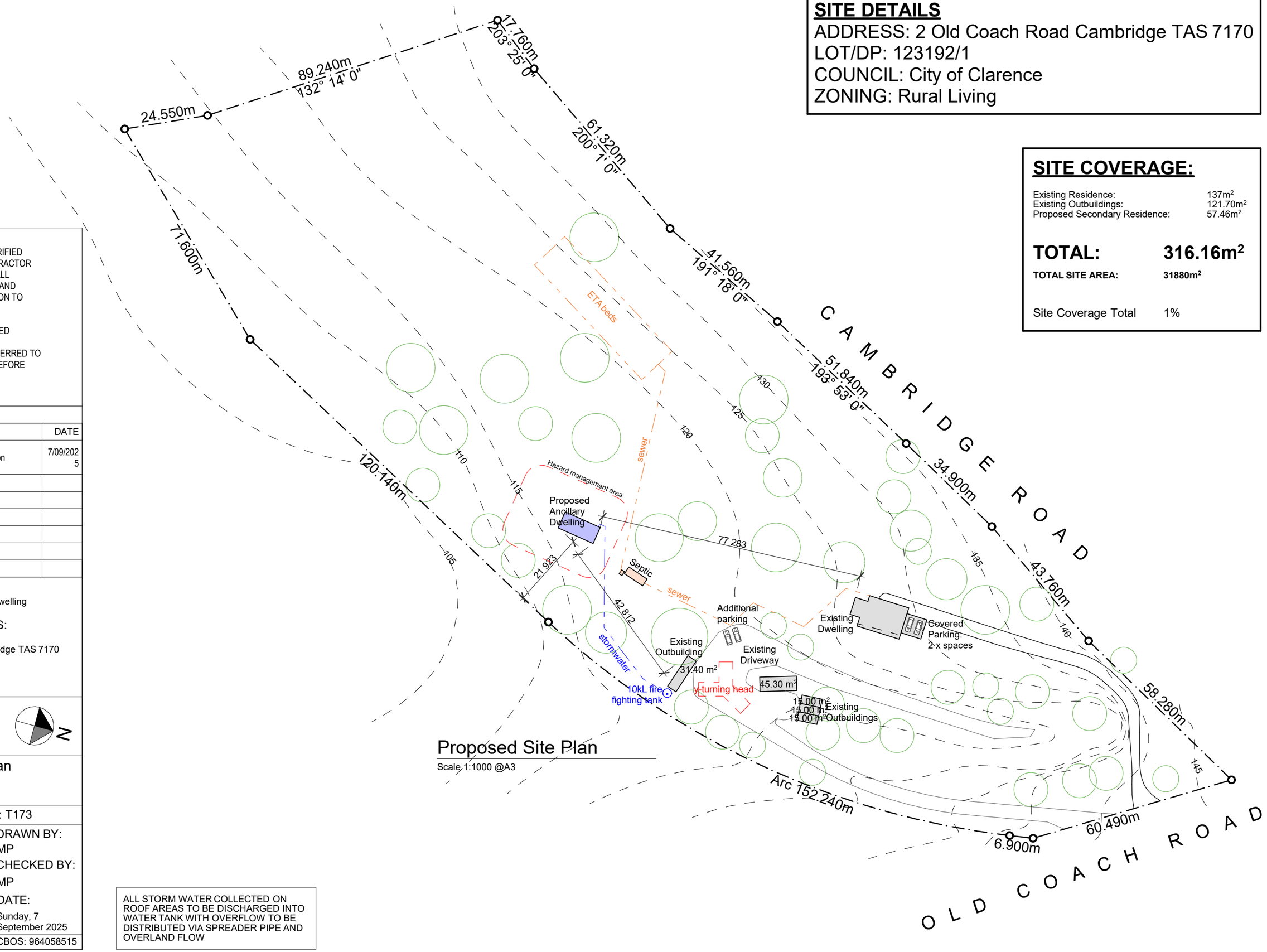
SCALE: 1:1000

PROJECT NUMBER: T173

SPECTURA STUDIO
www.spectura.com.au
P: 0423 250 079
E: admin@spectura.com.au
QBCC:15158346
BDA&T: 6521

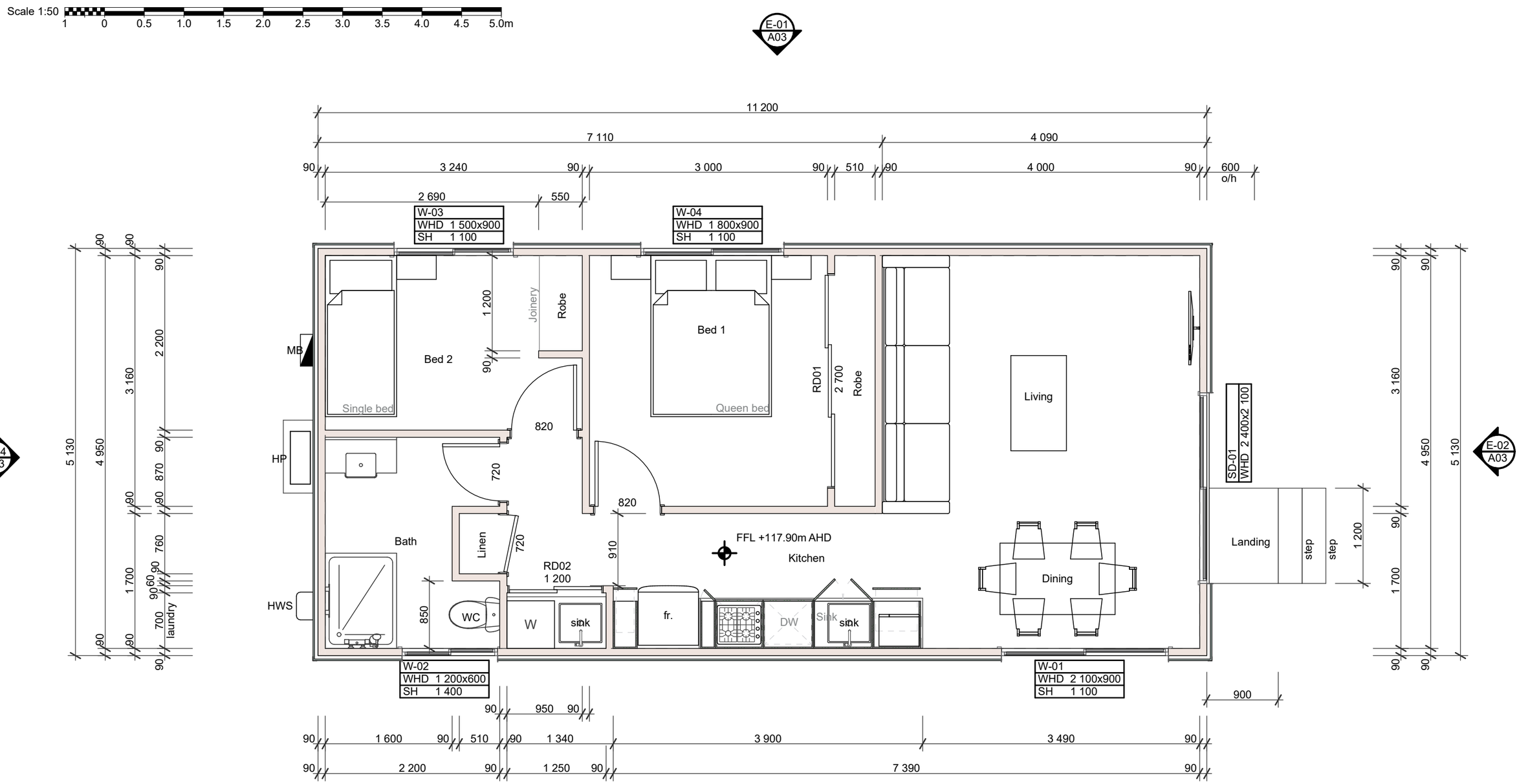
DRAWN BY: MP
CHECKED BY: MP
DATE: Sunday, 7 September 2025
CBOS: 964058515

ALL STORM WATER COLLECTED ON ROOF AREAS TO BE DISCHARGED INTO WATER TANK WITH OVERFLOW TO BE DISTRIBUTED VIA SPREADER PIPE AND OVERLAND FLOW



Proposed Site Plan

Scale 1:1000 @A3



Proposed Floor Plan

Scale 1:50 @A3

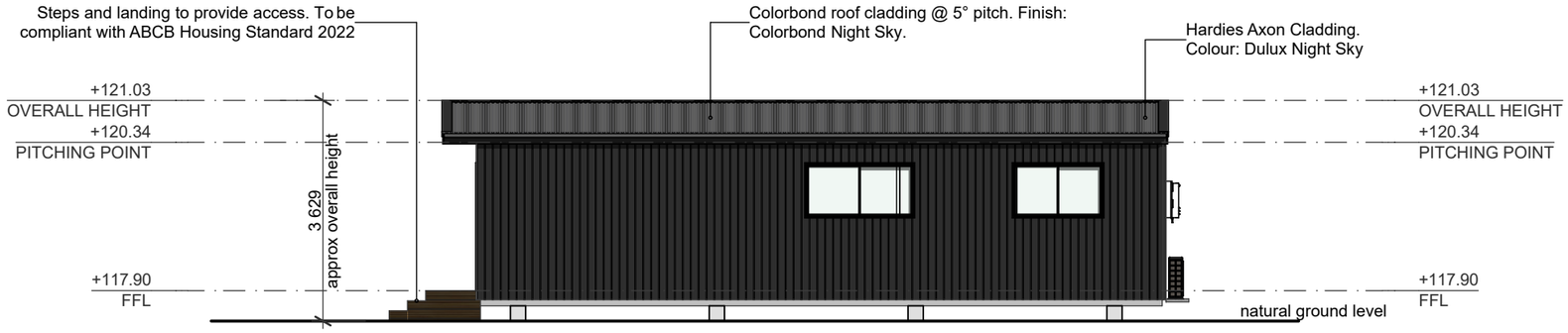
PROJECT NUMBER: T173	ISSUE LIST	PROJECT Proposed Prefabricated Dwelling	A02
SPECTURA STUDIO www.spectura.com.au P: 0423 250 079 E: admin@spectura.com.au QBCC:15158346 BDA&T: 6521	DRAWN BY: MP CHECKED BY: MP DATE: Sunday, 7 September 2025 CBOS: 964058515	PROJECT ADDRESS: 123192/1 2 Old Coach Road Cambridge TAS 7170 CLIENT Dean & Anita Smith	SHEET SIZE **A3** Proposed Floor Plan SCALE: 1:50 PROJECT NUMBER: T173

No.	DESCRIPTION	DATE
SK1	CONCEPT DEVELOPMENT	4/04/2024
SK2	CONCEPT DEVELOPMENT	8/04/2024
SK3	Variation to suit client needs	28/01/2025
SK4	Variation finalisation	4/02/2025
SK5	Variation finalisation - client changes	3/03/2025
A	Development Application	7/09/2025

NOTE:
ALL DIMENSIONS TO BE VERIFIED ONSITE BY BUILDING CONTRACTOR AND PHYSICALLY LOCATE ALL UNDERGROUND SERVICES AND THEIR LOCATION IN RELATION TO PROPOSED WORKS. WRITTEN DIMENSIONS PREFERENCED OVER SCALED DIMENSIONS. DISCREPENCIES TO BE REFERRED TO THE BUILDING DESIGNER BEFORE PROCEEDING.

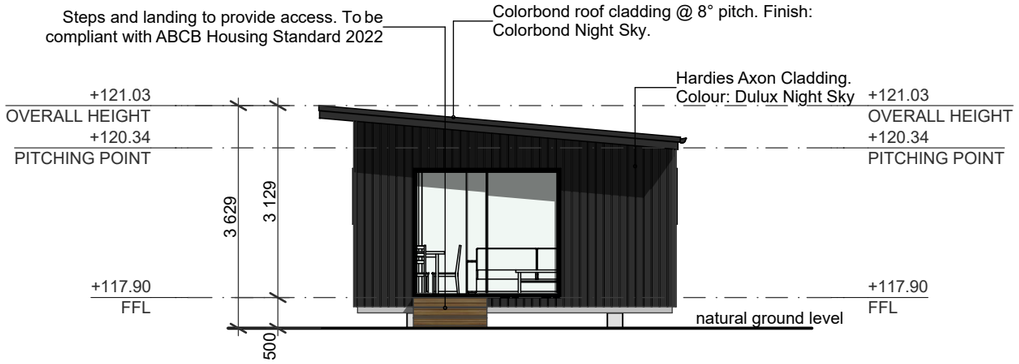
Scale 1:100

1 0 1 2 3 4 5 6 7 8 9 10m



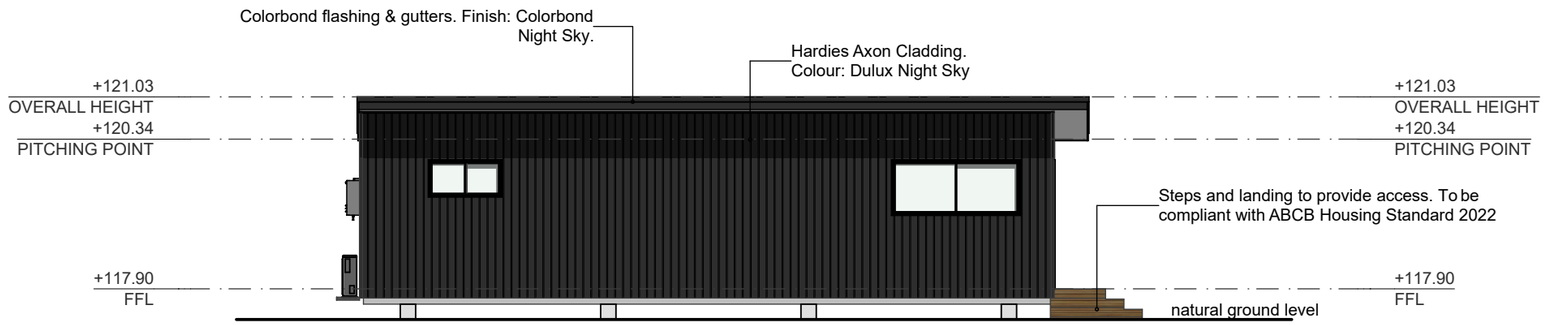
E-01 Western Elevation

A02 Scale 1:100 @A3



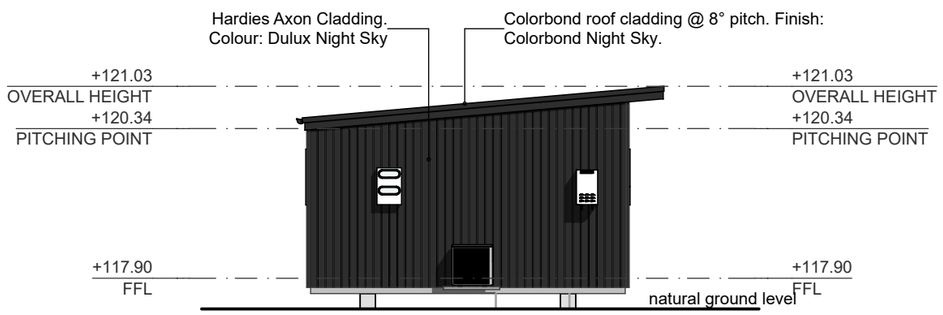
E-02 Northern Elevation

A02 Scale 1:100 @A3



E-03 Eastern Elevation

A02 Scale 1:100 @A3



E-04 Southern Elevation

A02 Scale 1:100 @A3

NOTE:
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ISSUE LIST

No.	DESCRIPTION	DATE
SK3	Variation to suit client needs	28/01/2025
SK4	Variation finalisation	4/02/2025
SK5	Variation finalisation - client changes	3/03/2025
A	Development Application	7/09/2025

PROJECT
Proposed Prefabricated Dwelling

PROJECT ADDRESS:
123192/1
2 Old Coach Road Cambridge TAS 7170

CLIENT
Dean & Anita Smith

SHEET SIZE **A3**

A03

Elevations

SCALE: 1:100

PROJECT NUMBER: T173

SPECTURA STUDIO
www.spectura.com.au
P: 0423 250 079
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QBCC:15158346
BDA&T: 6521

DRAWN BY: MP
CHECKED BY: MP
DATE: Sunday, 7 September 2025
CBOS: 964058515

Scale 1:1000 10 0 10 20 30 40 50 60 70 80 90 100m

Flood Mapping

Scale 1:1000 @A3

NOTE:
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ISSUE LIST

No.	DESCRIPTION	DATE
A	Development Application	7/09/2025

PROJECT
Proposed Prefabricated Dwelling

PROJECT ADDRESS:
123192/1
2 Old Coach Road Cambridge TAS 7170

CLIENT
Dean & Anita Smith

SHEET SIZE **A3**

A04

N

Flood Depth Projections

SCALE: 1:1000

PROJECT NUMBER: T173

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ISSUE LIST

No.	DESCRIPTION	DATE
A	Development Application	7/09/2025

PROJECT
Proposed Prefabricated Dwelling

PROJECT ADDRESS:
123192/1
2 Old Coach Road Cambridge TAS 7170

CLIENT
Dean & Anita Smith

SHEET SIZE **A3**

A05

N

Landslip Overlay

SCALE: 1:1000

PROJECT NUMBER: T173

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QBCC:15158346
BDA&T: 6521

DRAWN BY: MP
CHECKED BY: MP
DATE: Sunday, 7 September 2025
CBOS: 964058515

Landslip Overlay

Scale 1:1000 @A3

Proposed Secondary Residence

2 Old Coach Road
Cambridge
TAS 7170

Planning Scheme Response

September 2025

SPECTURA
STUDIO
BUILDING DESIGN

SPECTURA STUDIO
6 Sunrise Court Scamander
info@spectura.com.au
0423 250 079
www.spectura.com.au

Subject site & locality

1.0 Introduction

This planning scheme response supports the development application for the proposed secondary dwelling, to be located at No. 2 Old Coach Road Cambridge. The proposed development is situated within the Rural Living Zone as defined in the Tasmanian Planning Scheme - State Planning Provisions (SPP).

This document's coverage is for the Performance Criteria clauses in the SPP relevant to the related Development Application.

2.0 Project Description

The project involves the construction/installation of a secondary dwelling ancillary to an existing dwelling on an area of cleared land on the lot.

The septic system has been assessed and upgraded to meet additional loading requirements resultant of the proposed development.

The ancillary nature of the dwelling is seen as retaining the use class of Residential, as a single dwelling and therefore viewed as No Permit Required development.

Code overlays however, specifically the Flood Prone Area overlay, trigger a discretionary application.

No native vegetation is required to be removed as part of this application.

3.0 Planning Assessment

The following planning items listed rely on performance criteria. If a clause is not listed below, it is due to the proposed development being seen as meeting planning scheme provisions by means of the acceptable solutions relating to that clause.

3.1 Compliance with Overlay Codes

C12.0 Flood-Prone Areas Hazard Code

- **C12.5.1 – Uses within a flood-prone hazard area**

A1 – No Acceptable Solution

P1.1
A change of use that, converts a non habitable building to a habitable building, or a use involving a new habitable room within an existing building, within a flood-prone hazard area must have a tolerable risk, having regard to:
(a) the location of the building;
(b) the advice in a flood hazard report; and
(c) any advice from a State authority, regulated entity or a council.

P1.2
A flood hazard report also demonstrates that:
(a) any increase in the level of risk from flood does not require any specific hazard reduction or protection measures; or
(b) the use can achieve and maintain a tolerable risk from a 1 % annual exceedance probability flood event for the intended life of the use without requiring any flood protection measures.

Response:

P1.1

N/A

P1.2

N/A

- **C12.5.2 – Critical use, hazardous use or vulnerable use**

A1 – No Acceptable Solution

P1
A critical, hazardous, or vulnerable use within a flood-prone hazard area must achieve a tolerable level of risk from flood, having regard to:
(a) the type form and duration of the use; and
(b) a flood hazard report that demonstrates that:
(i) any increase in the level of risk from flood does not warrant any specific hazard reduction or protection measures; or
(ii) the use can achieve and maintain a tolerable risk from a 1% annual exceedance probability flood event for the intended life of the use without requiring any flood protection measures.

Response:

P1

N/A

A2 – No Acceptable Solution

P2
In addition to the requirements in clause C12.5.2 P1, a critical use within a flood-prone hazard area must achieve and maintain a tolerable risk, having regard to:
(a) the ability of the use to function and maintain service during the flood event and recovery period;
(b) any interruption to the operation of the critical use in locations external to the immediate impact of the flood;
(c) the creation of risk to the health or safety of people from damage or disruption to:
    (i) a water supply service; or
    (ii) the drainage and treatment of waste water;
(d) the advice contained in a flood hazard report; and
(e) any advice from a State authority, regulated entity or a council.

Response:

P2

N/A

A3 – No Acceptable Solution

P3
In addition to the requirements in clause C12.5.2 P1, the impact of flood on a hazardous use within a flood-prone hazard area must achieve and maintain a tolerable risk, having regard to:
(a) the health and safety of people;
(b) any impact on property;
(c) any impact on the environment;
(d) the advice contained in a flood hazard report; and
(e) any advice from a State authority, regulated entity or a council.

Response:

P3

N/A

A4 – No Acceptable Solution

P4
In addition to the requirements in clause C12.5.2 P1, a vulnerable use within a flood-prone hazard area, must be protected from flood, having regard to:
(a) any protection measures, existing or proposed;
(b) the ability and capability of people in a flood event who may live, work or visit the site, to:
    (i) protect themselves;
    (ii) evacuate in an emergency; and
    (iii) understand and respond to instructions in the event of an emergency;
(c) any emergency evacuation plan;
(d) the level of risk for emergency personnel involved in evacuation and rescue tasks;
(e) the advice contained in a flood hazard report; and
(f) any advice from a State authority, regulated entity or a council.

Response:

P4

N/A

- **C12.6.1 – Building and works within a flood-prone hazard area**

A1 – No Acceptable Solution

P1.1
Buildings and works within a flood-prone hazard area must achieve and maintain a tolerable risk from a flood, having regard to:
(a) the type, form, scale and intended duration of the development;
(b) whether any increase in the level of risk from flood requires any specific hazard reduction or protection measures;
(c) any advice from a State authority, regulated entity or a council; and
(d) the advice contained in a flood hazard report.

P1.2
A flood hazard report also demonstrates that the building and works:
(a) do not cause or contribute to flood on the site, on adjacent land or public infrastructure; and
(b) can achieve and maintain a tolerable risk from a 1% annual exceedance probability flood event for the intended life of the use without requiring any flood protection measures.

Response:

P1.1

(a) Careful siting of the dwelling utilising publicly available flood mapping has been implemented in the development design phase to ensure a tolerable risk from flooding is achieved. The subject site of the development, whilst falling under the flood prone areas code in part, does not appear to be at the risk of flooding based on the flood modelling undertaken in the locality.
(b) No increase in the level of risk from flood is foreseen as a result of this development.
(c) Currently no advice has been provided from any authorities regarding the flood risk. Due to the tolerable risk of flooding foreseen resultant of this application, it is not expected that advice will be given, however, if advice is provided, it would be reviewed and implemented where necessary.
(d) Due to the development being seen as low risk as described above, a flood report has not been sought for this development.

P1.2

A flood hazard report has not been sought for this development, with all publicly available flood modelling data indicating that the subject site of the proposed development is at a low and tolerable risk from flooding.

4.0 Conclusion

The proposed residential development at 2 Old Coach Road Cambridge is seen as complying with the relevant provisions of the Tasmanian Planning Scheme for the Rural Living Zone and applicable Code Overlays. The design and layout of the site have been carefully considered to ensure compatibility with the surrounding area and to meet the objectives of the zone.

We respectfully request that the planning authority grant approval for this development application.

Thank you,

Matthew Purves
Spectura Studio
CBOS Tas: 964058515

FUTURA
PLANNING

Bushfire Hazard Report

Proposed Development: Ancillary Dwelling

Address: 2 Old Coach Road, Cambridge 7170

Applicant: Anita & Dean Smith

Prepared by: J S Mayne

Bushfire Practitioner BFP-172

Report Date: Sept. 2025

Job Reference: FP0015-2025-V2

www.futuraplanning.com.au – 358B Macquarie Street, South Hobart 7004

ABN 19 248 759 296

Table of Contents

Limitations of this report

The viability of this report's efficacy hinges on the implementation and sustained upkeep of the prescribed measures and recommendations throughout the development's lifespan. Any alterations in site conditions could potentially lead to variations in the Bushfire Attack Level (BAL) classification, rendering this report null and void. It is important to note that the extent of this report's coverage does not ensure the complete prevention of property or life loss in the event of a bushfire. This is primarily due to the intricate nature of vegetation management, the inherently unpredictable behaviour of fires, and the influence of severe weather conditions. It is crucial to clarify that this report does not offer legal counsel, and no responsibility can be assumed for actions taken by property owners, the local council, or any other parties that might undermine the efficacy of this report.

1.0 Summary

The following is a Bushfire Assessment for an existing lot located 2 Old Coach Road, Cambridge. The development proposal is for new 60m^2 Ancillary Dwelling and on a single lot. The clients are Anita & Dean Smith; the builder / designer is Tas Manufactured Housing.

The development is located in a Bushfire Prone Area. The report is based on a site assessment completed on the 22nd March 2025 and additional information obtained from various electronic data bases.

The assessments contained in this report have been undertaken in accordance with the Australian Standard 3959:2018 Construction of buildings in bushfire-prone areas and Director's Determination- Bushfire Hazard Areas, Building Act 2016, Version: 1.2, Date: 16th July 2024.

Based on the Bushfire Attack Level (BAL) Assessment undertaken, the overall development has been assigned a BAL rating of BAL 29, which indicates a moderate risk of ember attack, radiant heat exposure and direct flame contact during a bushfire event. The assessment takes into account the Forest Fire Danger Index (FDI) of 50, but it should be noted that on days with an Extreme or Catastrophic Fire Danger Rating, the building's-built resistance may be exceeded if directly impacted by bushfire. It is therefore recommended that appropriate measures are taken to enhance the building's bushfire resilience, such as installing ember screens on windows, sealing gaps and openings, and ensuring adequate access for firefighting vehicles.

2.0 Location

Site Address: 2 Old Coach Road, Cambridge 7170

Title Reference: 123192 / 1

Property ID: 762208

Applicant: Anita & Dean Smith

Municipality: Clarence City Council

Planning Scheme: Tasmanian Planning Scheme

Zoning: Rural Living

Overlays: Low landslip hazard band, Medium landslip hazard band, Airport obstacle limitation area, Priority vegetation area, Flood-prone areas, Bushfire-prone areas, Potentially contaminated land

Bushfire Attack Level: BAL29

Image 1: Location of Site (Source: LISTMap 2025)

3.0 Site Characteristics

3.1 Topography and aspect

2 Old Coach Road is an existing lot situated at the corner of Old Coach Road and Cambridge Road, south of the Tasman Highway. The subject lot is approximately 32,000m² in size and contains an existing double-storey residential dwelling, along with multiple Class 10 outbuildings and shipping containers used for storage.

The lot is zoned as Rural Living under the Tasmanian Planning Scheme and falls within the municipality of Clarence City Council. As shown in Image 2, the subject lot is positioned between Tunnel Hill to the west and the Meehan Range to the east, placing it within a small valley. Consequently, the land slopes towards the southern quadrant at an angle of approximately 5–10° and rises in all other directions, as depicted in Image 2 and the site photographs.

3.2 Vegetation Description

The area surrounding the proposed development site, including the broader 100m vegetation radius, is predominantly classified as Woodland (Classification B – Woodland, AS3959:2018, Table 2.3). This classification primarily encompasses land near the existing dwelling and neighbouring properties, forming part of previously established hazard management areas and maintained woodland. While the understorey in these areas is generally well managed, mature Eucalyptus species (Eucalyptus pulchella and Eucalyptus globulus) are scattered throughout. However, towards the south of the proposed development, the vegetation density increases where management is less frequent.

The remaining hazardous vegetation within the 100m radius has been classified as Grassland (Classification G – Grassland, AS3959:2018, Table 2.3). The subject lot and surrounding neighbouring properties are utilised as hobby farms, resulting in areas of pastureland. This land use has contributed to the predominance of low-lying grasses and the notable absence of substantial tree or shrub coverage. These conditions were observed during the site inspection, as well as in aerial imagery and site photographs.

Beyond these hazardous vegetation classifications, there are areas classified as ‘Low Threat Vegetation’ in accordance with the exemptions outlined in AS3959:2018 Section 2.2.3.2 (e) & (f). The low-threat vegetation surrounding the existing dwelling and neighbouring properties consists of cultivated gardens and previously cleared hazard management areas that are well maintained, as confirmed during the site visit. Additionally, Old Coach Road and Cambridge Road are permanently cleared of vegetation. These areas pose minimal fire risk due to their limited fuel load, reducing any significant threat to the proposed development.

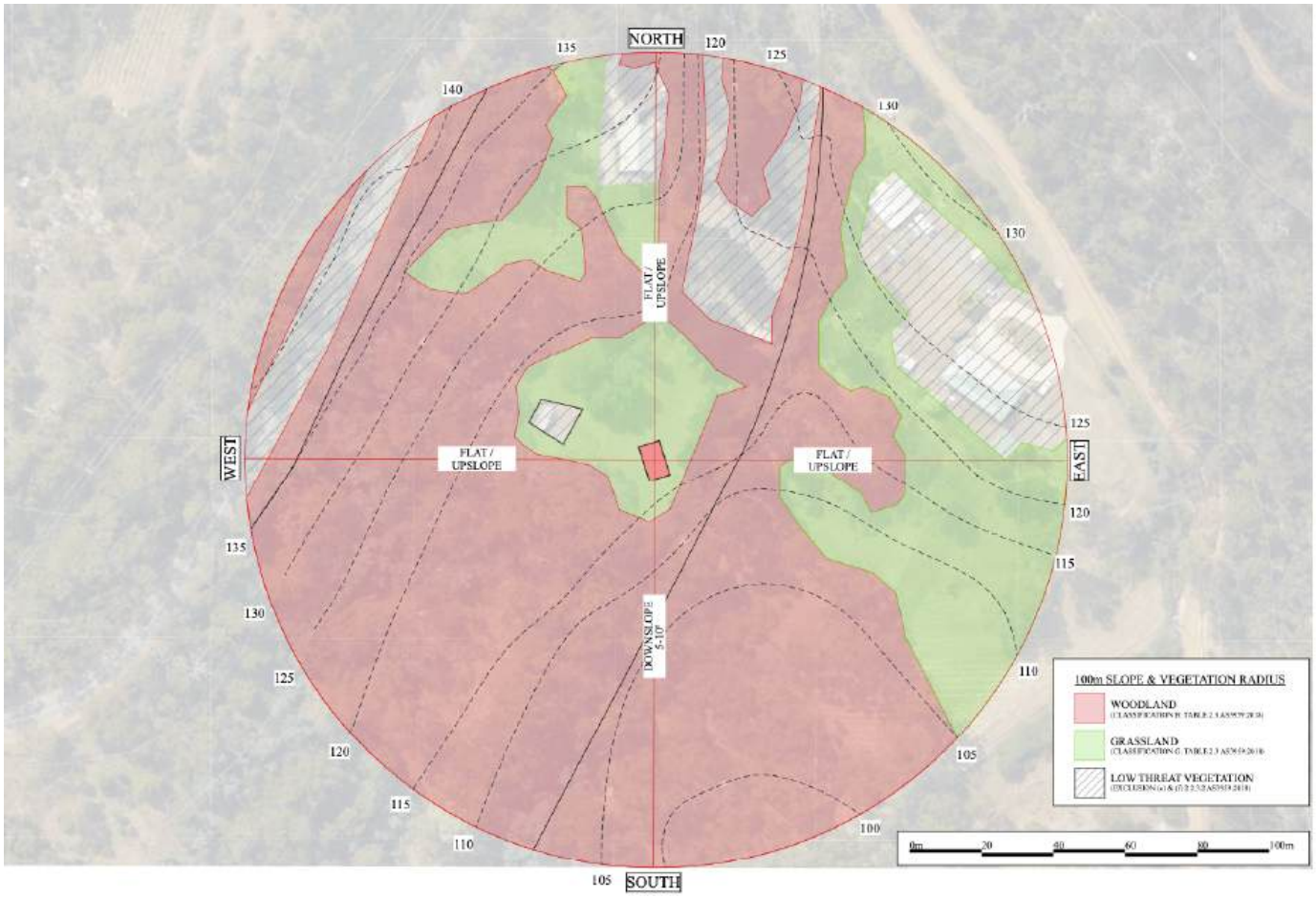


Image 2: 100m Vegetation & Effective Slope Radius – 2 Old Coach Road, Cambridge (Source: LISTMap 2025) Topography, Vegetation, and directions of bushfire threat.

4.0 Proposed Development

The proposed development involves the installation of a 60m^2 prefabricated pod, designed and manufactured by Tas Manufactured Housing, to be situated on the existing lot. The lot currently contains a residential dwelling positioned at the front, which features a bitumen driveway providing direct access to Old Coach Road.

As part of the proposed works, some vegetation removal will be required to accommodate the placement of the pod. It should be noted that, in certain circumstances, vegetation removal may necessitate obtaining prior planning approval in accordance with local planning and environmental regulations. Efforts will be made to ensure compliance with all applicable statutory requirements related to vegetation clearing and site preparation for this development.

This additional structure is designed to complement the existing use of the lot, providing an enhancement to the property while maintaining compatibility with the surrounding residential area.

5.0 Bushfire Attack Level Assessment

The Bushfire attack level has been determined through the application of section 2 of AS3959-2018 'Simplified Procedure'. Vegetation has been classified using a combination of onsite observations and remotely sensed data to be consistent with table 2.3 of AS3959-2018. Slope and distances have been determined by infield measurement and/or the use of remotely sensed data (aerial/satellite photography, GIS layers from various sources) analysed with proprietary software systems. Where appropriate vegetation has been classified as low threat.

Table 1. Determination of Bushfire Attack Level (BAL) – FDI 50

Azimuth	Vegetation Classification	Effective Slope	Distance to Bushfire Prone Vegetation	Hazard management area width	Bushfire Attack Level
North	Grassland Woodland	Flat / Upslope	0-36m 36-100m	6m	**BAL 29**
East	Grassland Woodland Grassland / Low Threat Vegetation	Flat / Upslope	0-7m 7-66m 66-100m	10m	**BAL 29**
South	Grassland Woodland	Downslope 5-10°	0-11m 11-100m	15m	**BAL 29**
West	Grassland Woodland	Flat / Upslope	0-20m 20-100m	10m	**BAL 29**

*Note: Road's, internal driveways, and fire breaks have been excluded under AS3959:2018 Section 2.2.3.2 (e), as they are non-vegetated areas that are permanently cleared.

6.0 Compliance

Requirements for construction within a bushfire prone area are to be in accordance with the *Australian Standard 3959:2018 Construction of buildings in bushfire-prone areas* and *Director's Determination- Bushfire Hazard Areas, Building Act 2016, Version: 1.2, Date: 16th July 2024.*

6.1 Construction requirements

Building work (including additions or alterations to an existing building) in a bushfire-prone area must be designed and constructed in accordance with an Acceptable Construction Manual determined by the Building Code of Australia, being either:

(a) AS3959-2018; or

(b) Standard for Steel Construction in Bushfire Areas published by the National Association of Steel Framed Housing Inc. (NASH).

as appropriate for BAL 29 as determined for the site. Compliance of the design must be verified to the relevant codes in the Certificate of Likely Compliance and verified prior to occupancy.

6.2 Property Access

The property is accessed via a pre-existing bitumen driveway from Old Coach Road, which includes an existing concrete crossover. The bitumen driveway is to be upgraded and installed in accordance with the Deemed-to-Satisfy requirements.

The Deemed-to-Satisfy requirements for access are outlined in Table 2 of the Determination (see Table 2) and must be constructed in accordance with the design and construction standards specified in Element B.

A site inspection conducted on 22/03/2025 confirmed that the driveway already meets the required 4m clearance and features all-weather construction. However, a turning head has been incorporated into the BHMP (refer to Attachment 2) to provide a designated turning area for firefighting appliances.

Table 2. (From Table 2, Requirements for Property Access)

Column 1		**Column 2**
Element		**Requirement**
A.	Property access length is less than 30 metres; or access is not required for a fire appliance to access a firefighting water point.	There are no specified design and construction requirements.
B.	Property access length is 30 metres or greater; or access is for a fire appliance to a water connection point.	The following design and construction requirements apply to property access: (1) All-weather construction; (2) Load capacity of at least 20 tonnes, including for bridges and culverts; (3) Minimum carriageway width of 4 metres; (4) Minimum vertical clearance of 4 metres; (5) Minimum horizontal clearance of 0.5 metres from the edge of the carriageway; (6) Cross falls of less than 3° (1:20 or 5%); (7) Dips less than 7° (1:8 or 12.5%) entry and exit angle; (8) Curves with a minimum inner radius of 10 metres; (9) Maximum gradient of 15° (1:3.5 or 28%) for sealed roads, and 10° (1:5.5 or 18%) for unsealed roads; and 10) Terminate with a turning area for fire appliances provided by one of the following: (a) A turning circle with a minimum inner radius of 10 metres; (b) A property access encircling the building; or (c) A hammerhead "T" or "Y" turning head 4 metres wide and 8 metres long.
C.	Property access length is 200 m or greater.	The following design and construction requirements apply to property access: (1) The requirement for B above; (2) Passing bays of 2 metres additional carriageway and 20 metres length provided every 200 metres.
D.	Property access length is greater than 30 metres, and access is provided to 3 or more properties.	The following design and construction requirements apply to property access: (a) Complies with Requirements for B above; and (b) Passing bays of 2 metres additional carriageway width and 20 metres length must be provided every 100 metres.

6.3 Static Water Supply for Fire Fighting

Firefighting water supply will be provided by a dedicated 10,000L metal tank. This tank will be located to the north of the proposed development, extending off the existing bitumen driveway, as shown in the Bushfire Hazard Management Plan (refer to Attachment 2).

The static water supply must comply with the Deemed-to-Satisfy requirements. These requirements are outlined in Table 3B of the Determination (see Table 3) and must be constructed in accordance with Elements A, B, C, D, and E. Compliance will be verified prior to occupancy.

Table 3. (From Table 3B, Requirements for Static Water Supply for Firefighting)

Column 1		**Column 2**
Element		**Requirement**
A.	Distance between building area to be protected and water supply	The following requirements apply: (a) The building area to be protected must be located within 90 metres of the water connection point of a static water supply; and (b) The distance must be measured as a hose lay, between the water connection point and the furthest part of the building area.
B.	Static Water Supplies	A static water supply: (a) May have a remotely located offtake connected to the static water supply; (b) May be a supply for combined use (fire fighting and other uses) but the specified minimum quantity of fire fighting water must be available at all times; (c) Must be a minimum of 10,000 litres per building area to be protected. This volume of water must not be used for any other purpose including fire fighting sprinkler or spray systems; (d) Must be metal, concrete or lagged by non-combustible materials if above ground; and (e) If a tank can be located so it is shielded in all directions in compliance with Section 3.5 of AS 3959-2009, the tank may be constructed of any material provided that the lowest 400 mm of the tank exterior is protected by: (i) metal; (ii) non-combustible material; or (iii) fibre-cement a minimum of 6 mm thickness.
C.	Fittings, pipework and accessories (including stands and tank supports)	Fittings and pipework associated with a firefighting water point for a static water supply must: (a) have a minimum nominal internal diameter of 50mm;

		(b) be fitted with a valve with a minimum nominal internal diameter of 50mm; (c) be metal or lagged by non-combustible materials if above ground; (d) if buried, have a minimum depth of 300mm; (e) provide a DIN or NEN standard forged Storz 65 mm coupling fitted with a suction washer for connection to firefighting equipment; (f) ensure the coupling is accessible and available for connection at all times; (g) ensure the coupling is fitted with a blank cap and securing chain (minimum 220mm length); and (h) ensure underground tanks have either an opening at the top of not less than 250mm diameter or a coupling compliant with this Table; and (i) where a remote offtake is installed, ensure the offtake is in a position that is: (i) visible; (ii) accessible to allow connection by firefighting equipment; (iii) at a working height of 450mm – 600mm above ground level; and (iv) protected from possible damage, including damage by vehicles.
D.	Signage for static water connections	The firefighting water point for a static water supply must be identified by a sign permanently fixed to the exterior of the assembly in a visible location. The sign must: (a) comply with water tank signage requirements within AS 2304; or (b) comply with the TFS Water Supply Signage Guideline.
E.	Hardstand	A hardstand area for fire appliances must be provided: (a) no more than three metres from the firefighting water point measured as a hose lay (including the minimum water level in dams, swimming pools and the like); (b) no closer than six metres from the building area to be protected; (c) a minimum width of three metres constructed to the same standard as the carriageway; and (d) connected to the property access by a carriageway equivalent to the standard of the property access.

6.4 Hazard Management Areas

A Bushfire Hazard Management Plan (Attachment 2) has been developed in accordance with the requirements outlined in Table 4 (Requirements for Hazard Management Areas). This plan establishes measures to mitigate risks and implement the necessary provisions for firefighting.

The Deemed-to-Satisfy requirements for access are specified in Table 4 of the Determination (see Table 4 below) and must be constructed in accordance with Element C of the Determination. Compliance will be verified prior to occupancy.

Table 4. (From Table 4, Requirements for Hazard Management Area)

Column 1		**Column 2**
Element		**Requirement**
A.	Hazard management areas for new buildings on lots provided with a BAL at the time of subdivision.	A new building must: (a) be located on the lot so as to be provided with a HMA no smaller than the required separation distances for the BAL determined at the time of subdivision; and (b) have a HMA established in accordance with a certified bushfire hazard management plan.
B.	Hazard management areas for new buildings on lots not provided with a BAL at the time of subdivision.	A new building must: (a) be located on the lot so as to be provided with a HMA no smaller than the separation distances required for BAL 29; and (b) have a HMA established in accordance with a certified bushfire hazard management plan
C.	Hazard management areas or alterations or additions to buildings.	An alteration or addition to a building must: (a) be located on the lot so as to be provided with a HMA which: (i) has the separation distances required for the BAL assessed for the Construction of the existing building; or (ii) in the case of a building without an existing BAL assessment, is no smaller than the separation distances required for BAL 29; and (b) have a HMA established in accordance with a certified bushfire hazard management plan
D.	Hazard management areas for new buildings and additions and alterations to buildings classified as an accommodation building BCA Class	A new building or an addition or alteration including change of use must: (a) be located on the lot so as to be provided with HMAs no smaller than the separation distances required for BAL 12.5; and (b) have a HMA established in accordance with a certified bushfire hazard management plan.

	1b, BCA Class 2, or BCA Class 3, other than Communal residence for persons with a disability, a respite centre or a residential aged care facility or similar.	
E.	Hazard management areas for new buildings and additions and alterations to existing buildings classified as vulnerable use as defined in the Bushfire=-Prone Areas Code (Planning Directive 5.1)	A new building or an addition or alteration including change of use must: (a) Be: (i) located on the lot so as to be provided with HMAs no smaller than the separation distances required for BAL 12.5; or (ii) provided with a certificate from an accredited person that a bushfire hazard management plan provides, to the degree necessary, separation of the building from the bushfire hazard, appropriate resistance to ignition from bushfire, property access and water supply for firefighting; and (b) Have a HMA established in accordance with a certified bushfire hazard management plan.
F.	Hazard management areas for new buildings or additions and alterations to buildings associated with a hazardous use	A new building or an alteration or addition, including change of use, for a building determined as a hazardous use must: (a) Be located on the lot so as to be provided with a HMA no smaller than the required separation distances for the BAL determined in the certified bushfire hazard management plan; and (b) Have a HMA established in accordance with a certified bushfire hazard management plan.

7.0 Conclusion

BAL RATING: BAL29

Based on the site analysis and vegetation assessment, the subject land has been classified under the appropriate bushfire rating. To comply with the requirements set out in AS3959:2018, a Hazard Management Area (HMA) will be established and maintained as mowed grassland, lawns, gardens, gravel areas, a driveway, and a hardstand, as detailed in the Bushfire Hazard Management Plan (refer to Attachment 2).

Furthermore, the proposed 60m² Ancillary Dwelling must comply with BAL 29 requirements, incorporating specific design considerations for firefighting water supply. A dedicated 10,000L firefighting water tank will be installed in accordance with the Director's Determination requirements, as shown on the BHMP. The Ancillary Dwelling must also be situated within the 90m hose lay requirement to comply with the relevant elements outlined in Table 3B of Director's Determination V1.2.

It is recommended that all construction and vegetation removal activities adhere strictly to the planning approval, with particular attention given to vegetation management. Compliance with all applicable regulations and standards must be verified prior to occupancy of the dwelling.

8.0 References

Australian Building Codes Board, *National Construction Code, Building Code of Australia,* Australian Building Codes Board, Canberra.

Building Amendment (Bushfire-Prone Areas) Regulations 2016
Determination, Director of Building Control – Bushfire Hazard Areas, version 1.2 16th July 2024. Consumer, Building and Occupational Services, Department of Justice, Tasmania.

Tasmanian Planning Scheme 2015, Tasmanian Planning Commission 2015, Tasmanian Planning Commission, Hobart.

Standards Australia, AS3959-2018 Construction of buildings in bushfire-prone areas. Sydney, NSW., Australia.

Attachment 1: Site Photos

Image 3: Northern Azimuth (Photo taken on site 22/3/2025)

Image 4: Eastern Azimuth (Photo taken on site 22/3/2025)

Image 5: Southern Azimuth (Photo taken on site 22/3/2025)

Image 6: Western Azimuth (Photo taken on site 22/3/2025)

Image 7: Existing bitumen driveway (Photo taken on site 22/3/2025)

Image 8: Existing outbuildings on site & area of firefighting 'Y' turning head (Photo taken on site 22/3/2025)

Image 9: Example of the dense Woodland to the south of the proposed development (Photo taken on site 22/3/2025)

Image 10: Grassy paddock where Ancillary Dwelling is to be installed (Photo taken on site 22/3/2025)

BUSHFIRE HAZARD MANAGEMENT PLAN

2 Old Coach Rd, Cambridge
Title: 123192/1 - Dated Sept. 2025
This plan is to be read in conjuction with 2 Old Coach Rd, Cambridge Bushfire Hazard Report, Prepared by J S Mayne, Dated Sept. 2025 (Job Ref# FP0015-2025-V2)

BUSHFIRE MITIGATION MEASURES BAL 29

Refer to specifications as set out in Part 6.0 Compliance in accompanying report 2 Old Coach Rd, Cambridge Bushfire Hazard Report, prepared by J S Mayne, dated Sept. 2025. Compliance to be verified prior to occupancy.

HAZARD MANAGEMENT AREA PRESCRIPTIONS

Hazard reduction and removal
· The Hazard Management Area is to be maintained in minimal fuel condition as mowed grassland with paddock trees, mowed lawns, gardens, areas of gravel, driveway and a hardstand.
· Ground cover vegetation (grasses, herbs and graminoids) to be maintained no higher than 100mm. · Remove fallen branches, bark and leaves and keep ground litter to a maximum of 20mm depth from around trees.
· Prune to create and maintain a separation distance of 2m (vertically) between the ground cover (maintained to <100mm) and the lowest branches of trees in the HMA.
· Clear private access of any trees and branches within 0.5m of carriageway and 4m over carriageway.
· Remove any fire hazards such as woodpiles and garden waste to at least 10m from dwelling.
· Keep roofs and guttering clear of flammable debris.
· Minimise the storage of petroleum fuels and store fuels at least 10m from dwelling in a suitable enclosed shed.

Landscaping
· Use low flammability plants in the garden and refrain from plantings within 1m of the dwelling (see Fire resisting garden plants Tasmanian Fire Service Brochure).
· Include non-flammable areas adjacent to dwelling such as paths

PROPOSED ANCILLARY DWELLING

FIRE FIGHTING HOSE LAY TO COMPLY WITH ELEMENTS A, B, C, D & E OF TABLE 3B IN DIRECTORS DETERMINATION - BUSHFIRE HAZARD AREAS V1.2

MIN. 10m

MIN. 6m

MIN. 15m

HAZARD MANAGEMENT AREA

MIN. 10m

CAMBRIDGE ROAD

EXISTING DWELLING

EXISTING OUTBUILDING

EXISTING OUTBUILDING

EXISTING OUTBUILDINGS

OLD COACH ROAD

INDICATIVE LOCATION OF 10,000L FIRE FIGHTING WATER TANK TO COMPLY WITH ELEMENTS A, B, C, D & E OF TABLE 3B IN DIRECTORS DETERMINATION - BUSHFIRE HAZARD AREAS V1.2

INDICATIVE LOCATION OF FIRE FIGHTING TURNING HEAD TO COMPLY WITH ELEMENT B OF TABLE 2 IN DIRECTORS DETERMINATION - BUSHFIRE HAZARD AREAS V1.2

EXISTING BITUMEN DRIVEWAY ALREADY COMPLYING WITH ELEMENT B OF TABLE 2 IN DIRECTORS DETERMINATION - BUSHFIRE HAZARD AREAS V1.2

LEGEND

- ANCILLARY DWELLING
- EXISTING DWELLING
- EXISTING OUTBUILDINGS
- EXISTING BITUMEN DRIVEWAY
- HAZARD MANAGEMENT AREA
- 10,000L FIRE FIGHTING TANK
- 'Y' TURNING HEAD
- HOSE LAY

PREPARED BY:
J S Mayne - Accreditation No. BFP-172
358B Macquarie St, South Hobart
0456 449 823
josh@futuraplanning.com.au
ABN 19 248 759 296

FUTURA PLANNING

N

SCALE 1:750 @ A3

0m 100m

REVISION SCHEDULE

DESCRIPTION	ISSUE	DATE
NEW DWELLING LOCATION	REV.02	SEPT. 2025

CERTIFICATE OF QUALIFIED PERSON – ASSESSABLE ITEM

Section 321

Form 55

To: Dean Smith *Owner /Agent*

2 Old Coach Road *Address*

Cambridge 7170 *Suburb/postcode*

Qualified person details:

Qualified person: Joshua Mayne

Address: 2/4 Bosco Street

Glenorchy 7010

Phone No: 0456 449 823

Fax No: N/A

Licence No: BFP-172

Email address: josh@futuraplanning.com.au

Qualifications and Insurance details: Accredited to report on bushfire hazards under the Fire Service Act 1979.
Insurance covered by Webber Insurance FPII16194 & FPII16195

(description from Column 3 of the Director's Determination - Certificates by Qualified Persons for Assessable Items

Speciality area of expertise: Analysis of bushfire hazards in bushfire prone areas

(description from Column 4 of the Director's Determination - Certificates by Qualified Persons for Assessable Items)

Details of work:

Address: 2 Old Coach Road

Cambridge TAS 7170

Lot No: 1

Certificate of title No: 123192

The assessable item related to this certificate: Bushfire hazard management plan and supporting bushfire hazard report for a Ancillary Dwelling

(description of the assessable item being certified)
Assessable item includes –
- *a material;*
- *a design*
- *a form of construction*
- *a document*
- *testing of a component, building system or plumbing system*
- *an inspection, or assessment, performed*

Certificate details:

Certificate type: Bushfire Hazard

(description from Column 1 of Schedule 1 of the Director's Determination - Certificates by Qualified Persons for Assessable Items n)

This certificate is in relation to the above assessable items, at any stage, as part of – *(tick one)*

◉ building work, plumbing work or plumbing installation or demolition work

OR

○ a building, temporary structure or plumbing installation

In issuing this certificate the following matters are relevant –

Documents:	Bushfire Hazard Report at 2 Old Coach Road, Cambridge (inc. bushfire hazard management plan), Job Ref: FP0015-2025-V2, Dated: Sept. 2025
Relevant calculations:	AS 3959:2018 - Method 1 BAL assessment
References:	Determination, Director of Building Control Requirements for Building in Bushfire-Prone Areas, version 1.2 16th July 2024. Consumer, Building and Occupational Services, Department of Justice, Tasmania. Building Amendment (Bushfire-Prone Areas) Regulations 2014 Standards Australia 2018, Construction of buildings in bushfire prone areas, Standards Australia, Sydney. Australian Standard 3959:2018 Construction of buildings in bushfire-prone areas

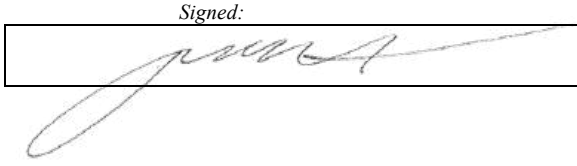
Substance of Certificate: *(what it is that is being certified)*

1. The assessed Bushfire Attack Level (BAL) is BAL 29.
2. The proposed building work – if designed and implemented in accordance with the bushfire hazard management plan referred to in this certificate – will comply with the deemed-to-satisfy requirements of the Director's Determination – Requirements for Building in Bushfire-Prone Areas v1.2.

Scope and/or Limitations

1. The scope of this certification is limited to compliance with the requirements of the Director's Determination – Requirements for Building in Bushfire-Prone Areas V1.2.
2. This certification may only be used for compliance purposes for 6 years from the date of certification.
3. The effectiveness of the measures prescribed in the bushfire hazard management plan and supporting report are dependent on their correct implementation and maintenance for the life of the development.
4. There is no guarantee that the building work will survive every bushfire event.

I certify the matters described in this certificate.

	Signed:	*Certificate No:*	*Date:*
Qualified person:		BFP-172	2/9/2025

GEO-ENVIRONMENTAL SOLUTIONS

ENVIRONMENTAL SITE ASSESSMENT

2 Old Coach Road, Cambridge

October 2025

For Mrs Anita Smith and Mr Dean Smith

Geo-Environmental Solutions P/L 29 Kirksway Place, Battery Point, 7004. Ph 6223 1839 E: Office@geosolutions.net.au

DOCUMENT CONTROL

Title	Version	Author	Date Written
Environmental Site Assessment: 2 Old Coach Road, Cambridge, Tasmania	Version 1	Sarah Joyce	30th October 2025

EXECUTIVE SUMMARY

This report presents the findings of an Environmental Site Assessment (ESA) undertaken by Geo-Environmental Solutions Pty. Ltd. (GES) at 2 Old Coach Road, Cambridge, Tasmania - hereby referred to as 'The Site'. GES was commissioned by Anita and Dean Smith to conduct the site assessment. This ESA has been prepared by a suitably qualified and experienced person in accordance with the procedures and practices detailed in the National Environmental Protection [Assessment of Site Contamination] Measure 1999 as amended 2013 (NEPM ASC 2013).

An ancillary dwelling is proposed with an associated wastewater system and the City of Clarence has requested the ESA (or similar) as a permit condition, planning permit number PDPLANPMTD-2025/055412. The objective of this ESA was to investigate the site for any contamination derived from the former railway line activities

The following information was gathered during the desktop investigation:

- The site is a rural residential block that historically hosted a railway line. The historical aerial photographs confirm that prior to 1946, the site housed the former railway line.
- The site is south facing and dips steeply to the south. The geology is mapped Late Carboniferous to Triassic sedimentary sequences Upper Parmeener Supergroup. The site is at the head waters of Clarence Plains Rivulet which feeds into Ralphs Bay at Rokeby Beach, 5.5km southeast of the site. The site surface has been historically modified.
- The Environment Protection Authority Tasmania does not consider the site to be contaminated. The EPA Tasmania's layers on the LIST were reviewed and there were no regulated premises and underground petroleum storage systems located either upgradient from the site or directly adjacent to the site.
- Contaminants of potential concern at the site include the following: total petroleum/recoverable hydrocarbons; mono aromatic hydrocarbons: (benzene, toluene, ethylbenzene, xylene, naphthalene); polynuclear aromatic hydrocarbons; heavy metals and asbestos.

From the soil assessment, it is concluded that:

- Environment: There were no risks to ecological receptors identified.
- Human Health: There were no risks to human receptors identified.
- Excavated Soil Management: All material tested was classified as clean fill.
- No asbestos was found.

Statement of Suitability The findings from this investigation confirm that there is no contaminated material, in particular heavy metals or asbestos in the footprint of the proposed ancillary dwelling or the new wastewater system area. There is no risk to Human Health or the Environment as part of the planned works.

Table of Contents

Figures

Tables

ABREVIATIONS

AEC	Areas of Environmental Concern
AHD	Australian Height Datum
ALS	Analytical Laboratory Services
BGS	Below Ground Surface
BH	Borehole
BTEXN	Benzene Toluene Ethylbenzene Xylene Naphthalene
COA	Certificate of Analysis
COC	Chain of Custody
COPC	Contaminant of Potential Concern
CRC CARE	Corporative Research Centre for Contamination Assessment and Remediation of the Environment
CSM	Conceptual Site Model
DQO	Data Quality Objectives
EOH	End Of Hole
EIL	Ecological Investigation Levels
ESL	Ecological Screening Levels
EPA	Environmental Protection Authority
ESA	Environmental Site Assessment
GDA94	Geocentric Datum of Australia 1994
GES	Geo-Environmental Solutions Pty. Ltd.
HIL	Health Investigation Levels
HSL	Health Screening Levels
IL	Investigation Levels
LOR	Limits of Reporting
NATA	National Association of Testing Authorities
NEPM ASC	National Environmental Protection (Assessment of Site Contamination) Measure
NHMRC	National Health and Medical Research Council
NL	Non Limiting
NRMMC	Natural Resource Management Ministerial Council
PAH	Polycyclic Aromatic Hydrocarbons
PHC	Petroleum Hydrocarbons
PID	Photo-Ionisation Detector
PPA	Preferential (PVI) Pathways Assessment
PVI	Petroleum Vapour Intrusion
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
UPSS	Underground Petroleum Storage Systems
USCS	Unified Soil Classification System
VOC	Volatile Organic Compounds

1 INTRODUCTION

1.1 General

This report presents the findings of an Environmental Site Assessment (ESA) undertaken by Geo-Environmental Solutions Pty. Ltd. (GES) at 2 Old Coach Road, Cambridge, Tasmania - hereby referred to as 'The Site'. GES was engaged by Anita and Dean Smith to conduct the site assessment. The site location in context of the greater Hobart area is presented in Figure 1.

This ESA has been prepared by a suitably qualified and experienced person in accordance with the procedures and practices detailed in the National Environmental Protection [Assessment of Site Contamination] Measure 1999 as amended 2013 (NEPM ASC 2013). Guidelines and key regulations and policies are identified in the References section of this document. Personnel engaged in preparing this ESA are listed in Appendix 1 along with their relevant qualifications and years of experience.

Figure 1 Site Location (Image source The LIST, 2025)

1.2 Site Layout

An aerial image of the existing site layout and the investigation area is presented in **Figure** 2.

Figure 2 Existing Site Layout (Image source The LIST)

1.3 Investigation Objectives

The Environmental Health Officer of the City of Clarence has requested the ESA (or similar) as a permit condition for a proposed ancillary dwelling at the site, planning permit number PDPLANPMTD-2025/055412, see request for information in Appendix 2. A railway line historically ran through the site and therefore the objective of this ESA was to investigate the site for any contamination derived from the former railway line activities.

1.4 Scope of Works

The scope of work for this ESA was to conduct a desktop review and an invasive soil investigation at the site. Work included the:

- Desktop review including gathering data from the LIST and the aerial photo viewer.
- Excavation of material from four boreholes to collect nine primary samples, five samples were selected for analysis.
- Samples were sent for analysis to ALS Global laboratory in Springvale Victoria which is a National Association of Testing Authorities (NATA) accredited laboratory.
- Analysis to determine the presence or absence, and if present the level of contamination of the site included Total Recoverable Hydrocarbons (TRH) Benzene Toluene Ethylbenzene Xylene Naphthalene (BTEXN), Polynuclear Aromatic Hydrocarbons (PAH), a suit of fifteen (15) metals and asbestos.
- Soil samples were sent with quality assurance/ quality control (QA/QC) samples including a duplicate split sample (BH1 0.2-0.4DUP) and one rinsate blank sample (RB).
- Results were compared against the relevant guidelines.
- A risk assessment, known as a Conceptual Site Model (CSM) was developed for the site; and
- Findings were presented in this ESA Report, detailing any specific onsite human health and environmental risks.

1.5 Site Details

Site details are presented in Table 1.

Table 1 Site Details

SITE LOCATION	2 Old Coach Road, Cambridge, Tasmania, 7170.
TITLE REFERENCES	Title Reference 123192/1, Property ID 7622208.
INVESTIGATION AREA	The investigation area is the footprint of the proposed ancillary dwelling and associated wastewater system only.
SITE AREA	The investigation area is approximately 4400m^2.
SITE ELEVATION & GRADIENT	The Site is situated 115m above sea level and falls towards the southeast.
SITE SURFACING	The surface of the site is natural material of sandy CLAY.
SITE OWNER	Anita and Dean Smith.
PREVIOUS AND CURRENT LANDUSE	Rural residential land.
SITE & SURROUNDING LAND ZONING	The site is zoned *Rural Living.*
PLANNING REQUIREMENTS	Potentially contaminated land code applies because of the historical railway line.
PROPOSED LAND USE	Rural residential.

2 DESKTOP STUDY

2.1 Site Walkover

A site visit was conducted on the 15th October 2025, photographs were taken and observations made with regards to current site conditions, relevant photographs are presented in Appendix 3. The site is a rural residential block with some small regrowth. The site was clean and free of debris and rubbish.

2.2 Site Zoning

The site is zoned Rural Living under the Tasmanian Planning Scheme of 2015, the investigation area is blue in Figure 3.

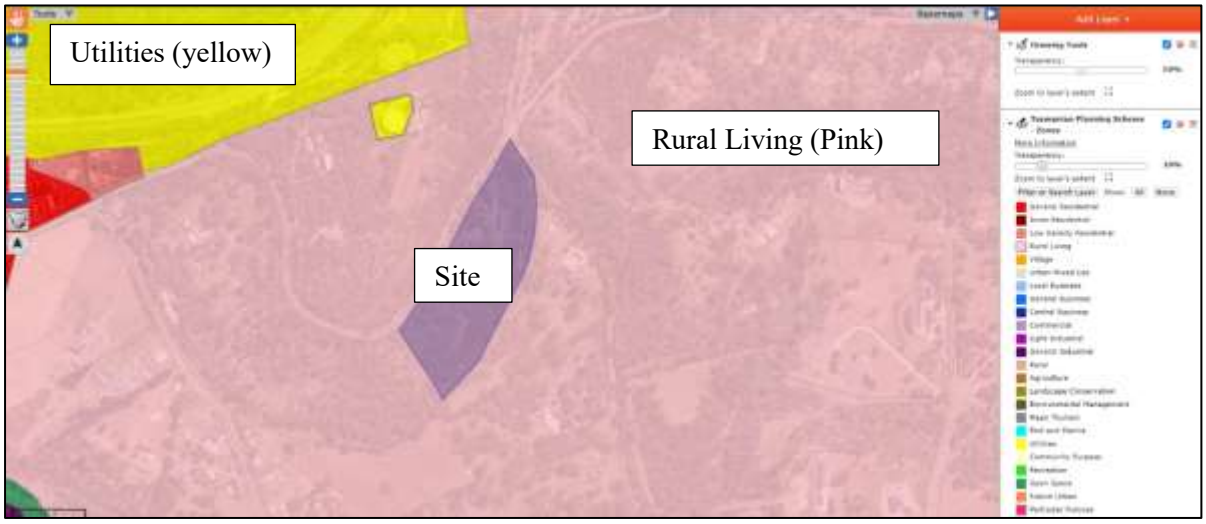


Figure 3 Tasmanian Planning Scheme Zones (Image source: The LIST, 2025)

2.3 MRT Geology Mapping

The 1:25,000 scale geology map of the Greater Hobart area is shown in Figure 4. The mapping indicates that the site is underlain by Late Carboniferous to Triassic sedimentary sequences Upper Parmeener Supergroup (Pch & P). Formations are likely to be freshwater cross-bedded arkose to quartzose sandstone and micaceous siltstone; lower interval with some carbonaceous sandstone, rare coalified wood and calcareous concretions, and commonly with thin lenticular beds of quartz pebble conglomerate near base in many areas; upper interval less feldspathic.

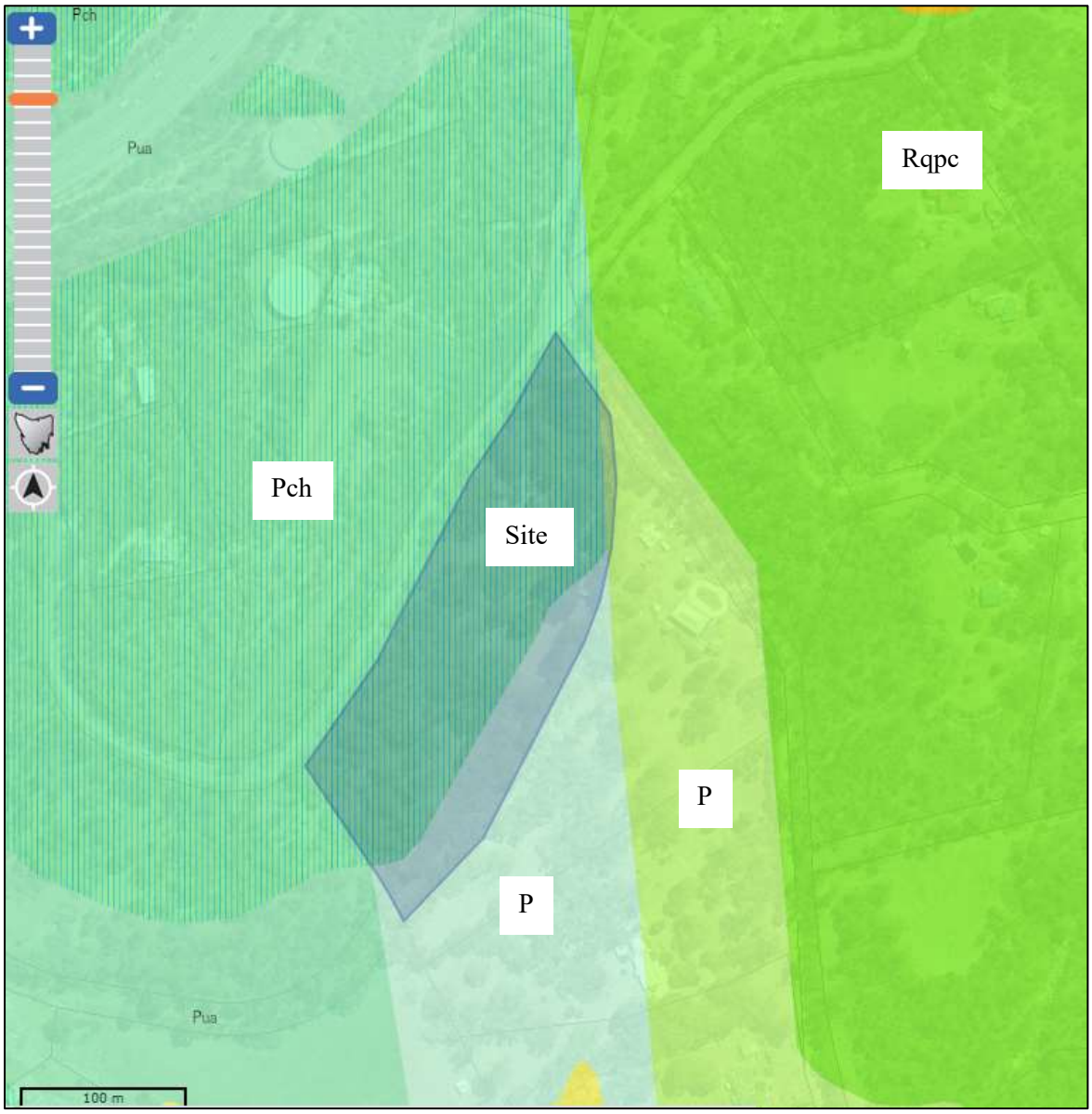


Figure 4 Mineral Resources Tasmania 1:25,000 Scale Mapping (Image source: The LIST, 2025).

2.4 Historical Aerial Photography Interpretation

The 2008, 1995, 1969, and 1946 historical aerial photographs were viewed as part of this ESA. The historical photographs are presented in Appendix 4.

In summary, the following observations on site were be made from the photographs.

- In the 2008 image shows little change to the site except the trees have started to grown and establish.
- In the 1995 image the current dwelling has been constructed and some earthworks to flatten an area can be seen on the eastern boundary of the property.
- In the 1969 image the site appears to be vacant land.
- In the 1946 image the railway tunnel is cutting is clearly visible as well as the cutting for the abandoned railway line. The site is half farmland and half slightly wooded land.

2.5 Previous Site Investigations

At the time of reporting GES was unaware of any previous site investigations at the site.

2.6 Environmental Protection Authority Tasmania

Mrs Smith contacted the Environmental Protection Authority (EPA) Tasmania and it was confirmed the EPA does not hold any information that the site is a contaminated site.

The Environmental Protection Authority (EPA) Regulated Premises and Underground Petroleum Storage Systems layers on The LIST were consulted; one abandoned UPSS (green pin) was identified 350m from the site see Figure 5. Any potential contamination from that site would not impact the investigation area.

Figure 5 EPA regulated premises and registered UPSS (The LIST, 2025)

2.7 Geomorphology

The Lidar Hillshade Basemap layer for the site is shown in Figure 6, the site is shown in blue. The image shows that the investigation area has been highly modified, most likely from the railway line construction.

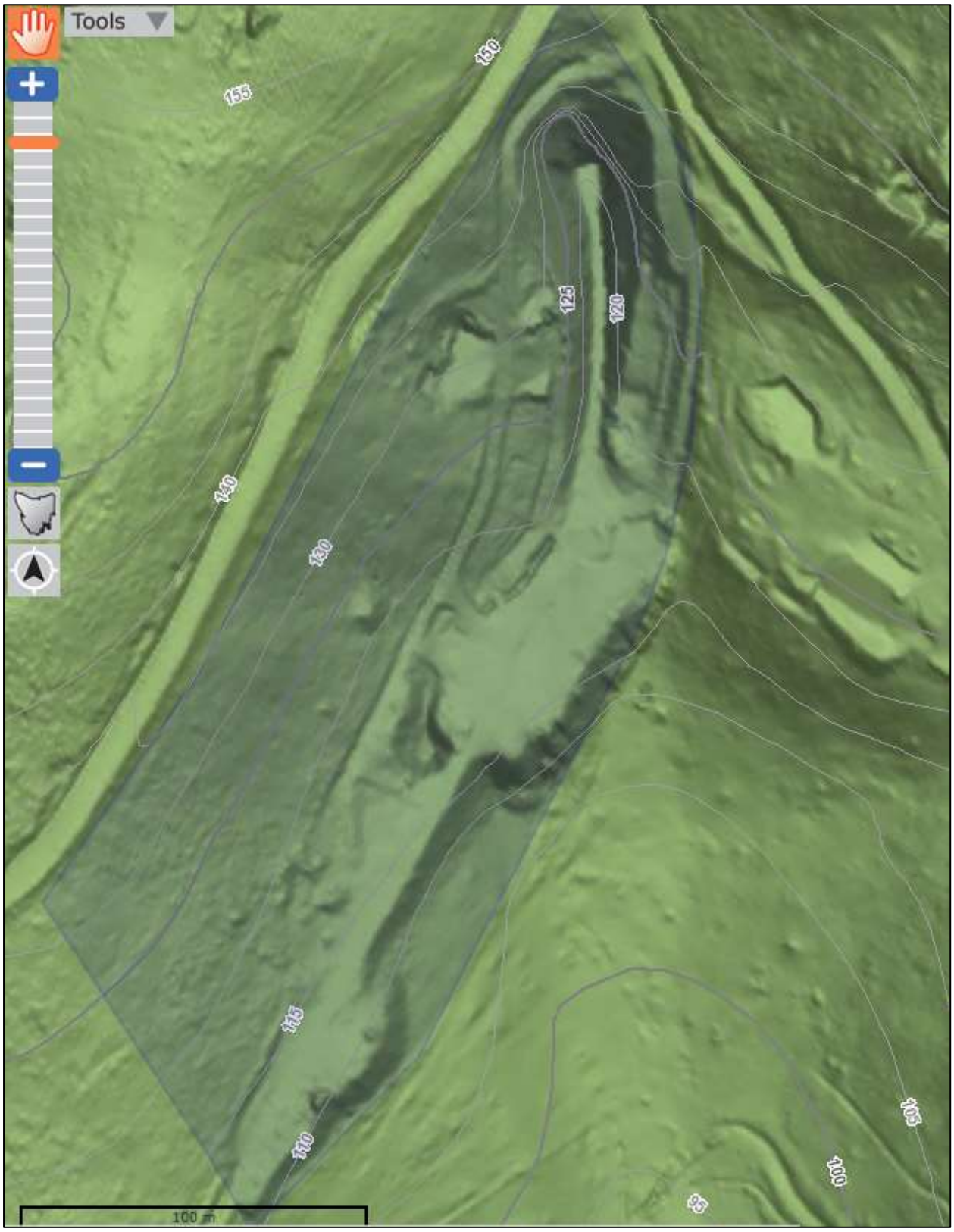


Figure 6 Hillshade Colour Basemap (sourced from The LIST, 2025)

2.8 Drainage & Hydrogeology

The elevation of the investigation area is about 115 above sea level and the site falls steeply to the southeast and is in the headwaters of Clarence Plains Rivulet which feeds into Ralphs Bay at Rokeby Beach, 5.5km south east of the site. The hypothetical groundwater flow direction is shown in Figure 7.

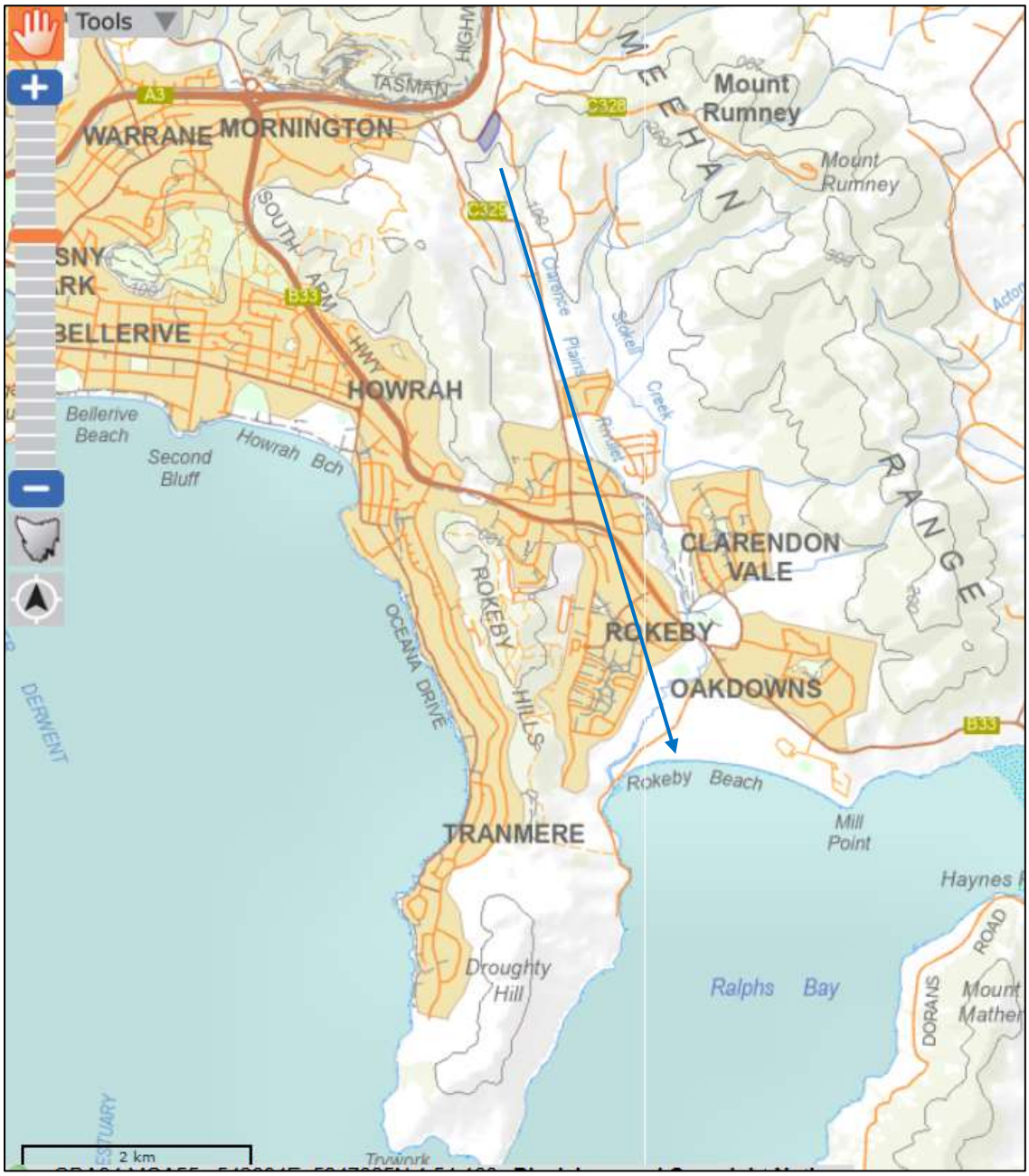


Figure 7 Inferred Surface and Groundwater Flow Direction (image source the LIST, 2025)

2.9 Potential Contamination Issues

2.9.1 Areas of Potential Concern

The area of potential concern is the footprint of the former railway line.

2.9.2 Contaminants of Potential Concern

Potential contaminants of potential concern (COPC) that have been considered include a suite of common urban contaminants suitable for Hobart:

- Petroleum Hydrocarbons: (including Total Petroleum/Recoverable Hydrocarbons (TPH/TRH), Mono Aromatic hydrocarbons: Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene (BTEXN), Polynuclear Aromatic Hydrocarbons (PAHs), and heavy metals plus asbestos.

3 FIELD INVESTIGATION PROCEDURES

3.1 Works Summary

Site works are summarised in Table 2 and Figure 8. Site photographs are shown in Appendix 3.

Table 2 Summary of Site Investigation Work Dates

Scope	Data	Lab Report	Details
Drilling and sampling	15th October 2025	EM2519157	A total of 4 soil bores were drilled or hand augured, a total of 9 primary soil samples were collected and 5 selected for analysis plus two QC samples were collected.

Figure 8 Borehole Locations

3.2 Soil Investigation

3.2.1 Borehole Drilling

A total of two boreholes were drilled and two were hand augured for assessing site geology and sampling potential contamination impact. Soil sampling was conducted per the National Environmental Protection [Assessment of Site Contamination] Measure (NEPM ASC 2013) and AS4482 sampling guidelines. Table 3 presents a summary of the soil assessment methodology adopted at the site.

Table 3 Summary of Soil Sampling Methods

Activity	Details / Comments
Sampling Methods	Geoprobe direct push drilling and hand auger.
Soil Logging	Logging the soil was conducted in accordance with the Unified Soil Classification System (USCS) as detailed in AS1726 (1993).
Decontamination of Sampling Equipment	Quantum Clean Laboratory Detergent (R213) was used to decontaminate reusable sampling equipment between each borehole sampling location. Fresh liners were used in the Geoprobe direct push sampling system between each location.
Soil Screening	In accordance with AS4482.2, individual soil samples were collected at 0.5 intervals below ground surface (bgs) and/or change in geology. Soil screening was not conducted as there was no soil odours discernible.
Laboratory Soil Sample Collection	In accordance with AS4482.2. All samples were collected using disposable nitrile gloves. Samples were collected for laboratory analysis where possible at the following intervals 0.2-0.4, & 0.9-1.0 below ground surface.
Sample preservation	Samples were placed into laboratory provided collection jars for analysis. Soil jars were placed in a pre-chilled eski with ice bricks.
Sample holding times	Sample holding times were within acceptable range (based on NEPM ASC B3-2013) from collection to extraction for the primary analysis. Samples arrived at the laboratory at 3.1°C.

3.2.2 Soil Analysis

Chain of Custody (COC) and Sample Receipt Notification (SRN) documentation is provided in Appendix 5. Table 4 presents a summary of the laboratory analyses undertaken. The primary samples and QC samples were submitted to Analytical Laboratory Services (ALS), Springvale, Melbourne for analysis. A total of 5 of the nine primary samples were selected for analysis.

Table 4 Overview of Soil Analysis and Quality Control

Analytes	Primary Samples	Duplicate[a]	Rinse Blank[b]
TPH/ BTEXN/ PAH	3	1	1
Suite 15 Metals	3	1	1
Asbestos	2	1	1

Sampling Quality Control Standards (AS4482):
a – Duplicate one (1) in twenty (20) primary samples
b- Single rinse sample per piece of equipment per day

Given metals were analysed, there was a requirement to assess the following soil physical properties to determine soil threshold investigation levels: Soil grain class (sand/silt or clay); % Clay content; Cation exchange capacity (CEC); and Soil pH. The soil physical properties were based on knowledge of similar soil types encountered around the Greater Hobart area.

4 QUALITY CONTROL

All field and laboratory Quality Assurance and Quality Control (QA/QC); Quality Control Report (QC) and Quality Control Interpretive Report (QCI) details and outputs are presented in Appendix 6.

4.1 Field

It is standard to expect up to 10% error in field duplication and up to 10% laboratory error. Therefore, in theory up to 20% error can be assumed on duplicate analysis. Some variation may exist in soil and groundwater because even though all efforts are made to split samples homogeneously, fragments of materials may bias samples in certain elements.

Relative Percentage Differences (RPDs) for the duplicate samples where applicable are calculated using the method outlined below.

The acceptance criteria used for the RPDs depend on the levels of contaminants detected and the laboratory's Method Detection Limits. The closer the levels detected are to the MDL the greater the acceptable RPD. RPDs are calculated as follows:

- RPD <50% for low level results (<20 * MDL)
- RPD <30% for medium level results (20-100 * MDL)
- RPD <15% for high level results (>100 * MDL)
- No limit applies at <2 * MDL (Method Detection Limit)

Field QA/QC procedures and compliance are summarised in Table 5.

Table 5 Soil Field QA/QC procedures and Compliance

QA/QC Requirement	Compliance	Comments
Appropriate sampling strategy used and representative samples collected	Yes	Sampling program was undertaken in accordance with AS4482.1-2005.
Appropriate and well documented sample collection, handling, logging and transportation procedures.	Yes	Appropriate and well documented.
Decontamination	Yes	Appropriate decontamination such as cleaning tools before sampling and between sample locations was undertaken and fresh liners were used in the Geoprobe direct push sampling system between each location.
Chain-of-custody documentation completed	Yes	COC were completed in accordance with NEPM ASC Schedule B2, Section 5.4.5 and transported under strict COC procedures. The signed COC documents are included in this report, which includes the condition report on arrival of samples to the Laboratory, cross checking of sample identification and paperwork and preservation method.
Required number of splits: Duplicate & inter-lab splits: 1 per 20 primary samples	Yes / No	One duplicate sample was collected and tested, for 5 primary sample collected as per AS4482.1-2005. No inter-laboratory split sample was collected.
QA/QC samples reported RPD's within indicated MDL guidelines.	Yes	For BH1 0.2-0.4 and BH1 0.2-0.4 DUP pairs, 98% of analytes complied.
Required numbers of rinse blank samples collected with no laboratory detections?	Yes	One rinse blank was collected as per AS4482.1-2005. There were no detections of contaminants in the rinsate sample.
Trip blanks collected with no laboratory detections?	NA	According to AS4482.2-1999, soil trip blanks are only required where volatile hydrocarbons are likely.
Field blanks collected with no laboratory detections?	NA	According to Australian Standards, there is no requirement to collect field blanks, unless there is concern with cross contamination risks. No field blanks were collected.
Samples delivered to the laboratory within sample holding times and with correct preservative	Yes / No	All primary samples were sent to the laboratory within holding times and correct preservative. Samples did arrive at the laboratory at 3.1 degrees Celsius (°C), ideally, they should arrive 6 °C or below.

4.2 Laboratory

Soil laboratory QA/QC procedures and compliance are summarised in Table 6.

Table 6 Soil Laboratory QA/QC Procedures and Compliance, QCI Report EM2316193

QA/QC Requirement	Compliance	Comments
All analyses NATA accredited	Yes	ALS Laboratories is NATA Accredited. Appropriate analytical methods used, in accordance with Schedule B(3) of the NEPM ASC 2013. Acceptable laboratory limits of reporting (LORs) adopted.
Method Blanks: zero to <Practical Quantitation Limit (PQL)	Yes	There were no method blank value outliers in the QCI report.
Laboratory Control Samples: 70% to 130% recovery for soil.	Yes	There were no laboratory control outliers in the QCI report.
Matrix spikes: 70% to 130% recovery for organics or 80%-120% recovery for inorganics	No	MS recovery was not determined or background levels were greater than or equal to 4x the spike level in an anonymous sample for manganese.
Duplicate Samples: 0% to <20% RPD.	Yes	There were no Duplicate outliers in QCI report.
Surrogates: 70% to 130% recovery	Yes	There were no surrogate recovery outliers in QCI report.
Analysis holding time outliers	Yes	There were no hold time outliers in the QCI report.
Quality Control Sample Frequency Outliers	No	Water. Rinsate – Matrix spikes for PAH/Phenols (0.00%) did not meet NEPM ASC 2013 B3 or ALS QC Standard of 5.00%.

5 FIELD INVESTIGATION FINDINGS

5.1 Soil Bores

5.1.1 Geological Interpretation

The geology of the site is consistent with the geological mapping of the area of Late Carboniferous to Triassic sedimentary sequences. The material encountered for each borehole is presented in Table 7.

Table 7 Material Encountered at the Site

BH	From	To	Description	USCS
BH1	0	0.1	Silty SAND	SM
BH1	0.1	0.5	Silty CLAY	CH
BH1	0.5	0.8	Clayey SAND	SC
BH1	0.8	1	Sandy GRAVEL	GW
BH2	0	0.3	Silty CLAY	CH
BH2	0.3	0.4	Clayey SAND	SC
BH2	0.4	0.5	Silty SAND	SM
BH2	0.5	1	Sandy CLAY	CL
BH3	0	0.5	Silty SAND	SM
BH4	0	0.5	Silty SAND	SM

5.1.2 Grain & Depth Class Interpretation

Grain size classifications are applied to all soils at the site to determine threshold screening level concentrations for hydrocarbons (and chromium) to assess soil ecological and human health risks.

Grain class threshold values are determined based on either the:

- sample grain size (in the case of ecological screening levels or chromium limits); or
- average grain class overlying the sample point (when assessing petroleum vapour screening levels) relative to the proposed finished floor level.

Table 8 provides a summary of the grain class averages for material overlying the sample.

Table 8 Summary of Grain Class Based on USCS Classification

Sample	Footing Excavation Depth^ - Red Fill Thickness^ - Green	Sample PVI Depth (m) Relative to Slab/Cut Depth	Soil Grain Size Class Averaging Above Soil Sample																	Crawl Space Thickness (m)	Attenuation			Petroleum Vapour Intrusion HSL Grain Class*	SAMPLE USCS
			GW	GP	GM	GC	SW	SP	SM	SC	ML	CL	OL	MH	CH	OH	CI	Rock (R)	Existing Pavement (P)		Proposed CONCRETE (CH)	Crawl Space	Biodegradation		
BH1 0.2-0.4	0.2	0.2													0.1					NA	0.1	1.0	1.0	CLAY	CH
BH1 0.2-0.4 DUP	0.2	0.2													0.1					NA	0.1	1.0	1.0	CLAY	CH
BH2 0.9-1.0	0.2	0.9							0.1	0.1		0.4			0.2					NA	0.1	1.0	1.0	CLAY	CL
BH4 0.4-0.5	0.2	0.4							0.3											NA	0.1	1.0	1.0	SAND	SM

Footnotes:

* Grain class is modified based on proposed building construction: concrete is interpreted to have similar vapour intrusion properties to clay and is therefore designated as CLAY within the grain size averaging assessment; backfill is inferred to comprise of gravel (GW)

< Sample has been collected from above the proposed excavation (base of slab or proposed ground level) and is not relevant in PVI risk assessment

^ Excavation depths are approximate and may vary due to change in services depths or overall building/footing construction design

5.1.3 Soil Contamination Observations

During the site walkover, photographs were taken and observations made with regards to current site conditions, see photographs in Appendix 3. The site is a rural residential block with some small regrowth. The site was clean and free of debris and rubbish. There was no surface staining or hydrocarbon odours observed in the investigation area.

6 SOIL ECOLOGICAL IMPACT ASSESSMENT

6.1 Protected Environmental Values

The requirement for protecting soil from contaminated activities in Tasmania is managed under the Environmental Management and Pollution Control Act 1994 (EMPCA) which states in Part 5A:

(2) An area of land is a contaminated site if –

(a) there is in, on or under that area of land a pollutant in a concentration that –

(i) is above the background concentration; and

(ii) is causing or is likely to be causing serious or material environmental harm or environmental nuisance, or is likely to cause serious or material environmental harm or environmental nuisance in the future if not appropriately managed;

Potential soil impact at the site is assessed through application of the following environmental investigation guidelines.

6.2 NEPM ASC (2013) Guidelines

The following ecological investigation guidelines are to be addressed in order to assess acceptable levels of risk to terrestrial ecosystems:

- NEPM ASC 2013: Ecological Investigation Levels (EILs) – have been developed for selected metal and organic substances. EILs depend on specific soil and physicochemical properties and land use scenarios and generally apply to the top two (2) metres of the soil profile (NEPM ASC 2013);
- NEPM ASC 2013: Ecological Screening Levels (ESLs) – have been developed for selected petroleum hydrocarbon compounds and total petroleum hydrocarbon fractions. ESL's broadly apply to coarse- and fine-grained soils and various land use scenarios within the top two (2) metres of the soil profile.

Soil analytical results are compared against ESLs and EILs limits presented in Table 9.

Table 9 Summary of Soil Contaminates Considered as part of this investigation, based on NEPM ASC 2013

Investigation Levels (IL)	**Analytes Investigated**						
	Hydrocarbons				**Metals**		**DDT**
	BTEX	**TRH (F1 to F4)**	**Benzo(a) pyrene (PAH)**	**Naphthalene (PAH)**	**Zn, Cu, Cr (III), Ni & As**	**Lead**	
ESLs	Analysed	Analysed	Analysed				
EILs				Analysed	Analysed	Analysed	Not Analysed

6.3 Guidelines

6.3.1 Ecological Screening Levels

The following compounds were compared against NEPM ASC 2013, ESLs:

- BTEXN
- F1 to F4 TRH and
- Benzo(a)pyrene (PAH)

Selection of ESL threshold investigation limits are set out in the NEPM ASC 2013 guidelines and require classification of the soil according to:

- Land use sensitivity:
    - Areas of ecological significance

  - Urban residential and public open space; and
  - Commercial and industrial.

- Dominant particle size passing through a 2 mm sieve into:
  - Coarse – sand sizes and greater; and
  - Fine – clay and silt sizes.

Adopted NEPM ASC 2013 guidelines for soil and land use classifications are presented below.

6.3.2 Ecological Investigation Levels

The following compounds were compared against EILs:

- Arsenic, Chromium, Copper, Lead, Nickel, Zinc and Naphthalene

There was a requirement to classify the soil according to physicochemical properties given that the above listed compounds. Adopted physicochemical parameters are presented in the results tables.

Selection of EIL threshold investigation limits are set out in the NEPM ASC 2013 guidelines and require classification of the soil per specific soil and physicochemical properties which are presented in the results tables. The adopted land use scenarios presented in Table 10.

Table 10 Adopted Land Use Scenario for the Soil Bores

Land Use Scenario	**Applicable Soil Bores**
Areas of Ecological Significance	
Urban Residential & Public Open Space	*All bore holes as it is a rural residential property.*
Commercial & Industrial	*All bore holes for worker during the installation of the new ancillary dwelling and waste water system*

Based on a preliminary assessment of site soil conditions, the following physicochemical properties are applied to assess guideline EILs:

- Clay content consistent with field observations
- A soil pH and cation exchange capacity (CEC) consistent with Table 11.

Table 11 Cation Exchange and Clay content, Adopted For the Site

Soil Physicochemical Properties			
USCS	Clay %	CEC	pH
R	100	10	4.5
GW	0	10	4.5
GP	0	10	4.5
GM	10	15	4.5
GC	30	20	4.5
SW	0	10	4.5
SP	0	10	4.5
SM	10	15	4.5
SC	20	20	4.5
ML	30	20	4.5
CL	100	35	4.5
OL	50	35	4.5
MH	30	35	4.5
CH	100	45	4.5
OH	100	60	4.5
PT	100	80	4.5
P	0	0	4.5
CM	100	35	4.5
CI	100	35	4.5
Rock	0	10	4.5

6.4 Findings

6.4.1 Ecological Screening Levels

Laboratory analytical results are presented in Appendix 7. Table 12 compares soil analytical results against relevant NEPM ASC (2013) ESLs for the most sensitive land use urban residential. Concentrations which exceeded laboratory limit of reporting (LOR) are highlighted in bold, ESL exceedances would be highlighted with a coloured cell. Of the 3 primary samples tested, there was one sample that had detections for TRH fractions. There were no ESL guideline limit exceedances and no risk to ecological receptors.

Table 12 Summary of Soil Analytical Results Compared with ESL's for Residential Land Use.

NEPM Ecological Screening Levels for Soil				BTEX				PAH	TRH			
Bold - Indicates LOR Exceedances				Benzene	Toluene	Ethylbenzene	Xylenes	Benzo(a)pyrene	F1 (C6 - C10)	F2 (>C10 - C16)	F3 (>C16 - C34)	F4 (>C34 - C40)
Colour Shading - Indicates ESL Exceedances: >1 x, * 2-5 x, ** 5-20 x, *** 20-50 x, **** >50 x												
Sample ID	Sample Date	Soil Texture Class (fine /coarse)	Land Use	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
				LOR 0.2	LOR 0.5	LOR 0.5	LOR 0.5	LOR 0.5	LOR 10	LOR 50	LOR 100	LOR 100
BH1 0.2-0.4	15/10/25	F	URBAN	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH1 0.2-0.4 DUP	15/10/25	F	URBAN	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH2 0.9-1.0	15/10/25	F	URBAN	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	<100	<100
BH4 0.4-0.5	15/10/25	C	URBAN	<0.2	<0.5	<0.5	<0.5	<0.5	<10	<50	**120**	<100

6.4.2 Ecological Investigation Levels

Laboratory analytical results are presented in Appendix 7. Table 13 compares soil analytical results against relevant EILs for urban residential land use. Concentrations which exceeded laboratory LOR are reported in the table and EIL exceedances would be highlighted with a coloured cell. There were no EIL guideline exceedances above urban residential land use guideline limits.

Table 13 Soil Analytical Results Compared Against EILs for Residential Land Use.

NEPM Ecological Investigation Levels for Soil						Copper (CEC)	Copper (pH)	Nickel	Zinc	Chromium III	Lead	Arsenic	Naphthalene
Bold - Indicates LOR Exceedances X - Indicates Sample Within Inferred Excavation													
Colour Shading - Indicates EIL Exceedances: >1 x, * 2-5 x, ** 5-20 x, *** 20-50 x, **** >50 x													
Sample ID	Sample Date	EIL Land Use Sensitivity Class	Soil CEC (cmolc/kg)	Soil pH	Soil Texture Class (fine /coarse)	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BH1 0.2-0.4	15/10/25	URBAN	45	4.5 (3)	F	33	33	16	84	21	22	<5	<1
BH1 0.2-0.4 DUP	15/10/25	URBAN	45	4.5 (3)	F	36	36	18	84	22	26	<5	<1
BH2 0.9-1.0	15/10/25	URBAN	35	4.5 (3)	F	6	6	12	41	13	13	<5	<1
BH4 0.4-0.5	15/10/25	URBAN	15	4.5 (3)	C	<5	<5	<2	33	2	10	<5	<1

pH Designation:
(1) Using 0.01M CaCl2 extract. Rayment, G.E. and Lyons, D.J. (2011). "Soil Chemical Methods – Australasia". 495+20 pp. CSIRO Publishing, Melbourne. **(2)** pHF (1:5). Adjusted by subtracting 0.75 with +/- 0.25 error to calibrate to the CaCl2 method (per comm. ALS Brisbane Acid Sulphate Soils Laboartory). Methods in accordance with Ahern, C.R., Stone Y., and Blunden B. (1998b). 'Acid Sulfate Soils Assessment Guidelines'. Acid Sulfate Soils Management Advisory Committee, Wollongbar, NSW, Australia.
(3) Classified in accordance with parent material typical soil pH as per the Tasmanian soils database

7 SOIL HUMAN HEALTH DIRECT CONTACT ASSESSMENT

7.1 Guidelines

Guidelines presented herein are based on potential exposure of human receptors to soil impact which may include:

- Trench workers repairing or building services (typically to 1 m bgs). This classification is not dependent on the land use class.
- On Site inhabitants which may be exposed to potential shallow soil impact in non-paved areas of the Site; and
- On Site excavation works which may include potential swimming pools (up to 3 m bgs); basement carparks; and deep foundations.

7.1.1 Land Use Classification

The NEPM ASC 2013 guidelines have been referenced to ensure that the correct land use and density category has been adopted for the site and the surrounding properties (where applicable). As per NEPM ASC 2013 guidelines, the adopted land use class is dependent on the building density and the opportunity for soil access by site occupants (exposure to potentially impacted soil). Aspects needing to be considered include:

- Whether the site is of sensitive land use such as a childcare centre, preschool, primary school or aged care facility in which case land use Class A is applicable;
- The percentage of paved area to determine direct contact exposure risk and therefore classification as low or high density; and
- Classifications are based on residential, recreational or commercial/industrial setting.

7.1.2 Adopted Land Use Classification

The adopted land use class is presented in Table 14. Land use class is based on the opportunity for soil access, as per NEPM ASC 2013 guidelines. Soil access is anticipated to include future construction workers during site redevelopment, future trench workers conducting routine maintenance or site upgrades and ongoing residential site users.

Table 14 Summary of Land Use Setting and Density for Determining Exposure Risk

Soil Bores	Construction Phase	Location	Land Use	Pathway	Land Use Class
All soil	During	Site	Construction worker and trench workers	ALL	D and trench worker specific
	Post	Site	Residential site users	ALL	HSL A

DC – Dermal Contact - Trench Worker Guidelines (CRC CARE 2013)
DI – Dust Inhalation - HIL Guidelines (NEPM ASC 2013); SI – Soil Ingestion - HIL Guidelines (NEPM ASC 2013); ALL – All of above

7.1.3 Health Investigation & Screening Levels

The main exposure pathways and methods for assessing heath risk from contaminated soils are presented in Table 15.

Table 15 Summary of Exposure Pathways and Preliminary (Tier 1) Methods for Assessing Human Exposure Risk

Exposure Scenario	Contaminant Type	Tier 1 Assessment Method	Reference
Vapour Inhalation – Indoor (PVI)	Petroleum Hydrocarbons	HSLs (addressed in PVI sections)	NEPM ASC 2013
Vapour Inhalation – Trench (PVI)			CRC CARE (Friebel & Nadebaum, 2011)
Dermal Contact		HSLs	
Dust Inhalation	Metals PAH's	Health Investigation Levels (HILs)	NEPM ASC 2013
Soil Ingestion			

PVI – Petroleum Vapour Intrusion

7.2 Findings

7.2.1 Dermal Contact - Petroleum Hydrocarbons

Laboratory analytical results are presented in Appendix 7. Table 16 presents soil hydrocarbon analytical results compared against CRC CARE (Friebel & Nadebaum, 2011) HSL guidelines for assessing dermal contact risk. Concentrations which exceeded laboratory LOR are highlighted in bold, HSL exceedances would be highlighted with a coloured cell indicating the highest HSL land used class which is exceeded.

One sample had a detection of hydrocarbons and there were no exceedances for low density residential, commercial / industrial land use or trench worker specific guidelines.

Table 16 Soil Analytical Results Compared Against CRC CARE (Friebel & Nadebaum, 2011) Guidelines for Dermal Contact

CRC CARE Health Screening Level Dermal Contact Hazard from Soil Hydrocarbons'		EP080: BTEXN					EP080/071: TRH			
		Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	C6 - C10 Fraction	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		0.2	0.5	0.5	0.5	1	10	50	100	100
HSL A Low Density Residential		100	14000	4500	12000	1400	4400	3300	4500	6300
HSL D Commercial/Industrial		430	99000	27000	81000	11000	26000	20000	27000	38000
Intrusive Maintenance Worker		1100	120000	85000	130000	29000	82000	62000	85000	120000
Date	Sample									
15/10/2025	BH1 0.2-0.4	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
15/10/2025	BH1 0.2-0.4 DUP	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
15/10/2025	BH2 0.9-1.0	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	<100	<100
15/10/2025	BH4 0.4-0.5	<0.2	<0.5	<0.5	<0.5	<1	<10	<50	**120**	<100

7.2.2 Dust Inhalation & Soil Ingestion

Laboratory analytical results are presented in Appendix 7. Soil analytical results are compared against combined dust inhalation and soil ingestion risk is assessed through the application of NEPM ASC 2013 Health Investigation Levels (HILs) for exposure to soil contaminants are presented in Table 17.

Concentrations which exceeded laboratory LOR would be highlight in bold (except for the metals), and HIL exceedances would be highlighted with a coloured cell indicating the highest HIL land used class. There were no HILA low density residential, HIL D, commercial / industrial guideline exceedances for dust inhalation and soil ingestion risk.

Table 17 Soil Analytical Results Compared Against NEPM ASC 2013 Health Investigation Levels Guidelines

Bold - Indicates LOR Exceedance in Non Metalic Compounds		EA055: Moisture Content															Total Recoverable Mercury by FIMS	EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																			
NEPM Health Investigation Levels (HIL's) **Dust Inhalation and Soil Ingestion Assessment** X - Indicates Sample Within Proposed Excavation Zone		Moisture Content	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium Total	Cobalt	Copper	Lead	Manganese	Nickel	Selenium	Vanadium	Zinc	Mercury	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1.2.3.cd)pyrene	Dibenz(a.h)anthracene	Benzo(g.h.i)perylene	PAHs	Benzo(a)pyrene TEQ (WHO)
Units		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		1	50	1	2	2	5	5	5	2	5	5	2	5	5	5	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
HIL A Low Density Residential	☑ HIL A		100		60	4500	20		100	6000	300	3800	400	200		7400	40																	300	3
HIL D Commerial/Industrial	☑ HIL D		3000		500	300000	900		4000	240000	1500	60000	6000	10000		400000	730																	4000	40
Sample date:	Sample ID																																		
15/10/2025	BH1 0.2-0.4		14.8	<5	70	<1	<50	<1	21	19	33	22	308	16	<5	99	84	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
15/10/2025	BH1 0.2-0.4 DUP		16.6	<5	80	<1	<50	<1	22	17	36	26	315	18	<5	140	84	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
15/10/2025	BH2 0.9-1.0		9.6	<5	30	1	<50	<1	13	15	6	13	233	12	<5	15	41	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
15/10/2025	BH4 0.4-0.5		5.3	<5	30	<1	<50	<1	2	<2	<5	10	126	<2	<5	<5	33	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

8 INDOOR INHABITANT PVI ASSESSMENT – HSL's

This PVI assessment has been conducted in accordance with relevant CRC CARE Technical Documentation and NEPM ASC 2013 guidelines presented in references section of this report. The HSL assessment approach is generally the first (Tier 1) investigation phase adopted for assessing PVI risk at petroleum hydrocarbon (PHC) impacted sites.

HSL guidelines have been applied for samples collected from the site to account for risks that may be associated with volatile hydrocarbon vapour intrusion into confined spaces where there may be an inhalation risk through longer term exposure. This does not constitute a full vapour risk assessment but provides additional information from which to further quantify any risk.

A detailed investigation (Tier 2 to 3) is recommended over an HSL assessment where an acute risk has been identified at the site (CRC CARE 2013) because of:

- Migrating product on surface soils beneath buildings;
- Strong PHC odours;
- Flammable risk in confined spaces; and/or
- Health complaints from occupants.

Based on the site visits, none of the above conditions have been identified at the site. If the outcome of this Tier 1 assessment reveals HSL exceedances for hydrocarbon vapour intrusion, a more detailed (Tier 2) assessment will be required to further evaluate the human health risk.

PVI risk is initially interpreted through the development of HSL threshold limits from the following classifications:

- The geology and or hydrogeology of the investigation point; and
- Land use sensitivity:

The resulting HSL threshold limits are compared with laboratory analytical results.

8.1 Selected Media for Assessing PVI Risk

Table 18 presents a summary of the preferred HSL approach to assessing PVI risk. In this case, soil PHC concentrations were assessed.

Table 18 Preferred Methods for Determining Site PVI Risk

Media Analysed	Method	Limitations	Order of Preference
Soil Gas	Concentrations of a soil gas through a soil vapor probe	This approach provides the most reliable data in interpreting PVI risk, although direct modelling should be applied if concentrations exceed HSL threshold limits.	Primary
Groundwater	Concentrations of PHC in groundwater through deployment of monitoring wells	More robust and reliable that soil in determining onsite and in particular, offsite risks. Determining PVI risk based on groundwater is inherently conservative when interpreting vapour risk to account for not readily discernible preferential pathways. Reference may be drawn to alternative assessment approaches: 1) Application of site-specific conditions to the CRC CARE model for assessing PVI risk 2) Soil gas interpretation for areas where a PVI risk is identified from groundwater analysis.	Secondary
Soil	Concentrations of PHC in soil	Concentrations in soil may be subject variability due to soil moisture, organic content and oxygen ingress all which create significant bias in threshold values. Reliance is place on utilizing groundwater analysis over soil. Soil results provide localised information.	Tertiary

8.2 Land Use Class

For surrounding properties, the potential PVI risk is characterised through application of CRC CARE HSL's for each individual property based on their existing land use (NEPM ASC 2013; Friebel & Nadebaum 2010). The CRC CARE guidelines have been referenced to ensure that the correct land use and density category has been adopted for surrounding land use to ensure health risks are consistent with the HSL models. Aspects considered include the:

- Sensitivity of the existing or potential land use;
- Percentage of paved area for defining potential vapour migration risk;
- Type of basement garage which may influence the confinement of PHC vapours;
- Presence of a slab or cavity for discerning vapour intrusion risk.

If hydrocarbon impacted soil is discerned at the site, consideration is given to downgradient receptors. Where applicable, land use class therefore considers:

- Downgradient receptors where onsite HSL exceedances have been identified in soil; and
- Variations in land use for different parts of the proposed development.

The following land use classes are applied:

- *HSL A for residential*
- *HSL D for commercial and industrial land use.*

8.3 Findings

Laboratory analytical results are presented in Appendix 7. Table 19 presents the results against a potential indoor vapour risk based on land use setting guidelines. Concentrations which exceeded laboratory LOR would be highlighted in bold. HSL exceedances would be highlighted with a coloured cell. There were no exceedances above HSL D guidelines for indoor vapour risk for commercial / industrial land use.

Table 19 Soil Analytical Results Compared Against HSL A for Indoor Vapour Risk

Soil Hydrocarbon HSL's for Assessing Indoor Vapour Intrusion (NEPM 2013) Soil Sample Analysis					EP080: BTEXN					EP080/071: TRH	
Bold - Indicates LOR Exceedances					Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	F1	F2
Colour Shading - Indicates HSL Exceedances: >1 x, * 2-5 x, ** 5-20 x, *** 20-50 x, **** >50 x											
Sample ID	Sample Date	Depth Class	Grain Class	HSL	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
					LOR 0.2	LOR 0.5	LOR 0.5	LOR 0.5	LOR 1	LOR 10	LOR 50
BH1 0.2-0.4	15/10/2025	0 - 1	CLAY	A	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH1 0.2-0.4 DUP	15/10/2025	0 - 1	CLAY	A	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH2 0.9-1.0	15/10/2025	0 - 1	CLAY	A	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH4 0.4-0.5	15/10/2025	0 - 1	SAND	A	<0.2	<0.5	<0.5	<0.5	<1	<10	<50

9 ASBESTOS ASSESSMENT

There were concerns that asbestos may be present on site and therefore two samples were tested for asbestos, see the results in Table 19. It was confirmed that asbestos was not present in these samples.

Table 20 Soil Analytical Results for the Presence or Absence of Asbestos

Client - Matrix:	SOIL			Sample Type:	REG	REG
Workgroup:	EM2519157			ALS Sample number:	EM2519157008	EM2519157010
Project name/number:	2 Old Coach Road			Sample date:	15/10/2025	15/10/2025
				Client sample ID (Primary):	BH1	BH3
				Client sample ID (Secondary):		
				Sample Site:		
				Purchase Order:		
Analyte grouping/Analyte	CAS Number	Units	LOR			
EA055: Moisture Content (Dried @ 105-110Â°C)						
Moisture Content		%	1		----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils						
Asbestos Detected	1332-21-4	g/kg	0.1		No	No
Asbestos (Trace)	1332-21-4				No	No
Asbestos Type	1332-21-4	--			No	No
Synthetic Mineral Fibre		--			No	Yes
Organic Fibre		--			Yes	Yes
Sample weight (dry)		g	0.01		558	318
Description		--			Brown sandy soil with rock and organic matter.	Grey sandy soil with organic matter and synthetic mineral fibres.
APPROVED IDENTIFIER:		--			M. TRAN	M. TRAN

10 TRENCH WORKER PVI ASSESSMENT – HSL's

10.1 Classification

The following Health Screening Assessment is based on hydrocarbon vapour intrusion risk to subsurface excavation workers within excavations. This is assessed through analysis of vapours from soil and soil vapours. Groundwater is generally not used to assess risk as threshold limits for all depth and grain classes are non-limiting. Land use classes are not applicable when assessing vapour intrusion into trenches.

Soil and soil vapour HSL's for assessing hydrocarbon risk to maintenance workers are based on CRC CARE Technical Report 10 guidelines (Friebel & Nadebaum 2011) and the following variables:

- Dominant grain size class of material at the soil sample depth or based on the dominant grain class of the backfill material based on US Agriculture Soil Classification System (SCS) and partitioning into either sand, silt or clay; and
- Classifying soil according to depth ranges: 0 to 2 m; 2 to 4 m; 4 to 8 m; and greater than 8 m.

10.2 Findings

Laboratory analytical results are presented in Appendix 7. Summary of Soil Analytical Results Compared against HSL's for Assessing PVI Risk to Trench Workers are presented in Table 21. Concentrations that exceeded laboratory LOR would be highlighted in bold, and if there were any HSL exceedances they would be highlighted with a coloured cell.

There were no volatile hydrocarbons detection and no guideline exceedances above of the CRC CARE HSL guidelines for Assessing PVI Risk to Trench Workers and no risk identified.

Table 21 Summary of Soil Analytical Results Compared against HSL's for Assessing PVI Risk to Trench Workers

CRC CARE Health Screening Level Assessment for PHC Inhalation Risk To Trench Workers From Soil Sample Analysis				EP080: BTEXN					EP080/071: TRH	
Bold - Indicates LOR Exceedances										
Dark Grey Shading - Indicates HSL Exceedances: >1 x, * 2-5 x, ** 5-20 x, * 20-50 x, **** >50 x**				Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	C6 - C10 Fraction	>C10 - C16 Fraction
Sample ID	Sample Date	Depth Class	Grain Class	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
				LOR 0.2	LOR 0.5	LOR 0.5	LOR 0.5	LOR 1	LOR 10	LOR 50
BH1 0.2-0.4	15/10/2025	0 to 2m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH1 0.2-0.4 DUP	15/10/2025	0 to 2m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH2 0.9-1.0	15/10/2025	0 to 2m	CLAY	<0.2	<0.5	<0.5	<0.5	<1	<10	<50
BH4 0.4-0.5	15/10/2025	0 to 2m	SAND	<0.2	<0.5	<0.5	<0.5	<1	<10	<50

11 SOIL DISPOSAL ASSESSSMENT

11.1 Guidelines

Soil which is excavated from the site for landfill disposal is to be assessed against Information Bulletin 105 (IB105) for Classification and Management of Contaminated Soil for Disposal. The EPA uses four categories to classify contaminated soil as per Table 22:

- (Level 1) Fill Material;
- (Level 2) Low Level Contaminated Soil;
- (Level 3) Contaminated Soil; and
- (Level 4) Contaminated Soil for Remediation.

Fixed numerical values are presented for soil concentrations and leachable fraction concentrations.

Table 22 Summary of IB105 Classification Guidelines

	Classification (with reference to Table 2)	Controlled Waste[1]	Comments
Fill Material[2] (Level 1)	Soil that exhibits levels of contaminants below the limits defined under *Fill Material* in Table 2.	Unlikely	Soil classified as *Fill Material* can still be a 'pollutant' under the *Environmental Management and Pollution Control Act 1994* and needs to be responsibly managed.
Low Level Contaminated Soil (Level 2)	Soil that exhibits levels of contaminants above the limits defined under *Fill Material* but below the limits defined under *Low Level Contaminated Soil* in Table 2.	Likely	Where leachable concentrations have not been prescribed, maximum total concentrations will be used to classify the soil.
Contaminated Soil (Level 3)	Soil that exhibits levels of contaminants above the limits defined under *Low Level Contaminated Soil* but below the limits defined under *Contaminated Soil* in Table 2.	Yes	Where leachable concentrations have not been prescribed, maximum total concentrations will be used to classify the soil.
Contaminated Soil for Remediation (Level 4)	Soil that exhibits levels of contaminants above the limits defined under *Contaminated Soil* in Table 2 (regardless of the maximum total concentrations) is generally ***not*** considered acceptable for off-site disposal without prior treatment.	Yes	Soil that contains contaminants that do not have criteria for leachable concentrations (*e.g.* petroleum hydrocarbons), and the levels of contaminants exceed the maximum total concentrations listed in *Contaminated Soil*, are generally classified as *Contaminated Soil for Remediation*.

[1] Controlled Waste is defined in the *Environmental Management and Pollution Control Act 1994*.
[2] Criteria for *Fill Material* are the limits set by the Director for the purposes of R.9(2)(a)(ii) in the *Regulations*.

11.2 Findings

The soil samples have been compared against IB105 guidelines for potential future soil disposal, see Table 23. For solid waste classification, all material tested was clean fill, level 1 material.

Table 23 Soil Analytical Results Compared Against IB105 Investigation Limits for Maximum Total Solids in Soil for Disposal (Dry Weight).

Information Bulletin 105 **Classification and Management of Contaminated Soil For Disposal**		Arsenic	Barium	Beryllium	Cadmium	Chromium Total	Copper	Cobalt	Lead	Manganese	Mercury	Nickel	Selenium	Zinc	Benzo(a)pyrene	C6 - C9 Fraction	C10 - C36 Fraction (sum)	Sum of polycyclic aromatic hydrocarbons	Benzene	Toluene	Ethylbenzene	Total Xylenes
Unit		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		50	1	2	5	5	2	5	5	5	0.1	2	5	5	0.5	10	50	0.5	0.2	0.5	0.5	0.5
Investigation Level Selected																						
IB105 Level 1		<20	<300	<2	<3	<50	<100	<100	<300	<500	<1	<60	<10	<200	<0.08	<65	<1000	<20	<1	<1	<3	<14
IB105 Level 2		20	300	2	3	50	100	100	300	500	1	60	10	200	0.08	65	1000	20	1	1	3	14
IB105 Level 3		200	3000	40	40	500	2000	200	1200	5000	30	600	50	14000	2	650	5000	40	5	100	100	180
IB105 Level 4		750	30000	400	400	5000	7500	1000	3000	25000	110	3000	200	50000	20	1000	10000	200	50	1000	1080	1800
15/10/2025	BH1 0.2-0.4	<5	70	<1	<1	21	33	19	22	308	<0.1	16	<5	84	<0.5	<10	<50	<0.5	<0.2	<0.5	<0.5	<0.5
15/10/2025	BH1 0.2-0.4 DUP	<5	80	<1	<1	22	36	17	26	315	<0.1	18	<5	84	<0.5	<10	<50	<0.5	<0.2	<0.5	<0.5	<0.5
15/10/2025	BH2 0.9-1.0	<5	30	1	<1	13	6	15	13	233	<0.1	12	<5	41	<0.5	<10	<50	<0.5	<0.2	<0.5	<0.5	<0.5
15/10/2025	BH4 0.4-0.5	<5	30	<1	<1	2	<5	<2	10	126	<0.1	<2	<5	33	<0.5	<10	<50	<0.5	<0.2	<0.5	<0.5	<0.5

12 CONCEPTUAL SITE MODEL

12.1 Overview

This CSM has been developed based on the current desktop investigation and invasive soil assessment. The site to be potentially contaminated land because the site hosted a former railway line.

Figure 9 illustrates the Conceptual Site Model (CSM) with potential risks identified during this investigation that may be associated with site contamination. All potential current and future contamination pathways have been considered and ruled out.

Contaminants of potential concern at the site include the following: total petroleum/recoverable hydrocarbons; mono aromatic hydrocarbons: (benzene, toluene, ethylbenzene, xylene, naphthalene); polynuclear aromatic hydrocarbons; heavy metals and asbestos.

12.2 Potential Ecological Receptors

The closest ecological receptor is the Clarence Plains Rivulet.

12.3 Potential Human Receptors

Potential human receptors considered during this investigation include; future residents, commercial workers and trench workers during the site redevelopment.

12.4 Potential Transport Mechanisms and Exposure Pathways

12.4.1 Ecological Receptors

No risk to ecological receptors has been identified.

12.4.2 Residential or Commercial Site Users

No risk to residential or commercial site workers has been identified.

12.4.3 Indoor Vapour Risk

There were no guideline exceedances, and no indoor vapour risk identified.

12.4.4 Trench Workers

No risk to trench workers was identified in accordance with trench worker specified guidelines.

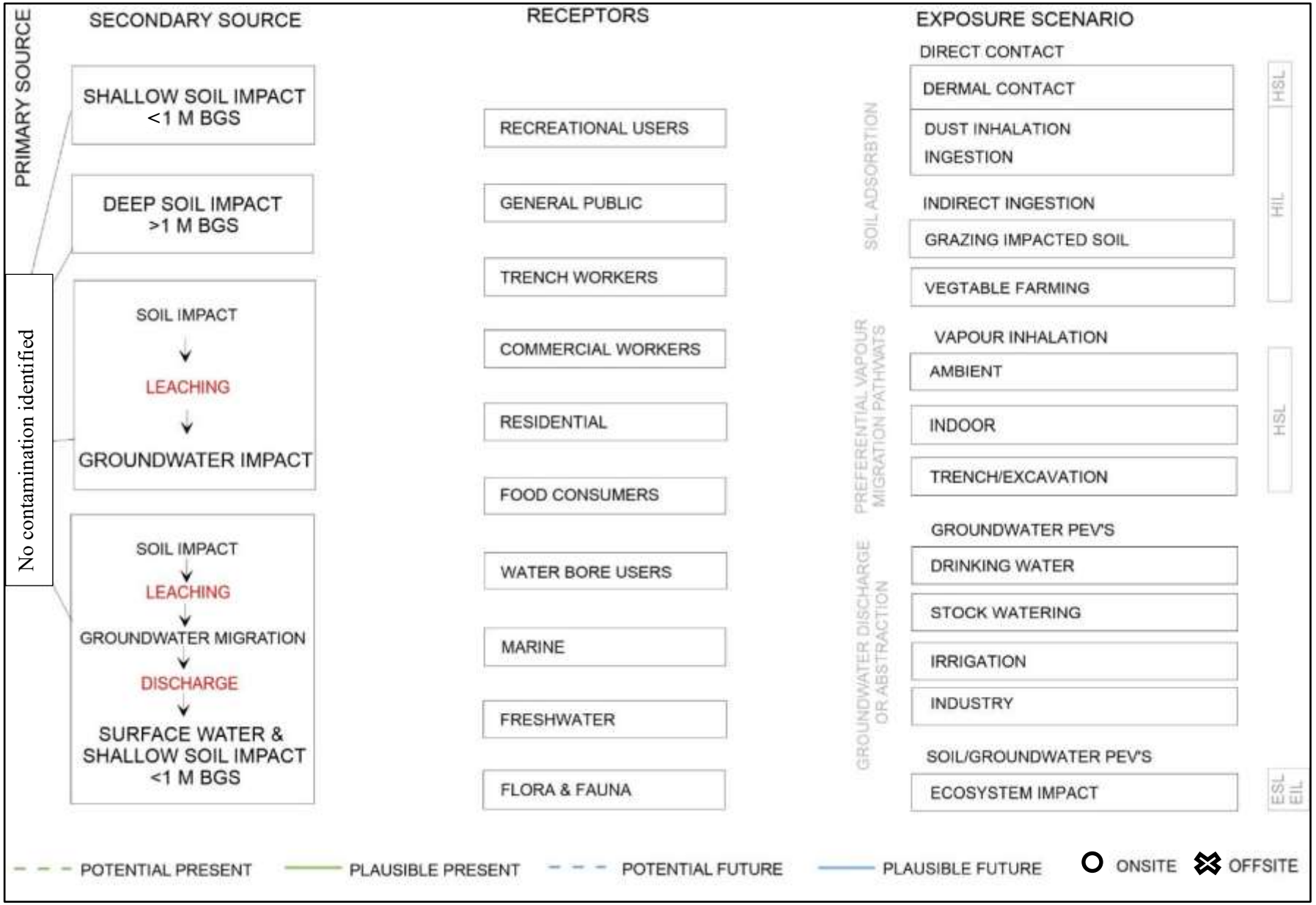


Figure 9 Conceptual Site Model – Flow Chart

13 CONCLUSIONS

13.1 Desktop Assessment

The following information was gathered during the desktop investigation:

- An ancillary dwelling is proposed with an associated wastewater system and the City of Clarence has requested the ESA (or similar) as a permit condition, planning permit number PDPLANPMTD-2025/055412. The objective of this ESA was to investigate the site for any contamination derived from the former railway line activities.
- The site is a rural residential block that historically hosted a railway line. The historical aerial photographs confirm that prior to 1946, the site housed the former railway line.
- The site is south facing and dips steeply to the south. The geology is mapped Late Carboniferous to Triassic sedimentary sequences Upper Parmeener Supergroup. The site is at the head waters of Clarence Plains Rivulet which feeds into Ralphs Bay at Rokeby Beach, 5.5km southeast of the site. The site surface has been historically modified.
- The Environment Protection Authority Tasmania does not consider the site to be contaminated. The EPA Tasmania's layers on the LIST were reviewed and there were no regulated premises and underground petroleum storage systems located either upgradient from the site or directly adjacent to the site.
- Contaminants of potential concern at the site include the following: total petroleum/recoverable hydrocarbons; mono aromatic hydrocarbons: (benzene, toluene, ethylbenzene, xylene, naphthalene); polynuclear aromatic hydrocarbons; heavy metals and asbestos.

13.2 Adopted Guideline Settings

The following investigation limits were adopted for the site:

- Ecosystem receptor: Residential land use ESL and EILs.
- Human Receptors: HSL A/HSL D for soil direct contact risk to dermal contact to residents and commercial workers during construction and future trench workers. HIL A/HIL D for soil ingestion and dust inhalation risk to residents and commercial workers during construction and future trench workers. HSL A indoor vapour risk to residents and trench works. Trench Worker specific guidelines.

13.3 Soil Assessment Conclusions

From the soil assessment, it is concluded that:

- Environment: There were no risks to ecological receptors identified.
- Human Health: There were no risks to human receptors identified.
- Excavated Soil Management: All material tested was classified as clean fill.
- No asbestos was found.

Statement of Suitability The findings from this investigation confirm there is no contaminated material, in particular heavy metals or asbestos in the footprint of the proposed ancillary dwelling or the new wastewater system area. There is no risk to Human Health or the Environment as part of the planned works.

Yours faithfully,

Sarah Joyce BSc (Hons)

Senior Environmental Scientist

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Friebel, E & Nadebaum, 2011b, 'Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 2: Application document', CRC for Contamination Assessment and Remediation of the Environment, CRC CARE Technical Report no. 10, Adelaide.

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NEPM, 1999.Guideline on Investigation Levels for Soil and Groundwater, Schedule B (1), National Environment Protection (Assessment of Site Contamination) Measure, National Environment Protection Council, 1999. Measures as amended, taking into account amendments up to National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1).

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LIMITATIONS STATEMENT

This *Environmental Site Assessment* Report has been prepared in accordance with the scope of services between Geo-Environmental Solutions Pty. Ltd. (GES) and Anita and Dean Smith ('the Client'). To the best of GES's knowledge, the information presented herein represents the Client's requirements at the time of printing of the Report. However, the passage of time, manifestation of latent conditions or impacts of future events may result in findings differing from that described in this Report. In preparing this Report, GES has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations referenced herein. Except as otherwise stated in this Report, GES has not verified the accuracy or completeness of such data, surveys, analyses, designs, plans and other information.

The scope of this study does not allow for the review of every possible soil and groundwater contaminant over the whole area of the site. Samples collected from the investigation area are assumed to be representative of the areas from where they were collected and indicative of the contamination status of the site at that point in time. The conclusions described within this report are based on these samples, the results of their analysis and an assessment of their contamination status.

This report does not purport to provide legal advice. Readers of the report should engage professional legal practitioners for this purpose as required.

No responsibility is accepted for use of any part of this report in any other context or for any other purpose by third party.

Appendix 1 GES Staff

Geo-Environmental Solutions (GES) is a specialist geotechnical and environmental consultancy providing advice on all aspects of soils, geology, hydrology, and soil and groundwater contamination across a diverse range of industries.

Geo Environmental Solutions Pty Ltd:

- ACN – 115 004 834
- ABN – 24 115 004 834

GES STAFF - ENGAGED IN SITE INVESTIGATION WORKS

Dr John Paul Cumming B.Agr.Sc (Hons) Phd CPSS GAICD

- Principle Author and Principle Environmental Consultant
- PhD in Environmental Soil Chemistry from the University of Tasmania in 2007
- 22 years' experience in environmental contamination assessment and site remediation.

Ms Sarah Joyce BSc (Hons)

- Senior Environmental Scientist
- Honours in Geography and Environmental Science at the University of Tasmania in 2003
- 20 years professional work experience and 12 years contaminated site assessment.

Mr Callum Cooper BSc

- Field Technician/ Geologist
- 2 year experience in contamination assessment

GES STAFF – CONTAMINATED SITES EXPERIENCE

Mr Aaron Plummer (Cert. IV)

- Senior Geotechnical Technician
- 10 years' experience in hydrocarbon and heavy metal contamination sampling of soils and groundwater.

Mr Grant McDonald (Adv. cert. hort.)

- Field Technician
- 15 years' experience in hydrocarbon and heavy metal contamination sampling of soils and groundwater.

Mr Mark Downie B.Agr.Sc

- Soil Scientist – 20 years' professional work experience
- 12 years' experience in contamination assessment and reporting of soils and groundwater.

Appendix 2 Planning Permit Enquiry and Development Plans

City of Clarence

City of Clarence
38 Bligh St Rosny Park
PO Box 96
Rosny Park TAS, 7018

03 6217 9500
clarence@ccc.tas.gov.au
ccc.tas.gov.au

Uvika Sahni
PDPLANPMTD-2025/055412

9 October 2025

Spectura Studio
6 Sunrise Court
Scamander TAS 7215

Email: Admin@spectura.com.au

Dear Sir/Madam

PDPLANPMTD-2025/055412 - Planning Permit Discretionary - 2 Old Coach Road, Cambridge

I refer to your recent application for the above proposal.

To enable further consideration of your application additional information is required in accordance with section 54(1) of the Land Use Planning and Approvals Act 1993 (LUPAA). The following information, under the Tasmanian Planning Scheme – Clarence (the Scheme), is required to progress your application:

11.0 Rural Living Zone

C14.0 Potentially Contaminated Land Code

C14.5.1 Suitability for intended use

- Please submit an Environmental Site Assessment (or similar) to determine whether or not the land is contaminated in the areas of the proposed works (site of ancillary and excavation for replacement wastewater system).
  This information is necessary to enable Council to adequately assess the application.

Your early attention to the above request is appreciated to enable prompt consideration of the application. In order that your application is dealt with as quickly as possible, please ensure that all information is clearly marked for the attention of Uvika Sahni and emailed to cityplanning@ccc.tas.gov.au.

In the interests of providing an efficient service to you and all our customers, please assist us to provide a helpful and timely service by addressing all the identified issues in a single submission.

Should you wish to discuss the matter, or require any additional information, please contact me on (03) 6217 9550.

Yours sincerely

Uvika Sahni
PLANNER

SHEET No.	DRAWING TITLE	ISSUE	DATE
A00	Cover Sheet	A	4/09/2025 10:58 AM
A01	Proposed Site Plan	A	4/09/2025 10:58 AM
A02	Proposed Floor Plan	A	4/09/2025 10:58 AM
A03	Elevations	A	4/09/2025 10:58 AM
A04	Flood Depth Projections	A	4/09/2025 10:58 AM
A05	Landslip Overlay	A	4/09/2025 10:58 AM

Development Application

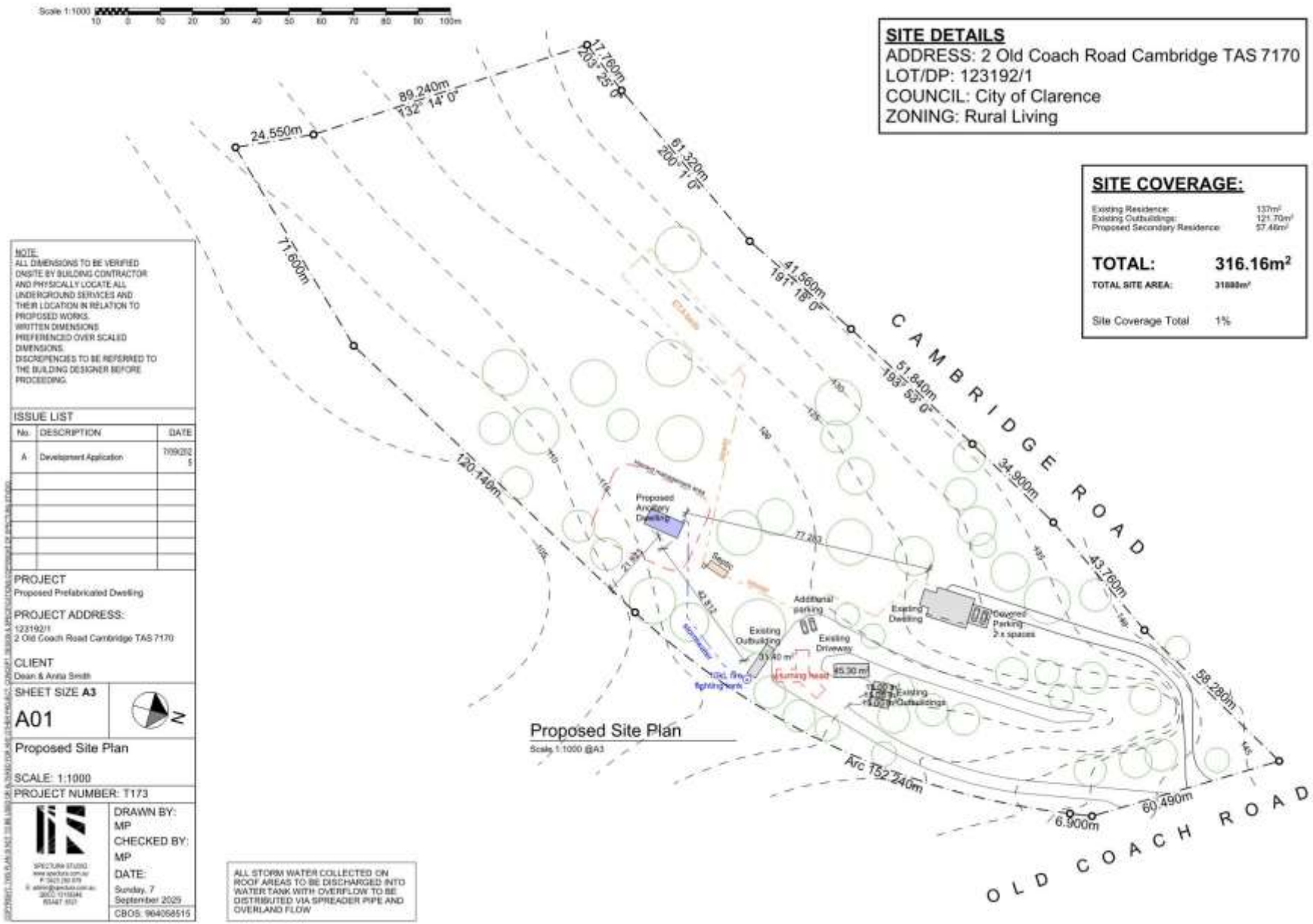
Issue: A - Development Application

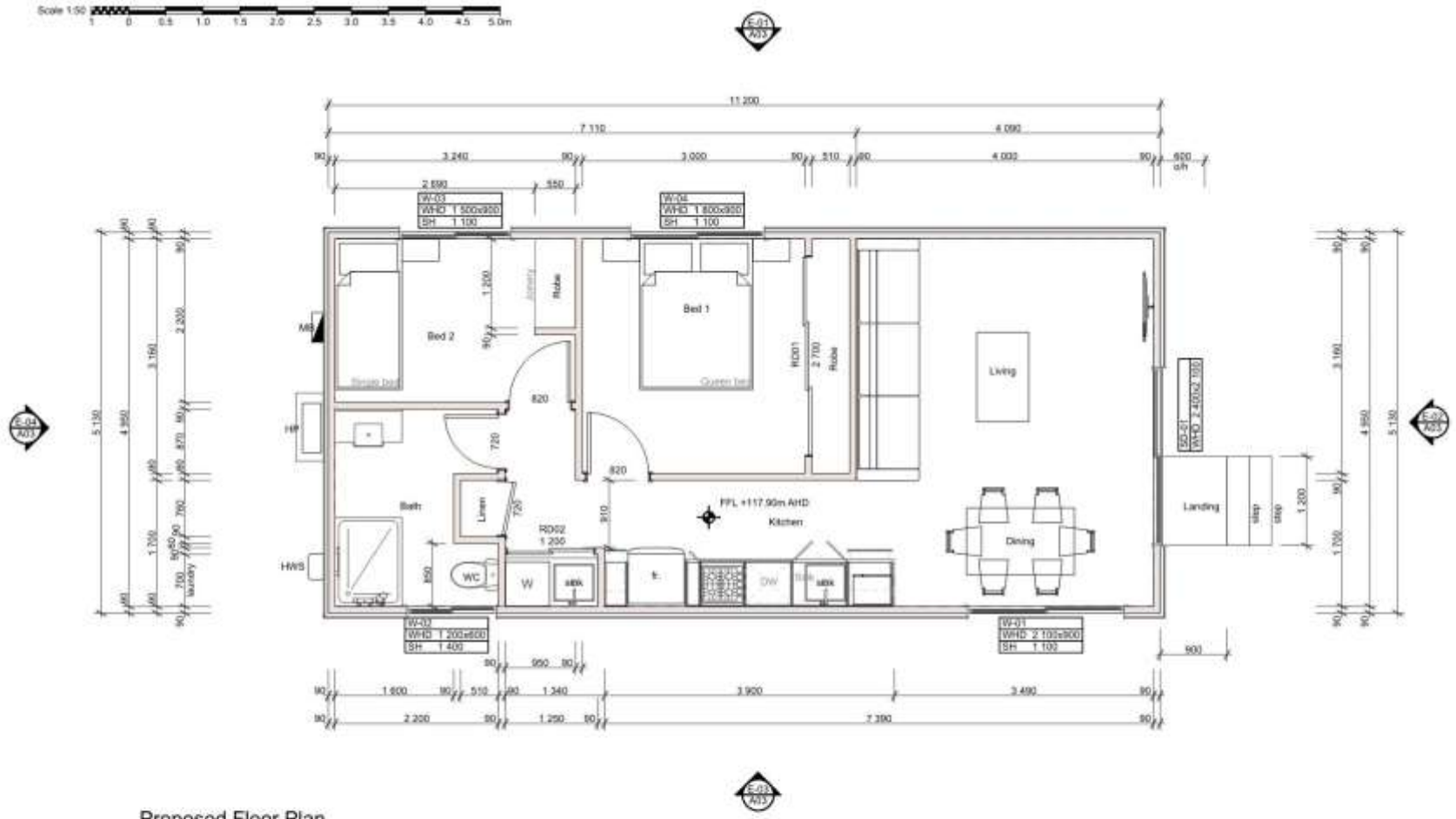
Sunday, 7 September 2025

SPECTURA STUDIO

Proposed Secondary Residence

2 Old Coach Road Cambridge TAS 7170

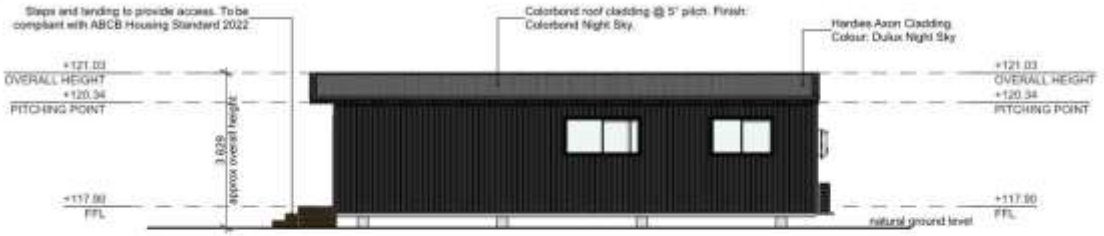

Scale 1:1000
10 0 10 20 30 40 50 60 70 80 90 100m
SITE DETAILS
ADDRESS: 2 Old Coach Road Cambridge TAS 7170
LOT/DP: 123192/1
COUNCIL: City of Clarence
ZONING: Rural Living
SITE COVERAGE:
Existing Residence: 137m²
Existing Outbuildings: 121.70m²
Proposed Secondary Residence: 57.46m²
TOTAL: 316.16m²
TOTAL SITE AREA: 31888m²
Site Coverage Total 1%
NOTE:
ALL DIMENSIONS TO BE VERIFIED ONSITE BY BUILDING CONTRACTOR AND PHYSICALLY LOCATE ALL UNDERGROUND SERVICES AND THEIR LOCATION IN RELATION TO PROPOSED WORKS.
WRITTEN DIMENSIONS PREFERENCED OVER SCALED DIMENSIONS.
DISCREPENCIES TO BE REFERRED TO THE BUILDING DESIGNER BEFORE PROCEEDING.
ISSUE LIST
No. DESCRIPTION DATE
A Development Application 7/09/2025
PROJECT
Proposed Prefabricated Dwelling
PROJECT ADDRESS:
123192/1
2 Old Coach Road Cambridge TAS 7170
CLIENT
Dean & Anita Smith
SHEET SIZE A3
A01
Proposed Site Plan
SCALE: 1:1000
PROJECT NUMBER: T173
DRAWN BY: MP
CHECKED BY: MP
DATE: Sunday, 7 September 2025
CBOS: 984068515
ALL STORM WATER COLLECTED ON ROOF AREAS TO BE DISCHARGED INTO WATER TANK WITH OVERFLOW TO BE DISTRIBUTED VIA SPREADER PIPE AND OVERLAND FLOW
17.760m
203° 25' 0"
89.240m
132° 14' 0"
24.550m
61.320m
200° 1' 0"
41.560m
191° 18' 0"
51.840m
193° 59' 0"
34.900m
43.760m
58.280m
60.490m
6.900m
Arc 152.240m
120.140m
77.600m
CAMBRIDGE ROAD
OLD COACH ROAD
Proposed Ancillary Dwelling
Septic
Additional parking
Existing Outbuilding 31.40 m²
Existing Driveway
Existing Dwelling
Covered Parking 2 x spaces
45.30 m²
Existing Outbuildings
Proposed Site Plan
Scale 1:1000 @A3



Proposed Floor Plan

Scale 1:50 @A3

PROJECT NUMBER: T173	ISSUE LIST			PROJECT Proposed Prefabricated Dwelling	A02	NOTE ALL DIMENSIONS TO BE VERIFIED ONSITE BY BUILDING CONTRACTOR AND PHYSICALLY LOCATE ALL UNDERGROUND SERVICES AND THEIR LOCATION IN RELATION TO PROPOSED WORKS. WRITTEN DIMENSIONS PREFERENCED OVER SCALED DIMENSIONS. DISCREPENCIES TO BE REFERRED TO THE BUILDING DESIGNER BEFORE PROCEEDING.
DRAWN BY: MP CHECKED BY: MP DATE: Sunday, 7 September 2025 CBOS: 984056515	No.	DESCRIPTION	DATE	PROJECT ADDRESS: 123192/1 2 Old Coach Road Cambridge TAS 7170 CLIENT Dean & Anita Smith	SHEET SIZE A3 Proposed Floor Plan SCALE: 1:50 PROJECT NUMBER: T173	
	SK1	CONCEPT DEVELOPMENT	4/04/2024			
	SK2	CONCEPT DEVELOPMENT	8/04/2024			
	SK3	Variation to suit client needs	28/01/2025			
	SK4	Variation finalisation	4/02/2025			
	SK5	Variation finalisation - client changes	3/03/2025			
	A	Development Application	7/08/2025			



E-01 A02 **Western Elevation**
Scale 1:100 @A3

NOTE:
ALL DIMENSIONS TO BE VERIFIED ONSITE BY BUILDING CONTRACTOR AND PHYSICALLY LOCATE ALL UNDERGROUND SERVICES AND THEIR LOCATION IN RELATION TO PROPOSED WORKS.
WRITTEN DIMENSIONS PREFERENCED OVER SCALED DIMENSIONS.
DISCREPENCIES TO BE REFERRED TO THE BUILDING DESIGNER BEFORE PROCEEDING.

ISSUE LIST

No.	DESCRIPTION	DATE
SK3	Variation to suit client needs	28/01/25
SK4	Variation finalisation	4/02/2025
SK5	Variation finalisation - client changes	3/03/2025
A	Development Application	7/09/2025

PROJECT
Proposed Prefabricated Dwelling

PROJECT ADDRESS:
123192/1
2 Old Coach Road Cambridge TAS 7170

CLIENT
Dean & Anita Smith

SHEET SIZE **A3**

A03

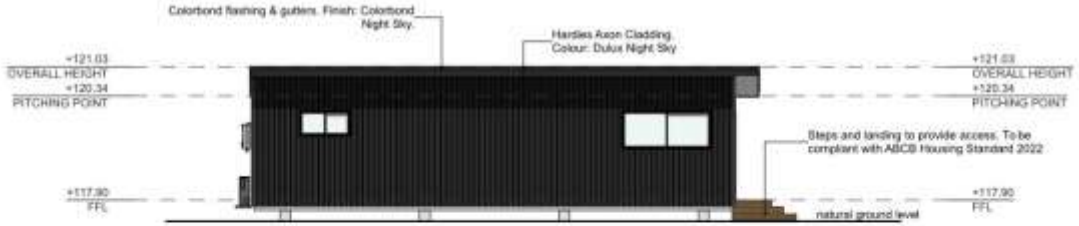
Elevations

SCALE: 1:100

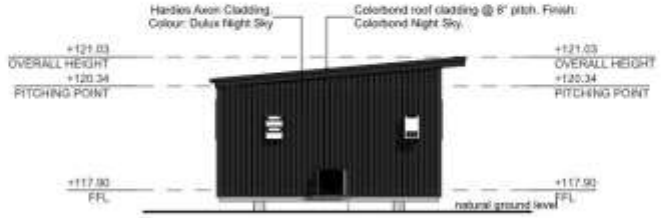
PROJECT NUMBER: T173

DRAWN BY: MP
CHECKED BY: MP
DATE: Sunday, 7 September 2025
CBOS: 984068515

E-02 A02 **Northern Elevation**
Scale 1:100 @A3



E-03 A02 **Eastern Elevation**
Scale 1:100 @A3



E-04 A02 **Southern Elevation**
Scale 1:100 @A3


Scale 1:1000
10 0 10 20 30 40 50 60 70 80 90 100m
No flooding potential on property according to simulated flood mapping data
Simulated flood depth 0.0-0.1m
Simulated flood depth 0.0-0.1m
CAMBERVILLE ROAD
OLD COACH ROAD
NOTE:
ALL DIMENSIONS TO BE VERIFIED ONSITE BY BUILDING CONTRACTOR AND PHYSICALLY LOCATE ALL UNDERGROUND SERVICES AND THEIR LOCATION IN RELATION TO PROPOSED WORKS.
WRITTEN DIMENSIONS PREFERENCED OVER SCALED DIMENSIONS.
DISCREPENCIES TO BE REFERRED TO THE BUILDING DESIGNER BEFORE PROCEEDING.
ISSUE LIST
No. DESCRIPTION DATE
A Development Application 7/09/2025
PROJECT
Proposed Prefabricated Dwelling
PROJECT ADDRESS:
123192/1
2 Old Coach Road Cambridge TAS 7170
CLIENT
Dean & Anita Smith
SHEET SIZE A3
A04
N
Flood Depth Projections
SCALE: 1:1000
PROJECT NUMBER: T173
DRAWN BY: MP
CHECKED BY: MP
DATE: Sunday, 7 September 2025
CBOS: 984068515
Flood Mapping
Scale 1:1000 @A3


Scale 1:1000
10 0 10 20 30 40 50 60 70 80 90 100m
CAMBRIDGE ROAD
OLD COACH ROAD
Landslip Overlay
Scale 1:1000 @A3
NOTE:
ALL DIMENSIONS TO BE VERIFIED ONSITE BY BUILDING CONTRACTOR AND PHYSICALLY LOCATE ALL UNDERGROUND SERVICES AND THEIR LOCATION IN RELATION TO PROPOSED WORKS.
WRITTEN DIMENSIONS PREFERENCED OVER SCALED DIMENSIONS.
DISCREPENCIES TO BE REFERRED TO THE BUILDING DESIGNER BEFORE PROCEEDING.
ISSUE LIST
No. DESCRIPTION DATE
A Development Application 7/09/2025
PROJECT
Proposed Prefabricated Dwelling
PROJECT ADDRESS:
123192/1
2 Old Coach Road Cambridge TAS 7170
CLIENT
Dean & Anita Smith
SHEET SIZE A3
A05
N
Landslip Overlay
SCALE: 1:1000
PROJECT NUMBER: T173
DRAWN BY: MP
CHECKED BY: MP
DATE: Sunday, 7 September 2025
CBOS: 984068515

Appendix 3 Site Photographs

Photo 1. Current Site Conditions

Photo 2. Current Site Conditions

Photo 3. BH1 (drilled)

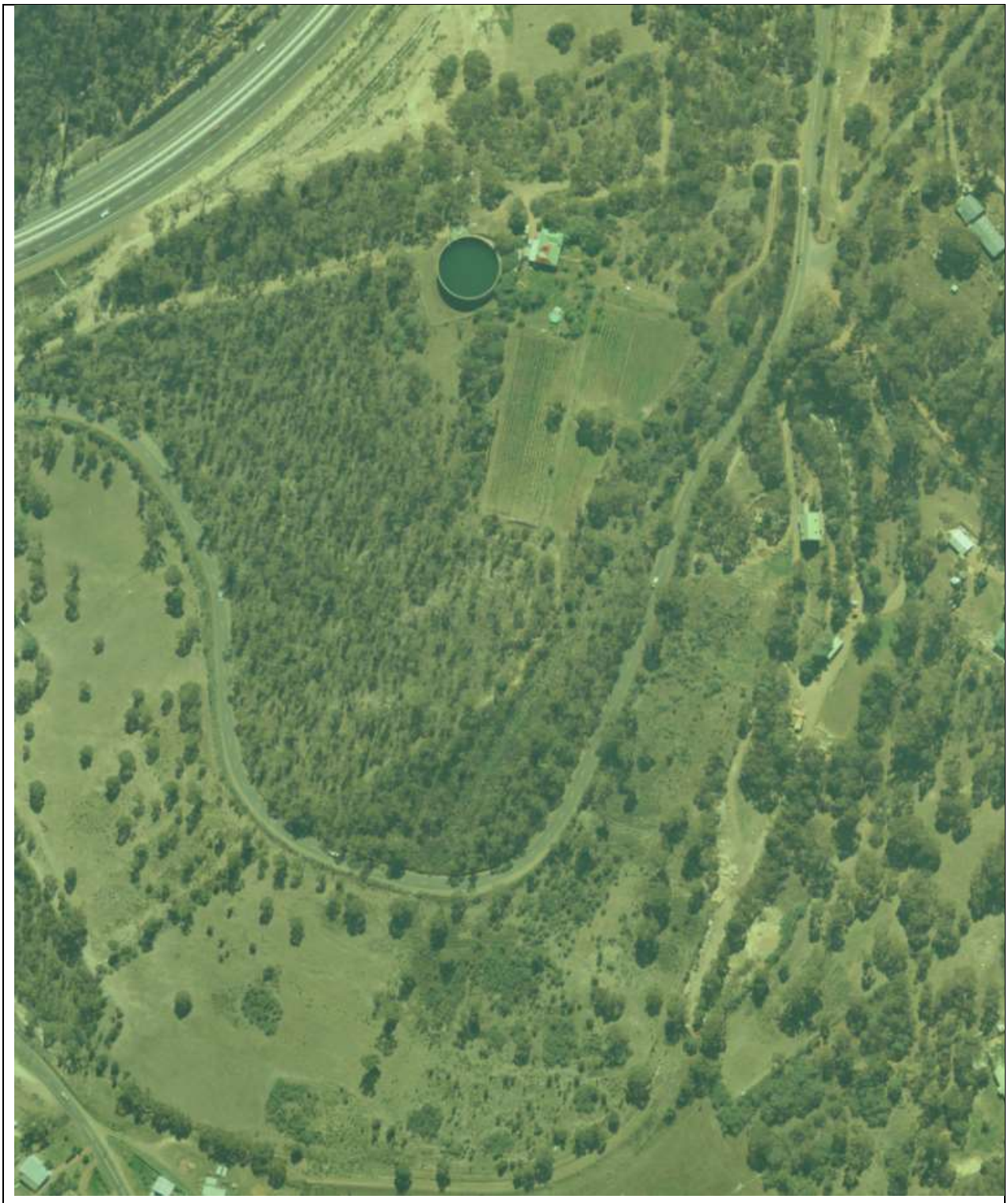
Photo 4. BH2 (drilled)

Photo 5. BH3 (hand augered)

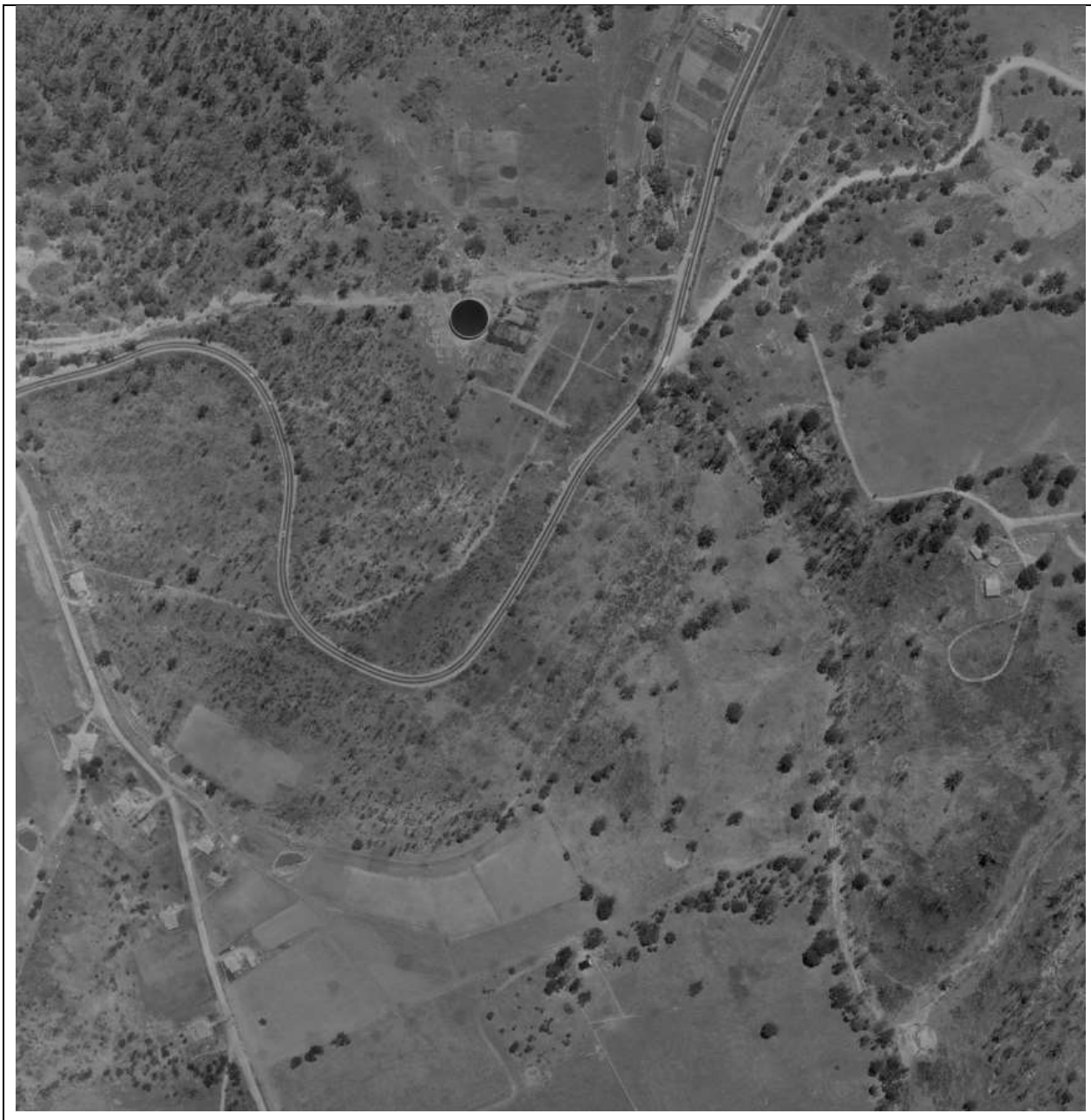
Photo 6. BH4 (hand augered)

Appendix 4 Historical Aerial Photographs

Historical Aerial Photograph 2. 3 January 2008 - Source NRE



Historical Aerial Photograph 5. 11 March 1995 - Source NRE



Historical Aerial Photograph 6. 24 January 1969 - Source NRE

Historical Aerial Photograph 9. 2 April 1946 – Source NRE

Appendix 5 Chain of Custody (COC) and Sample Receipt Notification (SRN)

ALS Environmental

FREIGHT

CLIENT: GEOENVIRONMENTAL SOLUTIONS

OFFICE: 29 Kirksway Pl, Battery Point TAS 7004

PROJECT: 2 Old Coach Road

ORDER NUMBER:

PROJECT MANAGER: JP Cumming CONTACT PH: 0413041531

SAMPLER: Sarah Joyce / Callum Cooper SAMPLER MOBILE: 0438255259

COC emailed to ALS? (YES / NO) EDD FORMAT:

Email Reports to: jcumming@geosolutions.net.au; sjoyce@geosolutions.net.au

Email Invoice to: jcumming@geosolutions.net.au; accounts@geosolutions.net.au; sjoyce;

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

ALS QUOTE NO.:

COC SEQUENCE NUMBER (Circle): COC: (1) 2 3 4 5 6 7 OF: (1) 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

RELINQUISHED BY: S. Joyce DATE/TIME: 16-10-25 1200

RECEIVED BY: DATE/TIME:

RELINQUISHED BY: DATE/TIME:

RECEIVED BY: CHARLEY ALS DATE/TIME: 17/10/25 12:45

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE	TOTAL CONTAINERS	Soil (S-07) TRH, BTEXN, PAH	Soil (S-03) NEPM 15 Metals	TRH C6 - C10	Tas EPA IB105	Water (W-07) TRH, BTEXN, PAH, NEPM 15 Metals	Soil: PCB	D/A Asbestos	HOLD	Additional Information
1	BH1 0.2-0.4	15-10-25 12:30	S	Large soil jar	1	✓	✓							
2	BH1 0.9-1.0	1230	S		1								✓	
3	BH1 0.2-0.4 DUP	1230	S		1	✓	✓							
4	BH2 0.2-0.4	1250	S		1								✓	
5	BH2 0.9-1.0	1250	S		1	✓	✓							
6	BH3 0.4-0.5	1:10	S		1								✓	
7	BH4 0.4-0.5	1:10	S		1	✓	✓							
8	BH1	12:30	S	1 bag	1							✓		
9	BH2	12:50	S	"	1								✓	
10	BH3	1:10	S	"	1							✓		
11	RB	12:20	W		4					✓				

Environmental Division Melbourne

Work Order Reference

EM2519157

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2519157**		
Client	: **GEO-ENVIRONMENTAL SOLUTIONS**	Laboratory	: Environmental Division Melbourne
Contact	: DR JOHN PAUL CUMMING	Contact	: Katie Davis
Address	: 29 KIRKSWAY PLACE BATTERY POINT TASMANIA, AUSTRALIA 7004	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: jcumming@geosolutions.net.au	E-mail	: katie.davis@alsglobal.com
Telephone	: +61 03 6223 1839	Telephone	: +61-3-8549 9600
Facsimile	: +61 03 6223 4539	Facsimile	: +61-3-8549 9626
Project	: 2 Old Coach Road	Page	: 1 of 3
Order number	: ----	Quote number	: EB2017GEOENVSOL0001 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: CC, SJ		

Dates

Date Samples Received	: 17-Oct-2025 12:45	Issue Date	: 17-Oct-2025
Client Requested Due Date	: 24-Oct-2025	Scheduled Reporting Date	: **24-Oct-2025**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 2.4°C 3.3°C 3.6°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 11 / 7

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Melbourne, NATA accreditation no. 825, site no. 13778.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Issue Date	: 17-Oct-2025
Page	: 2 of 3
Work Order	: EM2519157 Amendment 0
Client	: GEO-ENVIRONMENTAL SOLUTIONS

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - S-03 15 Metals (NEPM 2013 Suite - incl. Digestion)	SOIL - S-07 TRH/BTEX/N/PAH (SIM)
EM2519157-001	15-Oct-2025 12:30	BH1 0.2-0.4		✓		✓	✓
EM2519157-002	15-Oct-2025 12:30	BH1 0.9-1.0	✓				
EM2519157-003	15-Oct-2025 12:30	BH1 0.2-0.4 DUP		✓		✓	✓
EM2519157-004	15-Oct-2025 12:50	BH2 0.2-0.4	✓				
EM2519157-005	15-Oct-2025 12:50	BH2 0.9-1.0		✓		✓	✓
EM2519157-006	15-Oct-2025 13:10	BH3 0.4-0.5	✓				
EM2519157-007	15-Oct-2025 13:10	BH4 0.4-0.5		✓		✓	✓
EM2519157-008	15-Oct-2025 12:30	BH1			✓		
EM2519157-009	15-Oct-2025 12:30	BH2	✓				
EM2519157-010	15-Oct-2025 13:10	BH3			✓		

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - W-03 15 Metals (NEPM Suite)	WATER - W-07 TRH/BTEX/N/PAH
EM2519157-011	15-Oct-2025 12:20	RB	✓	✓

Proactive Holding Time Report

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

Issue Date	: 17-Oct-2025
Page	: 3 of 3
Work Order	: EM2519157 Amendment 0
Client	: GEO-ENVIRONMENTAL SOLUTIONS

Requested Deliverables

All Invoices		
- A4 - AU Tax Invoice (INV)	Email	accounts@geosolutions.net.au
JOHN PAUL CUMMING		
- *AU Certificate of Analysis - NATA (COA)	Email	jcumming@geosolutions.net.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	jcumming@geosolutions.net.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	jcumming@geosolutions.net.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	jcumming@geosolutions.net.au
- A4 - AU Tax Invoice (INV)	Email	jcumming@geosolutions.net.au
- Chain of Custody (CoC) (COC)	Email	jcumming@geosolutions.net.au
- EDI Format - ENMRG (ENMRG)	Email	jcumming@geosolutions.net.au
- EDI Format - ESDAT (ESDAT)	Email	jcumming@geosolutions.net.au
Sarah Joyce		
- *AU Certificate of Analysis - NATA (COA)	Email	sjoyce@geosolutions.net.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	sjoyce@geosolutions.net.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	sjoyce@geosolutions.net.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sjoyce@geosolutions.net.au
- A4 - AU Tax Invoice (INV)	Email	sjoyce@geosolutions.net.au
- Chain of Custody (CoC) (COC)	Email	sjoyce@geosolutions.net.au
- EDI Format - ENMRG (ENMRG)	Email	sjoyce@geosolutions.net.au
- EDI Format - ESDAT (ESDAT)	Email	sjoyce@geosolutions.net.au

Appendix 6 Quality Assurance and Quality Control

Duplicate Comparison

Duplicate Comparrison	Sample	Moisture Content (dried @ 103°	Lead	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1.2.3.cd)pyrene	Dibenz(a.h)anthracene	Benzo(g.h.i)perylene
Unit		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		1	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
15/10/2025	BH1 0.2-0.4	14.8	22	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
15/10/2025	BH1 0.2-0.4 DUP	16.6	26	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Relative Percentage Difference (RPD) %		11.5	16.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RPD Compliance Limit %		50	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Method Detection Limit (MDL)		20	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MDL Class		LOW	LOW	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
RPD Compliance With MDL?	55/56 (98%)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Duplicate Comparrison	Sample	Sum of polycyclic aromatic hydr	Benzo(a)pyrene TEQ (WHO)	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Sum of BTEX	Total Xylenes	Naphthalene	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)	C6 - C10 Fraction	F1	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	F2	Benzo(a)pyrene TEQ (half LOR)	Benzo(a)pyrene TEQ (LOR)
Unit		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		0.5	0.5	0.2	0.5	0.5	0.5	0.5	0.2	0.5	1	10	50	100	100	50	10	10	50	100	100	50	50	0.5	0.5
15/10/2025	BH1 0.2-0.4	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<1	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50	0.6	1.2
15/10/2025	BH1 0.2-0.4 DUP	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<1	<10	<50	<100	<100	<50	<10	<10	<50	<100	<100	<50	<50	0.6	1.2
Relative Percentage Difference (RPD) %		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0	0.0
RPD Compliance Limit %		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50
Method Detection Limit (MDL)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10
MDL Class		NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	LOW
RPD Compliance With MDL?	55/56 (98%)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

For BH1 0.2-0.4 and BH1 0.2-0.4 DUP pairs, 98% of analytes complied.

Rinsate Blank

		EG020F: Dissolved Metals by ICP-MS														EP080		EP080/071					EP080/071			
Quality Control Blanks		Arsenic	Beryllium	Barium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Nickel	Selenium	Vanadium	Zinc	Boron	Mercury	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Sum of BTEX	Naphthalene	C6 - C9 Fraction	C10 - C14 Fraction
Unit		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		0.001	0.001	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.01	0.005	0.05	0.0001	1	2	2	2	2	2	1	5	20	50
Date	Sample																									
15/10/2025	RB	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.005	<0.05	<0.0001	<1	<2	<2	<2	<2	<2	<1	<5	<20	<50

Quality Control Blanks		C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)	C6 - C10 Fraction	C6 - C10 Fraction minus BTEX (F1)	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	>C10 - C16 Fraction minus Naphthalene (F2)	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1.2.3.cd)pyrene	Dibenz(a.h)anthracene	Benzo(g.h.i)perylene	Sum of polycyclic aromatic hydrocarbons	Benzo(a)pyrene TEQ (zero)
Unit		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		100	50	50	20	20	100	100	100	100	100	1	1	1	1	1	1	1	1	1	1	1	0.5	1	1	1	0.5	0.5
Date	Sample																											
15/10/2025	RB	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0	<1.0	<0.5	<0.5

For rinsate sample, there were no detections <LOR.

QUALITY CONTROL REPORT

Work Order	: EM2519157	Page	: 1 of 12
Client	: GEO-ENVIRONMENTAL SOLUTIONS	Laboratory	: Environmental Division Melbourne
Contact	: DR JOHN PAUL CUMMING	Contact	: Katie Davis
Address	: 29 KIRKSWAY PLACE BATTERY POINT TASMANIA, AUSTRALIA 7004	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 6223 1839	Telephone	: +61-3-8549 9600
Project	: 2 Old Coach Road	Date Samples Received	: 17-Oct-2025
Order number	: —	Date Analysis Commenced	: 17-Oct-2025
C-O-C number	: —	Issue Date	: 22-Oct-2025
Sampler	: DC, SJ		
Site	: —		
Quote number	: EN/222		
No. of samples received	: 11		
No. of samples analysed	: 7		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	Position	Accreditation Category
Janes Nhieu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
MINNE TRAN	Approved Asbestos Identifier	Melbourne Asbestos, Springvale, VIC
Nancy Wong	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

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

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

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

Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
- CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
- LOR = Limit of reporting
- RPD = Relative Percentage Difference
- # = Indicates failed QC
- * = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 6938833)									
EM2519157-001	BH1 0.2-0.4	EG005T: Manganese	7439-96-5	5	mg/kg	308	274	11.6	0% - 30%
EM2519157-001	BH1 0.2-0.4	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	70	50	30.6	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	21	17	21.3	0% - 30%
		EG005T: Cobalt	7440-48-4	2	mg/kg	19	15	22.9	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	16	13	20.9	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	33	37	12.2	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	22	19	17.8	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	89	121	19.5	0% - 30%
		EG005T: Zinc	7440-66-6	5	mg/kg	84	69	19.4	0% - 30%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.0	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 6949954)									
EM2519132-001	Anonymous	EA055: Moisture Content	—	0.1 (1.0)*	%	15.4	12.7	19.2	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 6938834)									
EM2519157-001	BH1 0.2-0.4	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 6936783)									
EM2519132-002	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Page : 3 of 12
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Sub-Matrix: SOIL

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report: Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 6938783) - continued									
EM2519132-002	Anonymous	EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 6938760)									
EM2519120-011	Anonymous	EP080: C6 - C9 Fraction	---	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 6938764)									
EM2519132-002	Anonymous	EP071: C15 - C28 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	---	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 6938760)									
EM2519120-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 6938764)									
EM2519132-002	Anonymous	EP071: >C16 - C34 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	---	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	---	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 6938760)									
EM2519120-011	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Page : 4 of 12
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Sub-Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report: Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6943772)									
EM2519147-012	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.003	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.069	0.063	9.5	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	7.40	7.41	0.2	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.13	0.14	0.0	No Limit
EM2519161-004	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.060	0.055	8.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.006	0.007	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.28	0.29	4.2	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 6943771)									
EM2519143-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EM2519157-011	RB	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 6940282)									
EM2519066-031	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.0	No Limit

Page : 5 of 12
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 6940282) - continued									
EM2519058-031	Anonymous	EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz[a]anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo[b+j]fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo[k]fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno[1,2,3-cd]pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz[a,h]anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo[g,h,i]perylene	191-24-2	1	µg/L	<1.0	<1.0	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 6939890)									
EM2519150-006	Anonymous	EP080: C6 - C9 Fraction	---	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 6940283)									
EM2519150-004	Anonymous	EP071: C15 - C28 Fraction	---	100	µg/L	150	180	10.6	No Limit
		EP071: C10 - C14 Fraction	---	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	---	50	µg/L	50	70	27.0	No Limit
EM2519058-031	Anonymous	EP071: C15 - C28 Fraction	---	100	µg/L	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	---	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	---	50	µg/L	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 6939890)									
EM2519150-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 6940283)									
EM2519150-004	Anonymous	EP071: >C10 - C16 Fraction	---	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	---	100	µg/L	160	190	15.5	No Limit
		EP071: >C34 - C40 Fraction	---	100	µg/L	<100	<100	0.0	No Limit
EM2519058-031	Anonymous	EP071: >C10 - C16 Fraction	---	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	---	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	---	100	µg/L	<100	<100	0.0	No Limit
EP080: BTEXN (QC Lot: 6939890)									
EM2519150-006	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit

Page : 6 of 12
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080: BTEXN (QC Lot: 6939890) - continued									
EM2519150-006	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit

Page : 7 of 12
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 6938833)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	43 mg/kg	95.0	70.0	130
EG005T: Barium	7440-39-3	10	mg/kg	<10	524 mg/kg	102	70.0	130
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	---	---	---	---
EG005T: Boron	7440-42-8	50	mg/kg	<50	---	---	---	---
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	3 mg/kg	118	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	94 mg/kg	99.1	70.0	130
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	14.8 mg/kg	100	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	185 mg/kg	94.4	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	153 mg/kg	106	70.0	130
EG005T: Manganese	7439-96-5	5	mg/kg	<5	644 mg/kg	103	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.8 mg/kg	103	70.0	130
EG005T: Selenium	7782-49-2	5	mg/kg	<5	---	---	---	---
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	53.2 mg/kg	97.8	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	358 mg/kg	99.5	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 6938834)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	76.7	69.0	128
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 6938783)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	87.2	65.7	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	85.5	61.0	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	86.2	63.5	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	82.4	61.3	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	85.7	79.4	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	87.8	61.7	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	85.9	76.3	124
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	90.0	79.9	128
EP075(SIM): Benzo[a]anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	79.0	76.8	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	89.7	80.9	130
EP075(SIM): Benzo[b+j]fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	71.1	70.0	121
EP075(SIM): Benzo[k]fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	89.8	80.4	130
EP075(SIM): Benzo[a]pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	82.2	70.2	123

Page : 8 of 12
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 6938783) - continued								
EP075(SIM): Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	73.0	67.9	122
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	73.3	65.9	120
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	75.1	65.8	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6938780)								
EP080: C6 - C9 Fraction	---	10	mg/kg	<10	36 mg/kg	82.7	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6938784)								
EP071: C10 - C14 Fraction	---	50	mg/kg	<50	810 mg/kg	101	80.0	120
EP071: C10 - C28 Fraction	---	100	mg/kg	<100	2890 mg/kg	98.6	80.0	120
EP071: C29 - C36 Fraction	---	100	mg/kg	<100	1460 mg/kg	98.2	80.0	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6938780)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	79.3	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6938784)								
EP071: >C10 - C16 Fraction	---	50	mg/kg	<50	1120 mg/kg	96.3	80.0	120
EP071: >C16 - C34 Fraction	---	100	mg/kg	<100	3800 mg/kg	99.3	80.0	120
EP071: >C34 - C40 Fraction	---	100	mg/kg	<100	390 mg/kg	104	80.0	120
EP080: BTEXN (QCLot: 6938780)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	80.3	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	86.0	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	87.5	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	89.7	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	86.5	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	94.5	61.8	123

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 6943772)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	106	80.0	111
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	90.0	85.0	112
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	97.2	83.6	113
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.5	83.3	111
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.4	83.2	109
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	104	84.3	110
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	103	83.1	107

Page : 9 of 12
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 6943772) - continued								
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	89.1	86.6	108
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	89.4	84.9	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	86.3	110
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	105	82.5	113
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	99.7	83.7	110
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	106	86.3	112
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	88.8	85.4	115
EG035F: Dissolved Mercury by FIMS (QCLot: 6943771)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	103	71.8	116
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 6940282)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	102	42.8	114
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	104	48.6	119
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	107	47.5	117
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	109	49.5	119
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	110	49.4	121
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	103	48.4	122
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	111	50.3	124
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	111	50.0	126
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	107	49.4	127
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	110	48.7	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	99.0	54.3	134
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	101	56.1	134
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	110	55.6	135
EP075(SIM): Indeno(1,2,3-cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	116	54.4	126
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	117	54.5	126
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	119	54.4	126
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6939890)								
EP080: C6 - C9 Fraction	---	20	µg/L	<20	360 µg/L	93.1	69.2	134
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6940283)								
EP071: C10 - C14 Fraction	---	50	µg/L	<50	6421 µg/L	77.9	47.2	122
EP071: C15 - C28 Fraction	---	100	µg/L	<100	15219 µg/L	83.0	52.9	131
EP071: C29 - C36 Fraction	---	50	µg/L	<50	7904 µg/L	81.2	50.4	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6939890)								

Page : 10 of 12
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6939890) - continued								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	82.8	69.2	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6940283)								
EP071: >C10 - C16 Fraction	---	100	µg/L	<100	8080 µg/L	76.7	49.1	125
EP071: >C16 - C34 Fraction	---	100	µg/L	<100	20300 µg/L	83.4	51.6	128
EP071: >C34 - C40 Fraction	---	100	µg/L	<100	1456 µg/L	86.2	47.2	130
EP080: BTEXN (QCLot: 6939890)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	103	68.8	127
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	94.8	72.9	129
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	94.3	71.7	130
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	98.3	72.3	130
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	102	75.9	134
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	104	69.3	131

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Spike Recovery (%): MS	Acceptable Limits (%): Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 6938833)							
EM2519157-003	BH1 0.2-0.4 DUP	EG005T: Arsenic	7440-38-2	50 mg/kg	98.2	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	99.8	79.7	118
		EG005T: Chromium	7440-47-3	50 mg/kg	97.2	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	106	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	105	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	98.5	79.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	104	80.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 6938834)							
EM2519157-003	BH1 0.2-0.4 DUP	EG035T: Mercury	7439-97-6	0.5 mg/kg	86.2	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 6938782)							
EM2519157-001	BH1 0.2-0.4	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	84.8	77.2	116
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	89.3	65.5	139
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6938768)							
EM2519157-001	BH1 0.2-0.4	EP080: C6 - C9 Fraction	---	28 mg/kg	76.8	33.4	124

Page	: 11 of 12
Work Order	: EM2519157
Client	: GEO-ENVIRONMENTAL SOLUTIONS
Project	: 2 Old Coach Road

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6938794)							
EM2519157-001	BH1 0.2-0.4	EP071: C10 - C14 Fraction	---	810 mg/kg	101	70.0	130
		EP071: C15 - C28 Fraction	---	2680 mg/kg	99.8	70.0	130
		EP071: C29 - C36 Fraction	---	1460 mg/kg	99.2	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6938795)							
EM2519157-001	BH1 0.2-0.4	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	76.4	30.8	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6938784)							
EM2519157-001	BH1 0.2-0.4	EP071: >C10 - C16 Fraction	---	1120 mg/kg	96.8	70.0	130
		EP071: >C16 - C34 Fraction	---	3800 mg/kg	100	70.0	130
		EP071: >C34 - C40 Fraction	---	280 mg/kg	107	70.0	130
EP080: BTEXN (QCLot: 6938760)							
EM2519157-001	BH1 0.2-0.4	EP080: Benzene	71-43-2	2 mg/kg	87.8	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	93.6	67.1	131

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 6943772)							
EM2519147-012	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	116	78.6	124
		EG020A-F: Beryllium	7440-41-7	0.2 mg/L	89.6	73.0	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	110	75.0	127
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	105	74.6	118
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	107	71.0	135
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	115	78.0	133
		EG020A-F: Copper	7440-50-8	0.2 mg/L	116	76.0	132
		EG020A-F: Lead	7439-92-1	0.2 mg/L	104	75.0	133
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	# Not Determined	84.0	134
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	114	73.0	131
		EG020A-F: Vanadium	7440-62-2	0.2 mg/L	106	73.0	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	120	75.0	131
EG035F: Dissolved Mercury by FIMS (QCLot: 6943771)							
EM2519143-002	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	108	70.0	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6939890)							
EM2519150-007	Anonymous	EP080: C6 - C9 Fraction	---	280 µg/L	87.0	33.9	126
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6940283)							
EM2519150-003	Anonymous	EP071: C10 - C14 Fraction	---	4421 µg/L	50.2	48.0	126
		EP071: C15 - C28 Fraction	---	15219 µg/L	53.6	51.7	132

Page	: 12 of 12
Work Order	: EM2519157
Client	: GEO-ENVIRONMENTAL SOLUTIONS
Project	: 2 Old Coach Road

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 6940283) - continued							
EM2519150-003	Anonymous	EP071: C29 - C36 Fraction	---	7904 µg/L	53.3	50.5	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6939890)							
EM2519150-007	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	84.8	34.0	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 6940283)							
EM2519150-003	Anonymous	EP071: >C10 - C16 Fraction	---	6085 µg/L	48.8	48.0	126
		EP071: >C16 - C34 Fraction	---	20300 µg/L	53.9	50.4	130
		EP071: >C34 - C40 Fraction	---	1456 µg/L	55.1	47.4	131
EP080: BTEXN (QCLot: 6939890)							
EM2519150-007	Anonymous	EP080: Benzene	71-43-2	20 µg/L	89.9	58.5	133
		EP080: Toluene	108-88-3	20 µg/L	97.3	60.4	132

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EM2519157	Page	: 1 of 8
Client	: GEO-ENVIRONMENTAL SOLUTIONS	Laboratory	: Environmental Division Melbourne
Contact	: DR JOHN PAUL CUMMING	Telephone	: +61-3-8549 9600
Project	: 2 Old Coach Road	Date Samples Received	: 17-Oct-2025
Site	: ----	Issue Date	: 22-Oct-2025
Sampler	: CC, SJ	No. of samples received	: 11
Order number	: ----	No. of samples analysed	: 7

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG020F: Dissolved Metals by ICP-MS	EM2519147-012	Anonymous	**Manganese**	7439-96-5	Not Determined	---	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)						
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	3	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach data with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive as Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
BH1 0.2-0.4, BH2 0.9-1.0, BH1 0.3-0.4 DUP, BH4 0.4-0.5	**15-Oct-2025**	---	---	---	**20-Oct-2025**	29-Oct-2025	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag - Friable Asbestos/PSD Bag (EA200)							
BH1, BH3	**15-Oct-2025**	---	---	---	**20-Oct-2025**	13-Apr-2026	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
BH1 0.2-0.4, BH2 0.9-1.0, BH1 0.2-0.4 DUP, BH4 0.4-0.5	**15-Oct-2025**	**17-Oct-2025**	13-Apr-2026	✓	**20-Oct-2025**	13-Apr-2026	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
BH1 0.2-0.4, BH2 0.9-1.0, BH1 0.2-0.4 DUP, BH4 0.4-0.5	**15-Oct-2025**	**17-Oct-2025**	12-Nov-2025	✓	**20-Oct-2025**	12-Nov-2025	✓

Page : 3 of 8
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Matrix: **SOIL**

Evaluation: ♦ = Holding time breach ; ✓ = Within holding time

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BH1 0.2-0.4, BH2 0.9-1.0,	BH1 0.2-0.4 DUP, BH4 0.4-0.5	15-Oct-2025	17-Oct-2025	29-Oct-2025	✓	20-Oct-2025	26-Nov-2025	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
BH1 0.2-0.4, BH2 0.9-1.0,	BH1 0.2-0.4 DUP, BH4 0.4-0.5	15-Oct-2025	17-Oct-2025	29-Oct-2025	✓	17-Oct-2025	29-Oct-2025	✓
Soil Glass Jar - Unpreserved (EP071)							
BH1 0.2-0.4, BH2 0.9-1.0,	BH1 0.2-0.4 DUP, BH4 0.4-0.5	15-Oct-2025	17-Oct-2025	29-Oct-2025	✓	20-Oct-2025	26-Nov-2025	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
BH1 0.2-0.4, BH2 0.9-1.0,	BH1 0.2-0.4 DUP, BH4 0.4-0.5	15-Oct-2025	17-Oct-2025	29-Oct-2025	✓	17-Oct-2025	29-Oct-2025	✓
Soil Glass Jar - Unpreserved (EP071)							
BH1 0.2-0.4, BH2 0.9-1.0,	BH1 0.2-0.4 DUP, BH4 0.4-0.5	15-Oct-2025	17-Oct-2025	29-Oct-2025	✓	20-Oct-2025	26-Nov-2025	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
BH1 0.2-0.4, BH2 0.9-1.0,	BH1 0.2-0.4 DUP, BH4 0.4-0.5	15-Oct-2025	17-Oct-2025	29-Oct-2025	✓	17-Oct-2025	29-Oct-2025	✓

Matrix: **WATER**

Evaluation: ♦ = Holding time breach ; ✓ = Within holding time

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG035A-F)							
RB	15-Oct-2025	---	---	---	21-Oct-2025	13-Apr-2026	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F)							
RB	15-Oct-2025	---	---	---	21-Oct-2025	12-Nov-2025	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
RB	15-Oct-2025	20-Oct-2025	22-Oct-2025	✓	21-Oct-2025	29-Nov-2025	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
RB	15-Oct-2025	20-Oct-2025	22-Oct-2025	✓	21-Oct-2025	29-Nov-2025	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
RB	15-Oct-2025	18-Oct-2025	29-Oct-2025	✓	18-Oct-2025	29-Oct-2025	✓

Page : 4 of 8
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Matrix: **WATER**

Evaluation: ♦ = Holding time breach ; ✓ = Within holding time

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
RB	15-Oct-2025	20-Oct-2025	22-Oct-2025	✓	21-Oct-2025	29-Nov-2025	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
RB	15-Oct-2025	18-Oct-2025	29-Oct-2025	✓	18-Oct-2025	29-Oct-2025	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
RB	15-Oct-2025	18-Oct-2025	29-Oct-2025	✓	18-Oct-2025	29-Oct-2025	✓

Page	5 of 8
Work Order	EM2519157
Client	GEO-ENVIRONMENTAL SOLUTIONS
Project	2 Old Coach Road

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was/were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL** — Evaluation: ✖ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	9	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	8	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER** — Evaluation: ✖ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	2	10	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Page	6 of 8
Work Order	EM2519157
Client	GEO-ENVIRONMENTAL SOLUTIONS
Project	2 Old Coach Road

Matrix: **WATER** — Evaluation: ✖ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Control Samples (LCS) - Continued							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	2	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 Method for the qualitative identification of asbestos in bulk samples. Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120, USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015. Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125, USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015. The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3).
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270. Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260. Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GC/MS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3).

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	ENVR	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion: 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510. 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3). ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

Appendix 7 Certificate of Analysis

CERTIFICATE OF ANALYSIS

Work Order	: EM2519157	Page	: 1 of 11
Client	: GEO-ENVIRONMENTAL SOLUTIONS	Laboratory	: Environmental Division Melbourne
Contact	: DR JOHN PAUL CUMMING	Contact	: Katie Davis
Address	: 29 KIRKSWAY PLACE BATTERY POINT TASMANIA, AUSTRALIA 7004	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 6223 1839	Telephone	: +61-3-8549 9600
Project	: 2 Old Coach Road	Date Samples Received	: 17-Oct-2025 12:45
Order number	: ----	Date Analysis Commenced	: 17-Oct-2025
C-O-C number	: ----	Issue Date	: 22-Oct-2025 17:16
Sampler	: CC, SJ		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 11		
No. of samples analysed	: 7		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
James Nhieu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
MINNIE TRAN	Approved Asbestos Identifier	Melbourne Asbestos, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting.
* = This result is computed from individual analyte detections at or above the level of reporting.
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1,2,3-cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1,2,3-cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EA200: 'Am' Amosite (brown asbestos)
- EA200: 'Cr' Crocidolite (blue asbestos)
- EA200:'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200: Legend:
- EA200: 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. '-' indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO22909:2008(E) Sect 8.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Page : 3 of 11
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SH1 0.2-0.4	SH1 0.2-0.4 DUP	SH2 0.9-1.0	SH4 0.4-0.5	SH1
				Sampling date / time	15-Oct-2025 12:30	15-Oct-2025 12:30	15-Oct-2025 12:50	15-Oct-2025 13:10	15-Oct-2025 12:30
Compound	CAS Number	LOR	Unit		EM2519157-001	EM2519157-003	EM2519157-005	EM2519157-007	EM2519157-008
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		14.8	16.0	9.6	5.3	---
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		---	---	---	---	No
Asbestos (Trace)	1332-21-4	-	-		---	---	---	---	No
Asbestos Type	1332-21-4	-	-		---	---	---	---	No
Synthetic Mineral Fibre	----	-	-		---	---	---	---	No
Organic Fibre	----	-	-		---	---	---	---	Yes
Sample weight (dry)	----	0.01	g		---	---	---	---	558
APPROVED IDENTIFIER:	----	-	-		---	---	---	---	M. TRAN
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	---
Barium	7440-39-3	10	mg/kg		70	80	30	30	---
Beryllium	7440-41-7	1	mg/kg		<1	<1	1	<1	---
Boron	7440-42-8	50	mg/kg		<50	<50	<50	<50	---
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	---
Chromium	7440-47-3	2	mg/kg		21	22	13	2	---
Cobalt	7440-48-4	2	mg/kg		19	17	15	<2	---
Copper	7440-50-8	5	mg/kg		33	36	6	<5	---
Lead	7439-92-1	5	mg/kg		23	26	13	10	---
Manganese	7439-96-5	5	mg/kg		308	315	233	126	---
Nickel	7440-02-0	2	mg/kg		16	16	12	<2	---
Selenium	7782-49-2	5	mg/kg		<5	<5	<5	<5	---
Vanadium	7440-62-2	5	mg/kg		99	140	15	<5	---
Zinc	7440-66-6	5	mg/kg		64	64	41	33	---
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									

Page : 4 of 11
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SH1 0.2-0.4	SH1 0.2-0.4 DUP	SH2 0.9-1.0	SH4 0.4-0.5	SH1
				Sampling date / time	15-Oct-2025 12:30	15-Oct-2025 12:30	15-Oct-2025 12:50	15-Oct-2025 13:10	15-Oct-2025 12:30
Compound	CAS Number	LOR	Unit		EM2519157-001	EM2519157-003	EM2519157-005	EM2519157-007	EM2519157-008
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Benz[a]anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
* Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
* Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	---
* Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	---
* Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	---
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	---
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	---
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	---
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	---
* C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									

Page : 5 of 11
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH1 0.2-0.4	BH1 0.2-0.4 DUP	BH2 0.9-1.0	BH4 0.4-0.5	BH1
				Sampling date / time	15-Oct-2025 12:30	15-Oct-2025 12:30	15-Oct-2025 12:50	15-Oct-2025 13:10	15-Oct-2025 12:30
Compound	CAS Number	LOR	Unit		EM2519157-001	EM2519157-003	EM2519157-005	EM2519157-007	EM2519157-008
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	—
A C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	—
>C10 - C16 Fraction	—	50	mg/kg		<50	<50	<50	<50	—
>C16 - C34 Fraction	—	100	mg/kg		<100	<100	<100	120	—
>C34 - C40 Fraction	—	100	mg/kg		<100	<100	<100	<100	—
^ >C10 - C40 Fraction (sum)	—	50	mg/kg		<50	<50	<50	120	—
^ >C10 - C16 Fraction minus Naphthalene (F2)	—	50	mg/kg		<50	<50	<50	<50	—
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	—
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	—
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	—
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	—
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	—
^ Sum of BTEX	—	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	—
^ Total Xylenes	—	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	—
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	—
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		78.1	76.3	88.0	93.4	—
2-Chlorophenol-D4	93951-73-6	0.5	%		80.1	78.5	89.6	94.2	—
2,4,6-Tribromophenol	118-79-6	0.5	%		77.0	75.5	83.0	103	—
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		86.1	88.3	101	99.5	—
Anthracene-d10	1719-06-8	0.5	%		112	113	128	124	—
4-Terphenyl-d14	1718-51-0	0.5	%		87.2	84.8	97.1	105	—
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		107	105	108	112	—

Page : 6 of 11
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH1 0.2-0.4	BH1 0.2-0.4 DUP	BH2 0.9-1.0	BH4 0.4-0.5	BH1
				Sampling date / time	15-Oct-2025 12:30	15-Oct-2025 12:30	15-Oct-2025 12:50	15-Oct-2025 13:10	15-Oct-2025 12:30
Compound	CAS Number	LOR	Unit		EM2519157-001	EM2519157-003	EM2519157-005	EM2519157-007	EM2519157-008
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
Toluene-D8	2037-26-5	0.2	%		86.3	79.3	83.6	83.6	—
4-Bromofluorobenzene	460-00-4	0.2	%		95.3	90.8	93.4	93.6	—

Page : 7 of 11
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH3	---	---	---	---
				Sampling date / time	15-Oct-2025 13:10	---	---	---	---
Compound	CAS Number	LOR	Unit	EM2519157-010	------	------	------	------	
				Result	---	---	---	---	
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg	No	---	---	---	---	
Asbestos (Trace)	1332-21-4	-	-	No	---	---	---	---	
Asbestos Type	1332-21-4	-	-	No	---	---	---	---	
Synthetic Mineral Fibre	----	-	-	Yes	---	---	---	---	
Organic Fibre	----	-	-	Yes	---	---	---	---	
Sample weight (dry)	----	0.01	g	318	---	---	---	---	
APPROVED IDENTIFIER:	----	-	-	M. TRAN	---	---	---	---	

Page : 8 of 11
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RB	---	---	---	---
				Sampling date / time	15-Oct-2025 12:20	---	---	---	---
Compound	CAS Number	LOR	Unit	EM2519157-011	------	------	------	------	
				Result	---	---	---	---	
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L	<0.001	---	---	---	---	
Boron	7440-42-8	0.05	mg/L	<0.05	---	---	---	---	
Barium	7440-39-3	0.001	mg/L	<0.001	---	---	---	---	
Beryllium	7440-41-7	0.001	mg/L	<0.001	---	---	---	---	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	---	---	---	---	
Cobalt	7440-48-4	0.001	mg/L	<0.001	---	---	---	---	
Chromium	7440-47-3	0.001	mg/L	<0.001	---	---	---	---	
Copper	7440-50-8	0.001	mg/L	<0.001	---	---	---	---	
Manganese	7439-96-5	0.001	mg/L	<0.001	---	---	---	---	
Nickel	7440-02-0	0.001	mg/L	<0.001	---	---	---	---	
Lead	7439-92-1	0.001	mg/L	<0.001	---	---	---	---	
Selenium	7782-49-2	0.01	mg/L	<0.01	---	---	---	---	
Vanadium	7440-62-2	0.01	mg/L	<0.01	---	---	---	---	
Zinc	7440-66-6	0.005	mg/L	<0.005	---	---	---	---	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	---	---	---	---	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L	<1.0	---	---	---	---	
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	---	---	---	---	
Acenaphthene	83-32-9	1.0	µg/L	<1.0	---	---	---	---	
Fluorene	86-73-7	1.0	µg/L	<1.0	---	---	---	---	
Phenanthrene	85-01-8	1.0	µg/L	<1.0	---	---	---	---	
Anthracene	120-12-7	1.0	µg/L	<1.0	---	---	---	---	
Fluoranthene	206-44-0	1.0	µg/L	<1.0	---	---	---	---	
Pyrene	129-00-0	1.0	µg/L	<1.0	---	---	---	---	
Benz[a]anthracene	56-55-3	1.0	µg/L	<1.0	---	---	---	---	
Chrysene	218-01-9	1.0	µg/L	<1.0	---	---	---	---	

Page : 9 of 11
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RB	---	---	---	---
				Sampling date / time	15-Oct-2025 12:20	---	---	---	---
Compound	CAS Number	LOR	Unit	EM2519157-011	---	---	---	---	
				Result	---	---	---	---	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	---	---	---	---	
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	---	---	---	---	
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	---	---	---	---	
Indeno(1,2,3-cd)pyrene	193-39-5	1.0	µg/L	<1.0	---	---	---	---	
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	---	---	---	---	
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	---	---	---	---	
* Sum of polycyclic aromatic hydrocarbons	---	0.5	µg/L	<0.5	---	---	---	---	
^ Benzo(a)pyrene TEQ (zero)	---	0.5	µg/L	<0.5	---	---	---	---	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	---	20	µg/L	<20	---	---	---	---	
C10 - C14 Fraction	---	50	µg/L	<50	---	---	---	---	
C15 - C28 Fraction	---	100	µg/L	<100	---	---	---	---	
C29 - C36 Fraction	---	50	µg/L	<50	---	---	---	---	
* C10 - C36 Fraction (sum)	---	50	µg/L	<50	---	---	---	---	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	---	---	---	---	
* C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	---	---	---	---	
>C10 - C16 Fraction	---	100	µg/L	<100	---	---	---	---	
>C16 - C34 Fraction	---	100	µg/L	<100	---	---	---	---	
>C34 - C40 Fraction	---	100	µg/L	<100	---	---	---	---	
* >C10 - C40 Fraction (sum)	---	100	µg/L	<100	---	---	---	---	
* >C10 - C16 Fraction minus Naphthalene (F2)	---	100	µg/L	<100	---	---	---	---	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	---	---	---	---	
Toluene	108-88-3	2	µg/L	<2	---	---	---	---	
Ethylbenzene	100-41-4	2	µg/L	<2	---	---	---	---	

Page : 10 of 11
Work Order : EM2519157
Client : GEO-ENVIRONMENTAL SOLUTIONS
Project : 2 Old Coach Road

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RB	---	---	---	---
				Sampling date / time	15-Oct-2025 12:20	---	---	---	---
Compound	CAS Number	LOR	Unit	EM2519157-011	---	---	---	---	
				Result	---	---	---	---	---
EP080: BTEXN - Continued									
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	---	---	---	---	
ortho-Xylene	95-47-6	2	µg/L	<2	---	---	---	---	
* Total Xylenes	---	2	µg/L	<2	---	---	---	---	
* Sum of BTEX	---	1	µg/L	<1	---	---	---	---	
Naphthalene	91-20-3	5	µg/L	<5	---	---	---	---	
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%	101	---	---	---	---	
Anthracene-d10	1719-06-8	1.0	%	101	---	---	---	---	
4-Terphenyl-d14	1718-51-0	1.0	%	92.8	---	---	---	---	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	94.7	---	---	---	---	
Toluene-D8	2037-26-5	2	%	92.3	---	---	---	---	
4-Bromofluorobenzene	460-00-4	2	%	109	---	---	---	---	

Analytical Results

Descriptive Results

Sub-Matrix: SOIL

Method: Compound	Sample ID - Sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	BH1 - 15-Oct-2025 12:30	Brown sandy soil with rock and organic matter
EA200: Description	BH3 - 15-Oct-2025 13:10	Grey sandy soil with organic matter and synthetic mineral fibres

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	126
2-Chlorophenol-D4	93951-73-6	65	123
2,4,6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	51	129
Toluene-D8	2037-26-5	59	126
4-Bromofluorobenzene	460-00-4	58	124

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	35	127
Anthracene-d10	1719-06-8	44	122
4-Terphenyl-d14	1718-51-0	44	124
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	126
4-Bromofluorobenzene	460-00-4	71	128

Site & soil evaluation and design report.

Improvements to on-site wastewater management system at 2 Old Coach Road, Cambridge TAS 7170.

Richard Mason, Onsite Assessments Tas

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Mobile 0418 589309

BACKGROUND

This report and design information has been provided in order to identify suitable options for on-site wastewater management system, servicing an existing residence, alterations, and additions (secondary residence) and occasional commercial use (pop-up restaurant).

The information provided in this Report provides Design Information, Plans and Specifications suitable for inclusion in supporting documentation to enable the client to apply for a Plumbing Permit for an on-site wastewater management system.

Please note:
This design is provided as a combined Performance and Deemed to Satisfy solution, consistent with Clause A2G4 NCC Vol 3.

Part 1. Site and soil evaluation (S&SE)

Location: 2 Old Coach Road, Cambridge, TAS 7170

PID: 7622208

Title Ref: 123192/1

Client: Dean Smith

Project Summary:
On-site wastewater management system servicing 4-bedroom house, (whose existing septic tank system has failed), with future 2-bedroom secondary residence and occasional (2-weekly) pop-up restaurant via external caterers.

The soil profile on the proposed land application area is dominated by deep massive/structureless clay soils considered to be unsuitable for installation of a conventional absorption bed land application area due to the limited permeability of the soil profile.

It is therefore proposed to install a new 4500L septic tank, discharging to an in-ground Advanced Enviro Septic AES-38-SPD secondary treatment sand filter, with post treatment disinfection and pumped surface irrigation of secondary treated, disinfected effluent.

Site area: 3.2Ha approx.

Soil Category:
(as per AS/NZS 1547-2012) Modified Emerson Test Required? **N**
1,…**2**,…3,…4,….**5**,….6 If Yes, result:

Soil Profile:
A Christie Post Driver Soil Sampling Kit, comprising CHPD78 Christie Post Driver with Soil Sampling Tube (50mm OD x 1.6m) and a Seca Mighty Probe (1200mm) were used to obtain undisturbed soil cores or soil depth information at 2 different locations in the vicinity

to the proposed land application area; this being considered sufficient to provide a representative picture of soil conditions.
The soil on this site presents a duplex profile, with silty sand and light sandy clay to a depth of 1000mm+, underlain by sandstone of Triassic Age.

A Horizon: 0 - 500mm, silty sandy loam, very dark greyish brown 10YR 3/2, dry, massive; Category 2.

B Horizon: 500 - 1000mm+, light sandy clay, light olive brown 2.5Y 5/3, damp, moderately structured; Category 5.

1000mm+ - refusal on Triassic sandstone.

(From observation of test pitting and exposures on-site)

Soil Category:

A Horizon 1,....**2**,...3,…4,….5,…6

B Horizon 1,....2,...3,…4,….**5,**...6

Soil dispersion
Soil was not tested for dispersion but it is considered that it is possible that the clay components may have dispersive properties. Given prior experience with soils in this area, it is reasonably concluded that any dispersive tendencies in this soil profile can be successfully managed by observing the following precautions:

1. Application of gypsum to the base of the absorption bed/land application area prior to installation of distribution infrastructure, as per Part B5 of AS/NZS1547.2012 On-site domestic waste-water management.

2. Avoiding disturbing the soil whilst in a wet condition; raking/ripping should only occur when the soil is dry (i.e. during summer conditions) and should be treated with gypsum as soon as exposed and covered with imported sand as soon as possible; disturbed soil surfaces must not be left exposed to the elements during wet weather.

Measured or Estimated Soil Permeability (m/d)

Estimated from textural classification.

A-Horizon 1.4-3.0m/day

B Horizon 0.06 – 0.12m/day

Effluent Application Rates
(This is a recommendation to the designer advising how many litres of effluent should be applied to the soil for every square metre of absorption trench or other land application system.)

Absorption bed – not suitable

Irrigation – secondary treated only: 3mm/day.

Geology:
The site is shown on LISTmap geology layer as Cygnet Coal Measures sandstone of Carboniferous-Triassic age.

Topography

Slopes: 15º in the vicinity of the proposed wastewater land application/absorption area, in a SE direction.

Drainage lines / water courses: Minor creekline tributary of Clarence Plains Rivulet lies 115m downslope, to the west of the site.

Drainage/Groundwater
Water table was not intercepted in test cores to refusal at 1000mm depth.

Vegetation: TASVEG 4.0 layer on LISTmap shows vegetation on the land application area site as Eucalyptus amygdalina forest on mudstone; vegetation comprises mainly regenerating Acacia dealbata.

Site Exposure and Climate.

Aspect: The site lies on a SE- facing slope.

Pre-dominant wind direction: North-westerly to south westerly.

Climate: Annual rainfall averages 499mm/year (Hobart Airport), retained rain (RR) of with maximum daily average temperature of 22ºC and minimum of 12ºC, giving an annual evapotranspiration (ET) of 561mm. Annual average ET on this site is predicted to exceed average annual RR by 62mm.

Environmental Issues

Location of sensitive vegetation, high water table, swamps, waterways etc.
The vegetation on this site mainly comprises regenerating woodland of A. dealbata with some older E. amygdalina event.

The large buffer distance to the downslope surface water and separation from boundaries is consistent with the Acceptable Solution under the Director's Guidelines for on-site wastewater management systems.

Site Stability
The site is affected by a Landslip Hazard Area Class Low banding on the Planning Scheme overlay; engineering geologist advice is that effluent application by surface irrigation is unlikely to affect slope stability at this site.

Drainage/Groundwater

Depth to seasonal groundwater (m)
Evidence of groundwater was not detected in test cores to refusal at 1000mm depth.

There are no water bores depicted on the MRT Groundwater Information Portal within 500m of the development site.

Primary Land Application Area
The area 80m SSW of the primary residence house site and 25m SE and downslope of property boundary with Cambridge Road, is preferred for use as the primary land application area. See Appendix 4.

Reserve land application area.
Sufficient land is available on the site for establishment of a secondary land application system should this prove necessary.

Water Supply
Rain water supply.

Site History (land use)
The surrounding area is subdivided to low to medium density rural-residential usage. There are no known previous land uses which would prejudice the sustainable operation of an onsite wastewater management system land application area on this site.

The site is affected by a CLA-C14.0 Potentially Contaminated Land Code (historic railway tunnel waste).

Examination of the soil profiles in the land application area indicates that this part of the site does not carry any overburden derived from railway tunnelling.

Part 2. On-site wastewater management system design.

On Site Wastewater Management System Options. (Deemed to satisfy)
Given the site area and soil profile constraints of the site, secondary treatment of wastewater is preferred with effluent application by surface irrigation.

All household wastewater will receive primary treatment in a new 4500L Bloo septic tank which will discharge effluent to an inground Advanced Enviro Septic AES-38-SPD bed providing secondary treatment; effluent will be pressure discharged via an 1200L capacity pumpwell, to a surface irrigation area located 80m SSW of the house site.

Pumpwell etc (Deemed to satisfy)
The surface irrigation system will be pressurised via a 1200L Netco pumpwell, with Davey D42AB pump.

Please note that 24m x 300mm diameter AES pipe provides at least 2500L storage capacity, in the event of a pump failure. The Netco pumpwell is certified as compliant with AS/NZS1546.1 2008 and therefore satisfies NCC 2022 Vol 3, TAS A5G4(9) (see Appendix 4 of this report).

NCC Vol 3 TAS A5G4(9) states:

(9) A holding tank or collection well for use in a plumbing or drainage installation may be verified as meeting the Performance Requirements of the Director of Building Control if it complies with AS/NZS 1546.1.

Loadings.
The residence comprises 4 bedrooms, plus 2 bedrooms in the proposed secondary residence, with a design occupancy of up to 8 persons and an adopted per capita wastewater loading of 150 litres per day, resulting in a total, residential, hydraulic loading of 1200 litres per day.

Additional hydraulic loading derives from proposed future use of the railway tunnel (currently used as a mushroom growing space) as a pop-up dining venue, with all catering provided by external caterers; a small toilet building will be constructed on-site. Maximum patronage will comprise 70 diners, no more than once every two weeks.

A per capita hydraulic loading of 5L/person/event is anticipated (*see Appendix E "On-site Wastewater Systems Code 2013" by Department for Health and Ageing, Government of South Australia.*)

Public toilet & handbasin loadings used, as catering is entirely external, with all food preparation and equipment cleaning undertaken off-site.

5L x 70person = 350L, averaging 25L/day over a 14-day period

Peak loading of 1550L/day results in linear loading on AES (36m long) of 43L/m/day; exceeds usual AES pipe design loading of 38L/m/day by 13%, it is well within the overload testing criteria of AS1546.3.

Total design hydraulic loading = 1225L/day

Fortnightly potential peak loading is estimated at 1550L; Simtech bottle-brush type filter will be installed in septic tank outlet to prevent solids carryover during peak flows.

Sludge accumulation rate:

Residential – 8 persons x 80L/person/year	= 640L/year
Restaurant – 70 persons x 20L/year x 26/365	= 100L/year
Total	= **740L/year**
Septic tank volume	= 4500L
After 3 years sludge volume	= 2220L
Settlement volume remaining at 3 years	= **2280L**

Maximum daily hydraulic loading = 1550L

Tiny house connection requirements:
Secondary dwelling connection to the on-site wastewater management system to be consistent with the requirements of one of the following:

- CBOS Regulatory Note – Tiny Houses - Regulatory Note
- CBOS Regulatory Note – Prefabricated buildings - Plumbing approvals process

AES-38-SPD secondary treatment system design (Performance solution)
The Advanced Enviro Septic AES-38-SPD system is an accredited secondary treatment system – certificate of accreditation - DOC/24/92888.

The standard AES-38-SPD as accredited is a 1200L/day system configuration comprising a 6-row configuration of 2 x AES pipes (36m of AES pipe), with standard bed dimensions of 6.6m long x 3.15m wide.

The Performance Solution provides for scalability (as per standard AES design manual), to predicted average wastewater loading of 1225L/day.

The required total AES pipe length is determined by a maximum loading of 38L per day per metre of pipe.

Minimum pipe length = $\frac{\text{daily hydraulic loading}}{38\text{L/m/day}}$

= $\frac{1225\text{L/day}}{38\text{L/m/day}}$

= 32m

The standard AES-38-SPD as accredited provides for 36m of AES pipe.

Wastewater Land Application System (Deemed to Satisfy).
Irrigation area requirements are calculated on the basis of 4mm/day DLR for a Category 2 A-horizon soil profile.

Required wetted area:

= daily wastewater loading / Design irrigation rate 2° effluent

= 1225 litres per day / 4mm day

= **306m^2**

Wetted area for each wobbler head = (wetted radius)^2 x π

= 5m x 5m x 3.1419

= 78.54m^2

Wetted area for 4 x wobbler heads = **314m^2**

7 wobbler heads will be installed at 5m spacings in order to maximise flow/application rate and minimise pump-run times and conserve power – run time 42 minutes/day at 1225L/day (8 EP+) loading.

Total wetted area including non-overlapping spray patterns is approximately 472m^2.

The irrigator risers will be supplied from the pumpwell via individual gate valves to ensure minimal head/flow differences between each irrigator.

It is proposed to utilise land on regenerating eucalypt woodland with understorey vegetation on the site as a ready-made, naturally vegetated and self-mulching area for uptake of irrigant and nutrients, by installing a 35m long irrigation pipeline along the contour, with 5m wetted radius spray head (non-aerosol) Senninger Mini- Wobblers (#6 – gold – 2.38mm nozzle, 216L/hr) on 500mm galvanised risers (raised up to provide protection from possible ground-fires and interference of spray pattern by vegetation growth) at 5.0m spacings.

The irrigator risers will be supplied from the pump-chamber via individual gate valves to ensure minimal head/flow differences between each irrigator.

It is anticipated that the vegetation in irrigated area will be kept short by local wildlife which will be attracted to feed on the relatively lush vegetation growth resulting from elevated water and nutrient application.

Application of Clause M9.4.3 of the Standard
This clause provides a number of requirements for spray irrigation systems, of which the following are considered most critical for protection of public health on this site:

(a) Distribute the effluent through coarse spray heads suitable for use with effluent;

(b) Distribute the effluent evenly;

(c) Not produce fine mist or aerosols (see M8);

(d) Comply with setback requirements…..

This clause also requires the following:

(e) Not exceed a spray height greater than 500mm above the finished surface level of the irrigation area, nor have a wetted diameter of greater than 2000mm and be contained inside the designated irrigation area.

The selected sprinkler head type (wobbler) and location of the proposed land application area satisfactorily meets (a) to (d) of the above requirements; however, the only suitable commercially available wobbler has a wetted diameter of 10m approximately (under

predicted dynamic head from the recommended pump to be installed) and a spray height of 900mm above the riser, for a total maximum plume height of 1400mm.

Given the nature of the site, with large buffer zones available to adjoining property boundaries and established buffer vegetation, it is submitted that provided that the surface irrigation meets requirements (a) – (d).

Whilst the height and diameter of the spray plume are exceeded by this design, sufficient setbacks from boundaries (minimum 25m) are provided to ensure that the smallest droplets in the plume, which are droplets as small as 0.5mm in diameter (fall speed 2m/s) reach the ground under normal maximum wind speeds.

The nearest adjoining land potentially vulnerable to spray drift lies over the eastern boundary, 25m from the edge of the proposed land application area; this significantly exceeds the Acceptable Solution separation of 1.5m.

Horizontal clearances from the edge of the wetted area of 90m to the main residence and 60m to the secondary residence site provide similar protection from contact with spray drift.

This is supported by reference to wind speed & direction (wind rose) records for the local area, which show that winds blow from the eastern quadrant for 13% of the year, with “fresh” force winds (29-39km/hr) occasionally experienced in this area.

With a plume height of 1.4m and small droplet fall velocity of 2m/s, such droplets will fall to ground within 0.7 seconds, during which the droplet could move 8m horizontally at a windspeed of 11m/s or 39km/hr.

In practice, maximum plume height occurs at approximately 2/3 of the wetted area radius, due to the ballistic trajectory followed by water droplets, in this case, approximately 3.33m from the bubbler head and 28m+ from the eastern boundary, which also lies 9m higher than the uppermost edge of the irrigation area.

Surface drainage and flooding

Given the size of the land application area and low effective DIR (2.6mm/day), cut-off drains are not required for the land application area.

Parts of the former railway track-bed is affected by a Flood Prone Areas overlay under the Tasmanian Planning Scheme, the on-site wastewater management system (septic tank and AES-SPD bed) are located so as to avoid flood-prone areas.

Hydraulic design calculation

Design occupancy	Per capita loading (L/day)	Total daily loading	DIR (mm/day)	Required land application area	Required length dripperline at 1m spacings	Required length dripper line at 0.5m spacings)
8	153	1224	3	408	408	816
Length irrigation pipe (m)	wobbler spacing	wobbler flow rate (l/hr)	Number of wobblers	Total wobbler flow rate L/hr	Total wobbler flow rate (L/min)	Head loss (m)
35	5	216	8	1728	**28.8**	
wobbler make and type	wobbler nozzle	wetted diameter (m)	wetted area per wobbler (m2)	Actual wetted area with overlap m2	**Actual DIR (mm/day)**	
Senninger mini wobbler	#6 Gold 2.38mm	10	78.5475	472	**3.43**	
Daily effluent loading (L/day)	daily pump time (minutes)	annual pump time (hours)				
1225	42.5	259				
Length supply pipe	Material supply pipe	ID pipe	Friction loss (m) at flow rate L/min	https://www.tuhorse.com.au/total-dynamic-head-tdh-calculator/		
106	LDPE	32	1.45			1.45
Friction loss from other pipe fittings						
25%			0.36			0.36
Type of filter	Make	Model	Friction loss (m) at flow rate L/min			
n/a						0
Type of indexing valve	Model		Friction loss (m) at flow rate L/min			
n/a						0

					Total Friction head (m)	**1.81**
Differential elevation in (m)	(pump to irrigation area)					
9.5					**Elevation head (m)**	**9.5**
Operating head of wobbler (m)					**Operating head (m)**	
7.5					7.5	**7.5**
Total	**Dynamic**	**Head**	**(TDH)**	**in m**		**18.81**
Required	**pump**	**capacity**	**(minimum)**		**@ 28.8 L/min**	**18.81 TDH**

Pumpwell unit	Pump supplied	Minimum required operating head at 29L/min	Operating head at 29L/min (from published pump curve data)	Pump suitable for flow/head requirement?
Zenox/Netco NPE-1200	Zenox ZHS-040	19m	18.2m	No
Recommended	Davey D42 A/B	19m	30m	Yes

Part 3. Regulatory compliance

AS/NZS1547.2012 / Directors Guidelines for OSWMS 2017

Compliance Table	Directors Guidelines for OSWM	
Acceptable Solutions	Performance Criteria	Compliance achieved by
5.1 To ensure sufficient land is available for sustainable onsite wastewater management for buildings.		
A1 A new dwelling must be provided with a land application area that complies with Table 3.	P1 A new dwelling must be provided with a land application area that meets all of the following: a) The land application area is sized in accordance with the requirements of AS/NZS 1547; and b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	A1 Category 2 site, secondary treatment, 120m^2 x 6 bedrooms 840+ m^2 of suitable land application area is available.
5.2 To ensure sustainable onsite wastewater management for commercial and non-residential buildings (Class 3-9).		
A1 An onsite wastewater management system including the land application area for non-residential buildings must satisfy all of the following: (a) be sized based on the hydraulic and organic loadings contained in Table 4 and design loading or irrigation rates contained in AS/NZS 1547; (b) be located in accordance with clause 7.1	P1 An onsite wastewater management system including the land application area for non-residential building must satisfy all of the following: a) A site and soil evaluation and design report prepared by a suitably person determined by the Director demonstrating that the land application area is of sufficient size to treat and manage the wastewater generated from the proposed building within the property boundaries. b) The SSE report and system design demonstrates the design is consistent with AS/NZS 1547 and uses appropriate hydraulic and organic loading rates for the proposed activity. c) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable. d) The land application area is to be located in accordance with the acceptable solution or performance criteria specified in clause 7.1.	P1(a) S&SE demonstrates sufficient land area. P1(b) S&SE etc demonstrates that design is consistent with AS/NZS1547. P1(c) Risk assessment demonstrates that risk is acceptable. P1(d) Land application area location meets acceptable solution under Clause 7.1
6 Area required for on-site wastewater management – building extensions, alterations or outbuildings (Building Class 1-10)		

A2 An outbuilding, addition or alteration to an existing building, or change of use of that building, must not encroach onto or be within 2m (if upslope) or 6m (if downslope) of an existing land application area (including land reserved for a future land application area) or a wastewater treatment unit and comply with at least one of the following: a) not increase the number of bedrooms (or rooms reasonably capable of being used as a bedroom) or otherwise increase the potential volume of wastewater generated onsite; and b) not increase the number of bedrooms (or rooms reasonably capable of being used as a bedroom) or otherwise increase the potential volume of wastewater generated onsite to greater than that allowed for in the design of the existing OWMS.	P2 An outbuilding addition or alteration to an existing building or change of use of that building, must be provided with a land application area (including land reserved for a future land application area) that meets all of the following: a) The land application area is of sufficient size to comply with the either Appendix L, M or N and setback distances are consistent with Appendix R of AS/NZS 1547; and b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	n/a
7. Standards for Wastewater Land Application Areas		
A1 Horizontal separation distance from a building to a land application area must comply with one of the following: a) be no less than 6m; b) be no less than: (i) 3m from an upslope boundary or level building; (ii) If primary treated effluent to be no less than 4m plus 1m for every degree of average gradient from a downslope building; (iii) If secondary treated effluent and subsurface application, no less than 2m plus 0.25m for every degree of average gradient from a downslope building.	P1 The land application area is located so that the risk of wastewater reducing the bearing capacity of a building's foundations is acceptably low.	A1(a) Land application area is 60m from nearest residential building.
A2 Horizontal separation distance from downslope surface water to a land application area must comply with (a) or (b) (a) be no less than 100m; or (b) be no less than the following: (i) if primary treated effluent 15m plus 7m for every degree of average gradient to downslope surface water; or (ii) if secondary treated effluent and subsurface application, 15m plus 2m for every degree of average gradient to down slope surface water.	P2 Horizontal separation distance from downslope surface water to a land application area must comply with all of the following: a) Setbacks must be consistent with AS/NZS 1547 Appendix R; b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	A2(a) Land application area is 115m+ from nearest creekline.
A3	P3	A3(a)

Horizontal separation distance from a property boundary to a land application area must comply with either of the following: (a) be no less than 40m from a property boundary; or (b) be no less than: (i) 1.5m from an upslope or level property boundary; and (ii) If primary treated effluent 2m for every degree of average gradient from a downslope property boundary; or (iii) If secondary treated effluent and subsurface application, 1.5m plus 1m for every degree of average gradient from a downslope property boundary.	Horizontal separation distance from a property boundary to a land application area must comply with all of the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment in accordance with Appendix A of AS/NZS 1547 has been completed that demonstrates that the risk is acceptable.	More than 40m from downslope and cross-slope boundary. A3(b)(i). Land application area is 25m+ upslope boundary.
A4 Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must be no less than 50m and not be within the zone of influence of the bore whether up or down gradient.	P4 Horizontal separation distance from a downslope bore, well or similar water supply to a land application area must comply with all of the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 demonstrates that the risk is acceptable.	A4 No known borehole within 200km.
A5 Vertical separation distance between groundwater and a land application area must be no less than: (a) 1.5m if primary treated effluent; or (b) 0.6m if secondary treated effluent	P5 Vertical separation distance between groundwater and a land application area must comply with the following: (a) Setback must be consistent with AS/NZS 1547 Appendix R; and (b) A risk assessment completed in accordance with Appendix A of AS/NZS 1547 that demonstrates that the risk is acceptable	A5(b) Groundwater not detected in test holes to refusal at 1000mm and is considered unlikely to be present on this site. Secondary treatment. Land application area design provides 1000mm+ vertical separation to this depth.
A6 Vertical separation distance between a limiting layer and a land application area must be no less than: (a) 1.5m if primary treated effluent; or (b) 0.5m if secondary treated effluent	P6 Vertical setback must be consistent with AS/NZS1547 Appendix R.	A6(b) Limiting layer struck at 1000mm. Secondary treatment. Land application area design provides 1000mm+ vertical separation to this depth.
A7 Nil	P7 A wastewater treatment unit must be located a sufficient distance from buildings or neighbouring properties so that emissions (odour, noise or aerosols)	P7 High level vent to be fitted with activated carbon filter to mitigate potential odour

	from the unit do not create an environmental nuisance to the residents of those properties Note: Part 6 of the Building Act 2016 specifies	emissions.

Risk assessment is limited to consideration of Clause 5.2 P1.

Risk assessment

Each identified environmental aspect is subject to a qualitative risk analysis based on likelihood and consequences of environmental impact. The risk analysis matrix is as follows:

LIKELIHOOD	***CONSEQUENCES***				
	Catastrophic 1	Major 2	Moderate 3	Minor 4	Insignificant 5
A (almost certain)	Extreme	Extreme	High	High	Medium
B (likely)	Extreme	Extreme	High	High	Medium
C (possible)	Extreme	Extreme	High	Medium	Low
D (unlikely)	Extreme	High	Medium	Low	Low
E (rare)	High	Medium	Low	Low	Low

Criteria for the five categories of likelihood:

Almost certain: An environmental health impact is expected to occur in most circumstances.

Likely: An environmental health impact will probably occur in most circumstances

Possible: An environmental health impact could occur.

Unlikely: An environmental health impact could occur but is not expected.

Rare: An environmental health impact would occur only in exceptional circumstances.

Criteria for determining consequence to environmental health from an on-site wastewater management issue:

Catastrophic: Widespread, irreparable environmental damage; loss of human life or long term human health effects; serious litigation; over $1 million to manage consequences.

Major: Widespread, medium to long term impact; moderate human health impacts requiring medical treatment; major breach of legal requirements (prosecution); $50,000 to $1 million to manage consequences.

Moderate: Localised medium to long term impact; minor and reversible human health impacts treatable with first aid; moderate breach of legal requirements with fine (EIN/prosecution); $5,000 to $50,000 to manage consequences.

Minor: Localised short to medium term impact; no injury to people; minor breach of legal requirements (eg legal notice, EIN); $1000 to $5,000 to manage consequences.

Insignificant: Limited impact to a local area but no long-term effects; concern or complaints from neighbours; no injury to people; minor technical nonconformity but no legal nonconformity; less than $1000 cost to manage consequences.

Conducting a risk analysis results in the allocating of a risk level of *extreme*, *high*, *moderate* or *low* for each environmental aspect. Environmental health aspects with an *extreme* or *high* risk are considered to be *significant*, that is, they have or can have a significant environmental impact.

Issue	Potential impacts	Likelihood	Consequence	Risk rating	Risk reduction measure (RRM) / factors	Rating after adoption of RRM
Commercial/ non-residential wastewater	Inadequate treatment and/or inadequate land application area leading to on-site wastewater management system failure	C	4	M	On-site wastewater management system sized and designed to appropriate hydraulic and biological loadings	Low

Date of Site Visit: 21/05/2025.

Weather Conditions:
Cool and fine with 28mm of rain falling at Hobart Airport since 01/04/2025.

Further Information.

For further detailed assessment and design information, together with operation and maintenance advice, please refer to the Appendices.

Statement.

I certify that this Site and Soil Evaluation and Design for an on-site wastewater management system at 2 Old Coach Road, Cambridge, has been has been undertaken in accordance with the relevant provisions of AS/NZS 1547:2012. Onsite Domestic Wastewater Management and also the requirements of the Director of Building's Guidelines for On-site Wastewater Management Systems and is therefore compliant with the deemed to satisfy requirements of the NCC Vol 3.

The design of this on-site wastewater system is suitable for the proposed residence referred to in this report.

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Please Note:

It is generally understood that the successful operation of an on-site wastewater disposal system is dependent upon a number of complex, interacting factors and that the operating life of in-ground absorption systems in particular may be limited. This system may require future maintenance or modification to ensure its continued satisfactory operation. The client is advised that such works are the responsibility of the property owner.

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This report contains observations & interpretations based often on limited subsurface evaluation. Where interpretative information or evaluation has been reported, this information has been identified accordingly & is presented based on professional judgement. OAT does not accept responsibility for variations between interpreted conditions & those that may be subsequently revealed by whatever means.

Due to the possibility of variation in subsurface conditions & materials, the characteristics of materials can vary between sample & observation sites. OAT takes no responsibility for changed or unexpected variations in ground conditions that may affect any aspect of the project. The classifications in this report are based on samples taken from specific sites. The information is not transferable to different sites, no matter how close (ie if the development site is moved from the original assessment site an additional assessment will be required).

It is recommended to notify the author should it be revealed that the sub-surface conditions differ from those presented in this report, so additional assessment & advice may be provided.

Investigations are conducted to standards outlined in relevant Australian Standards, codes and guidelines, including:

- AS1547-2012: Onsite Domestic Wastewater Management
- AS3959.2009: Construction of Buildings in Bushfire Prone Areas
- Director's Guidelines for on-site wastewater management systems. (CBOS)
- Director's Determination – Requirements for Building in Bushfire-Prone Areas. (CBOS)

All new developments should subject to strict site maintenance. Attention is drawn to the relevant appendices of this report.

Any assessment that has included an onsite wastewater system design will require a further site visit once the system has been installed if certification of an installation/works is required (to verify that the system has been installed as per OAT's design). An additional fee may apply for the site visit & issuing the certificate.

OAT is not responsible for the correct installation of wastewater systems. Any wastewater installation is the sole responsibility of the owner/agent and certified plumber. Any variation to the wastewater design must be approved by OAT, and an amended Special Plumbing Permit obtained, if required from the relevant council. The registered plumber must obtain a copy and carefully follow the details in the council issued Plumbing Permit. Certification of completion of works will be based on surface visual inspection only, to verify the location of the system. All underground plumbing works are the responsibility of the certified plumber.

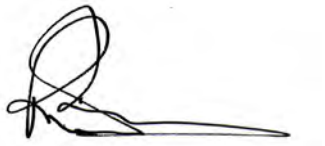
SITE ASSESSOR AND SYSTEM DESIGNER

NAME: Richard Mason, Environmental Health Professional

NAME OF ORGANISATION: Onsite Assessments Tas

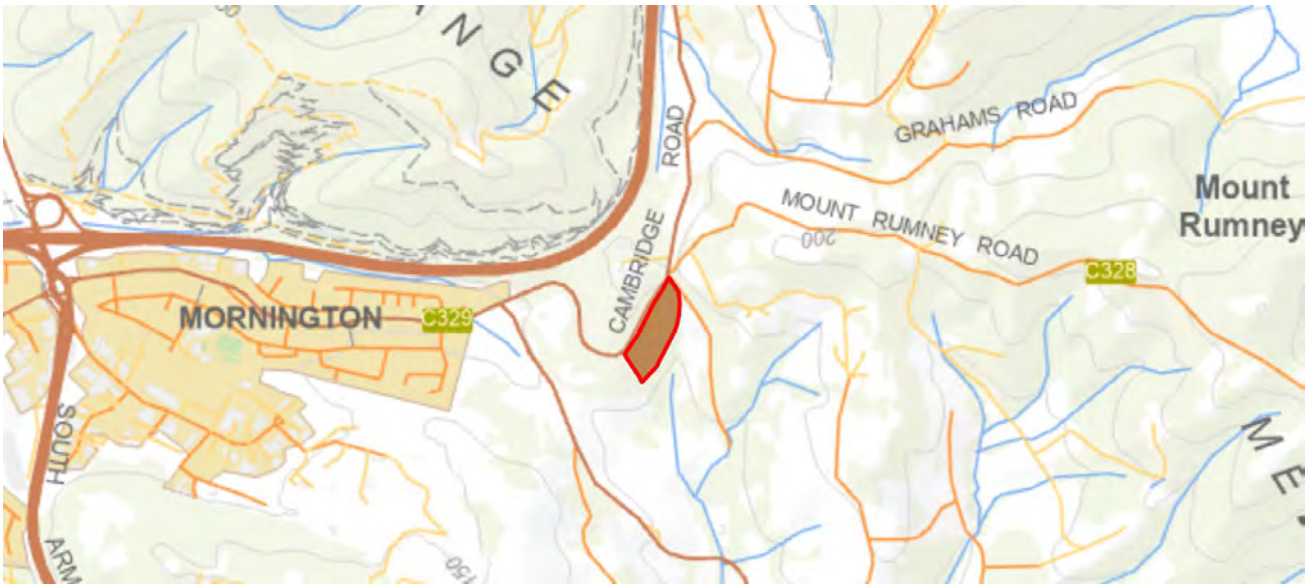
ADDRESS: 20 Adelong Drive, Kingston, Tasmania, 7050

CONTACT DETAILS: 0418 589 309; richardmason@iprimus.com.au

SIGNED:  DATED:31/05/2025.

APPENDICES

Appendix 1 - Site Location



(above) Site location details.

Appendix 2 – Site Photos

(above) Views of proposed land application area showing characteristic vegetation.

(above) View of proposed toilet block site.

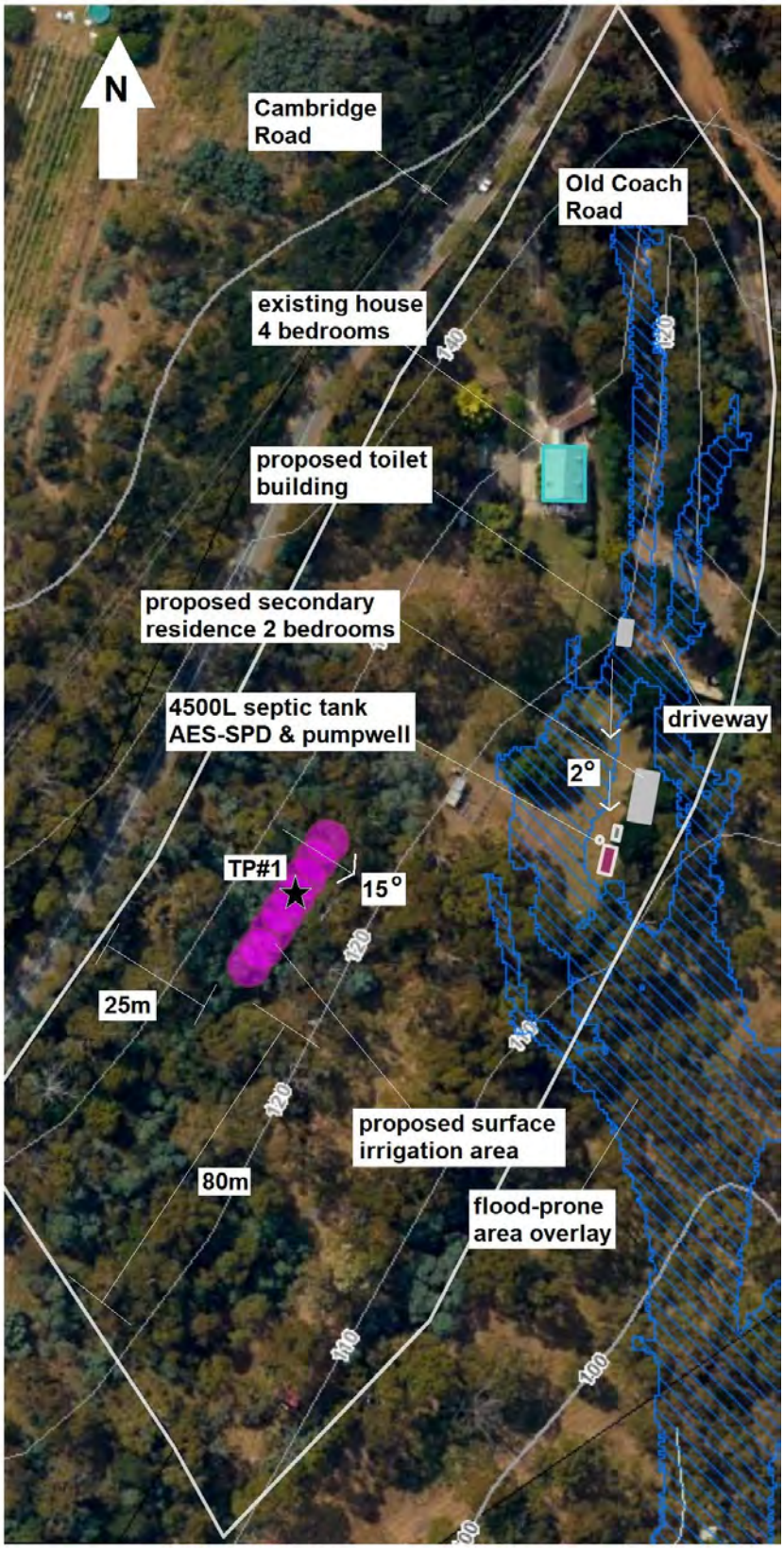
(above) View of proposed secondary dwelling and on-site wastewater management system site.

Appendix 3 – Soil testing

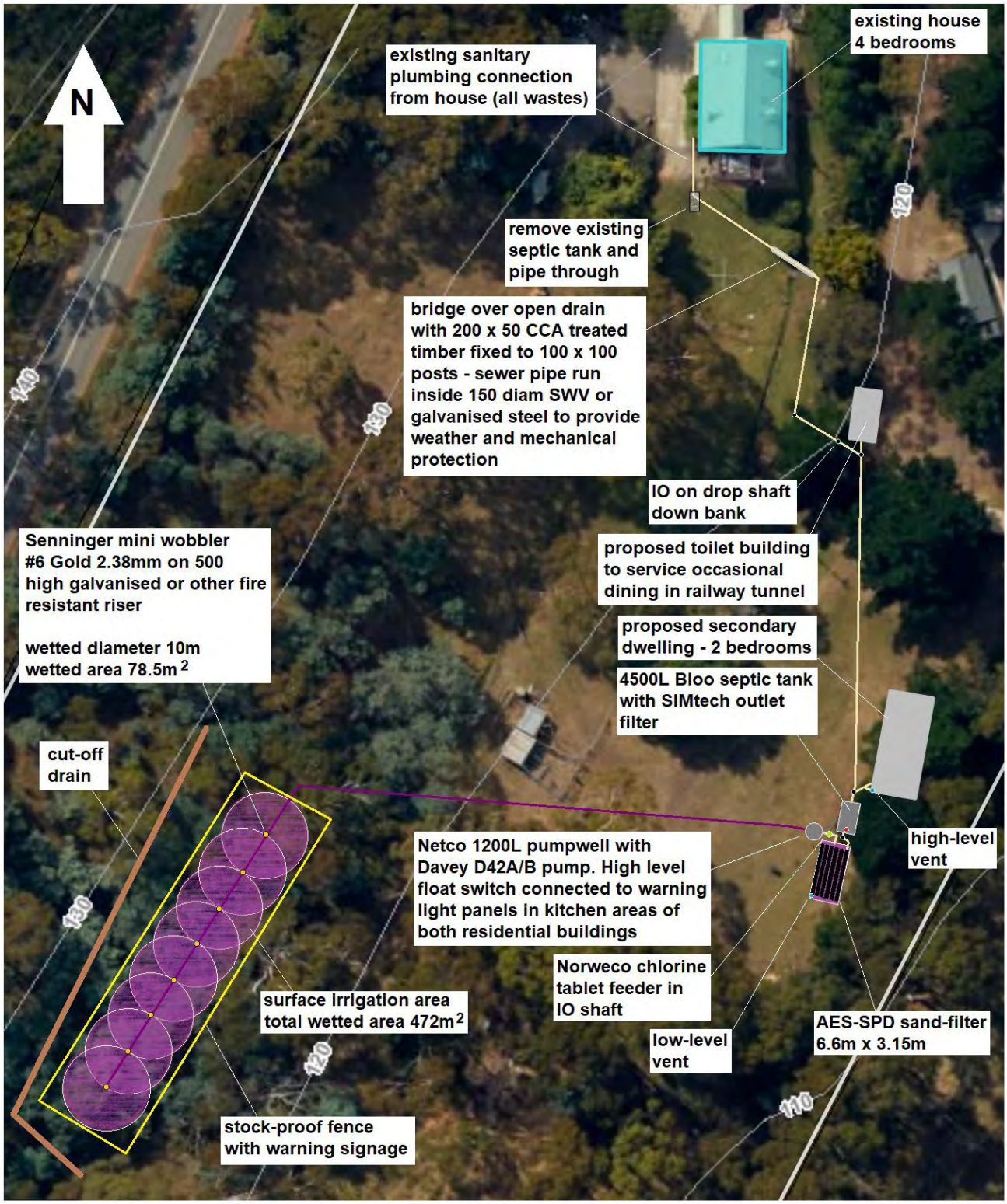
(above) Soil profile core sample from proposed land application area.

(above) Exposed soil profile in bank immediately downslope of proposed land application area.

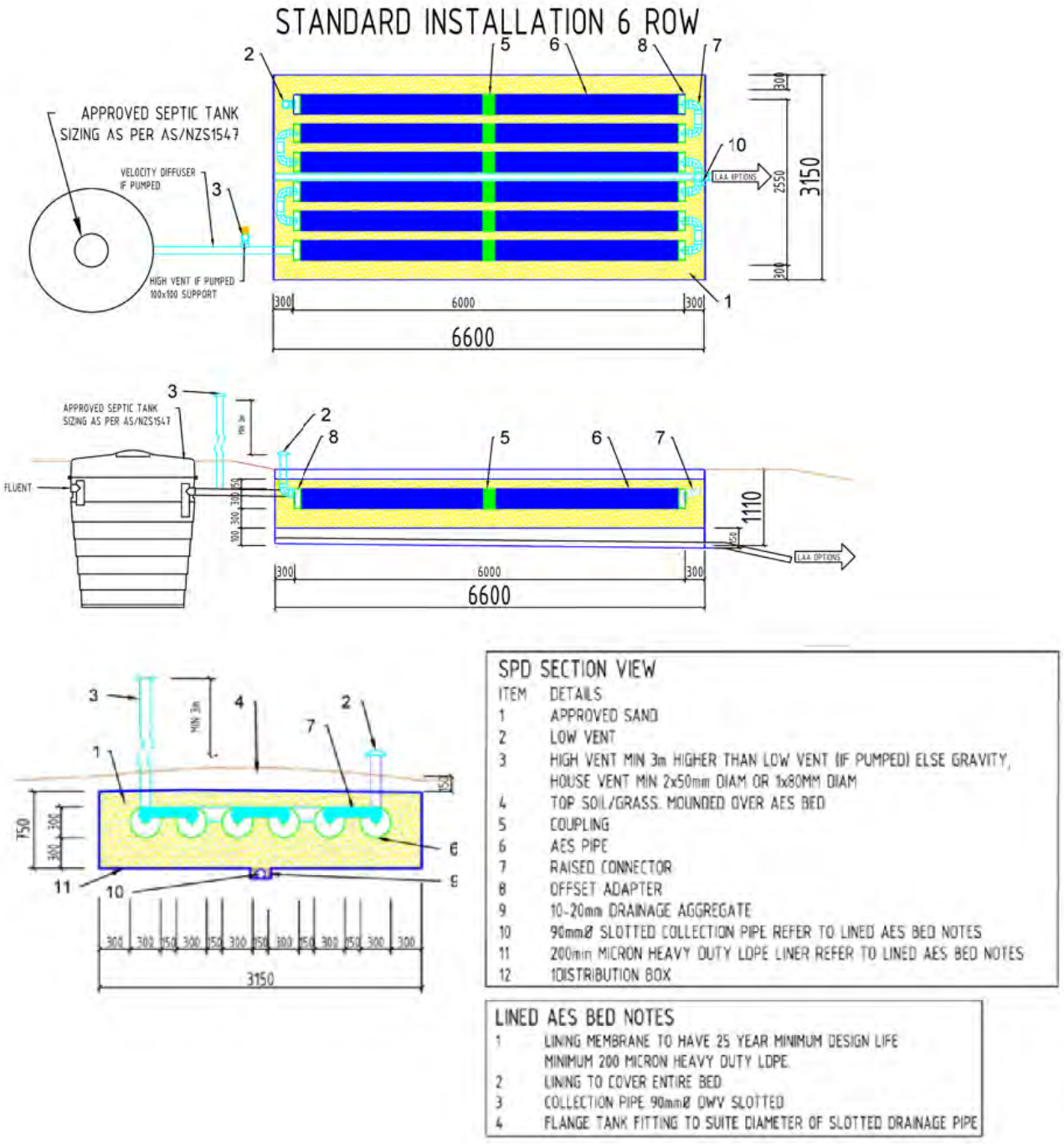
Appendix 4 – Design plans



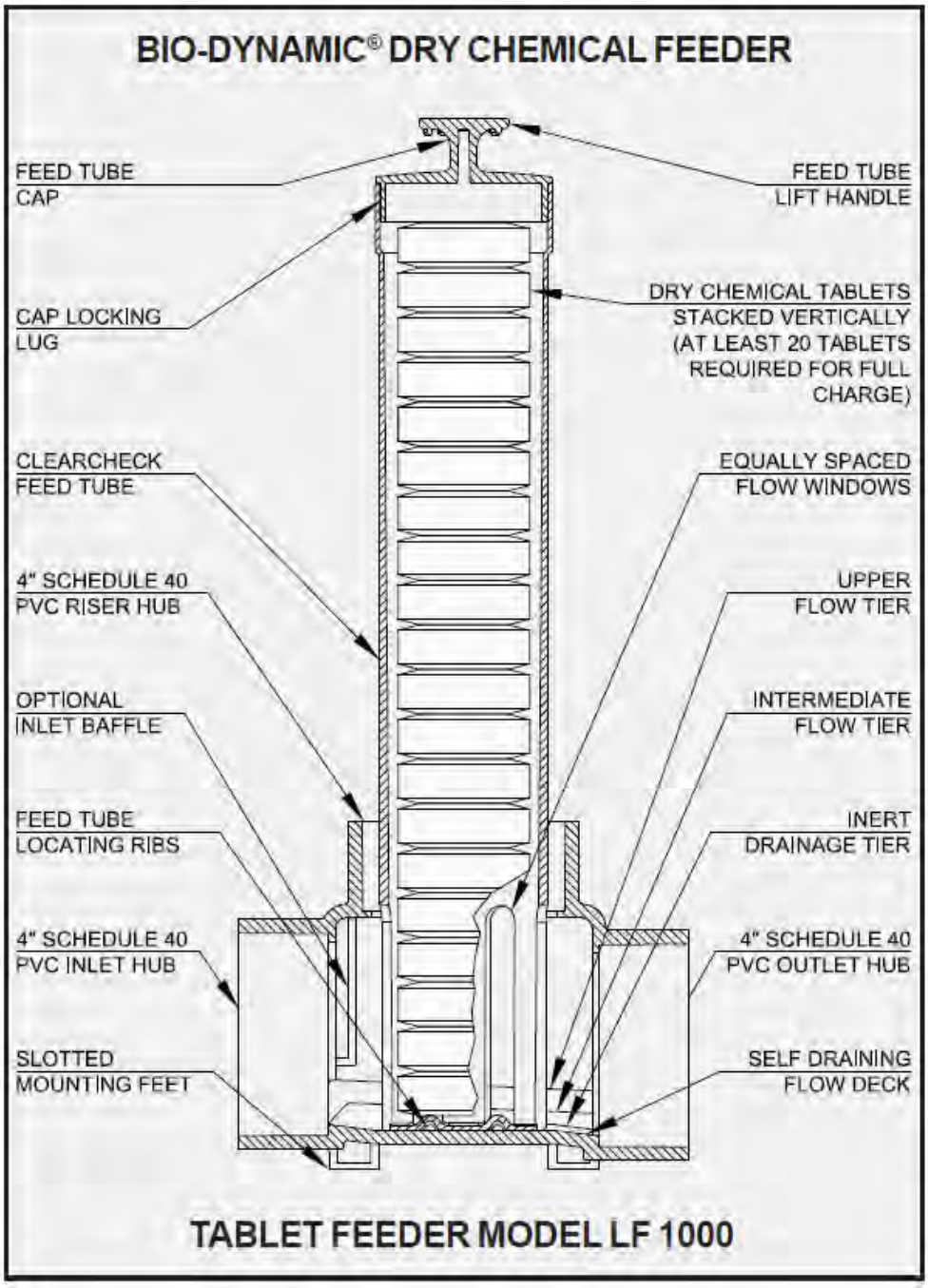
(above) Site plan



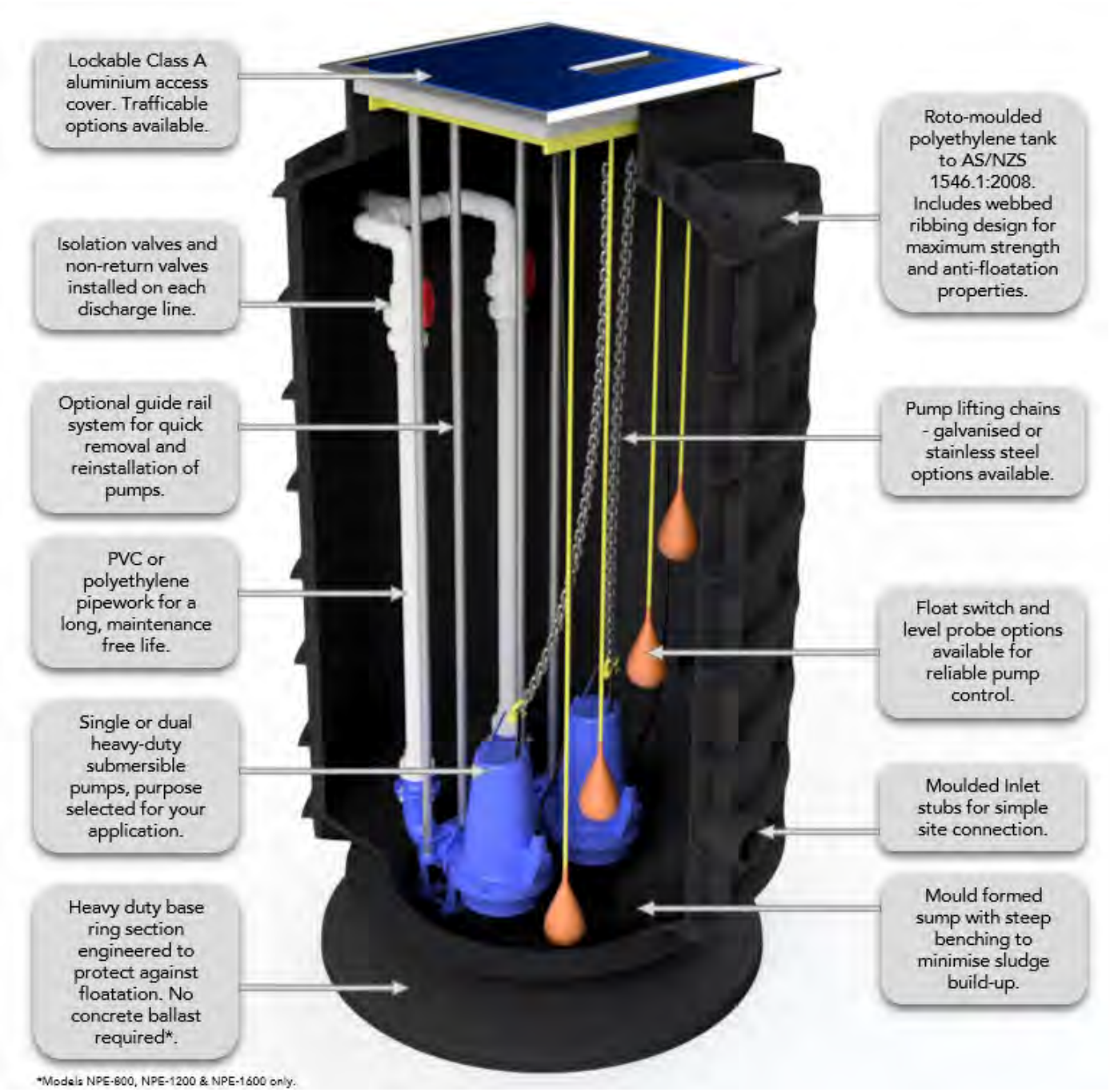
(above) Drainage plan



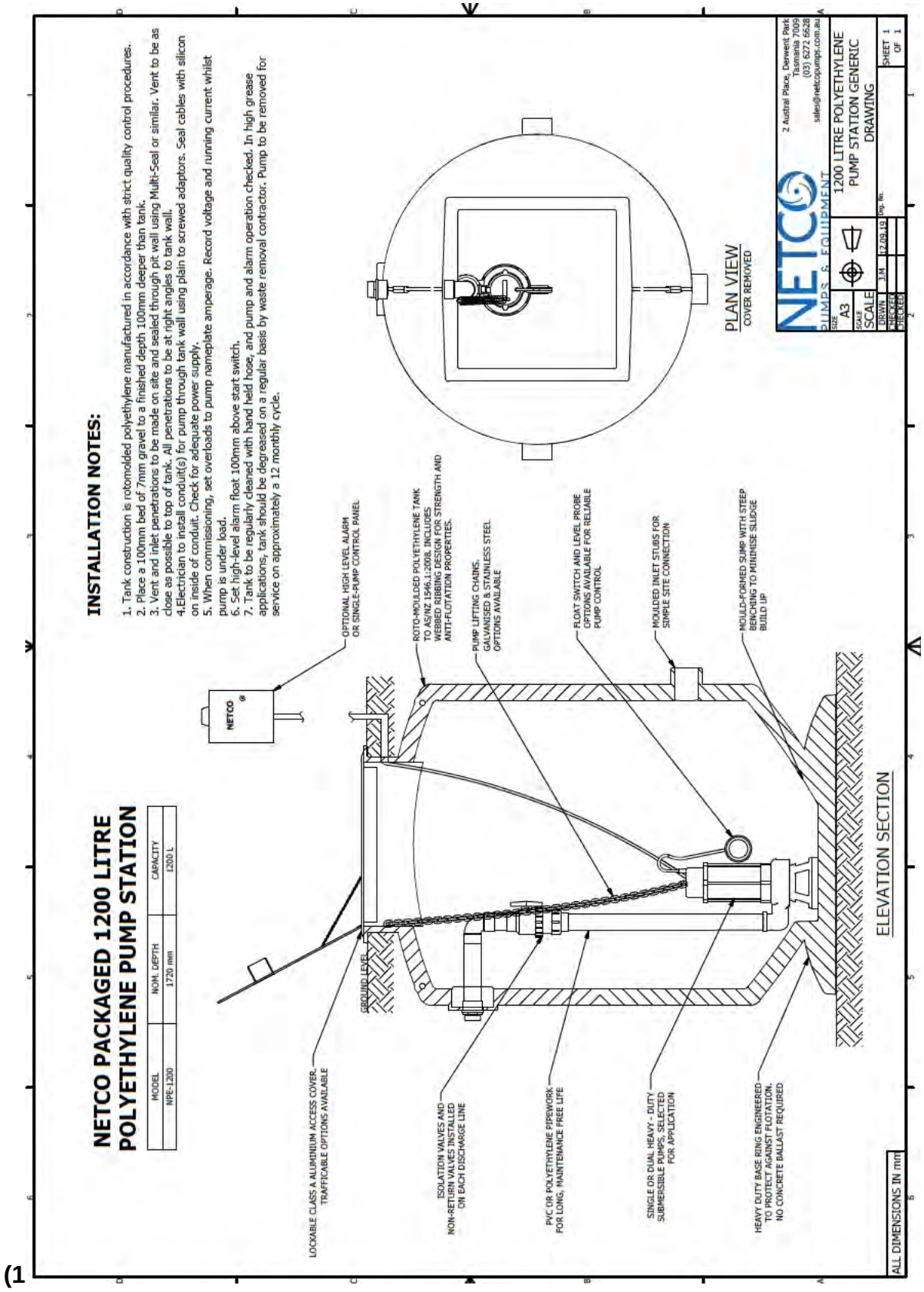
(above) AES SPD unit design plan.



Cross-section through Norweco Chlorine tablet feeder, to be installed in IO prior to pumpwell.



(above) Pump station detail – 1 (1200L model) Davey D42 A/B pump (or similar) to be fitted



(above) Pump station (1200L model) detail – 2

ZLA-240 Series

zenox pumps

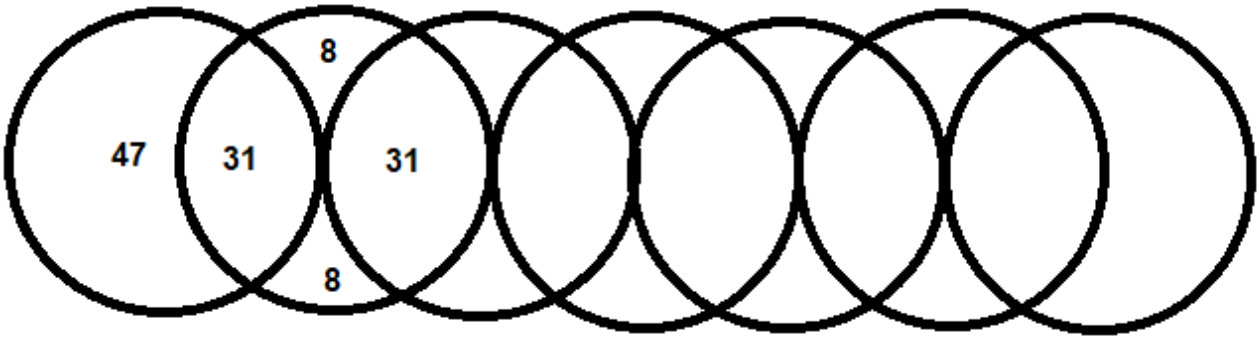
Zenox ZLA-240-FM Flush Mounting Alarm

- Aesthetically pleasing flush mounting design
- Can be used on all tanks and sumps
- After 12 hour mute feature
- A low voltage supply to float switch
- Simple dip switch operation to select alarm for "High Level" or "Low Level"
- Quality construction - Made in Australia
- Supplied complete with 10 metre level-sensing float switch

SPECIFICATION:

- 240 volt power supply
- 240 VDC operating voltage
- 118 mm high x 71 mm wide
- Standard float cable length 10 metres, lengths up to 50 metres available on request

(above) High-level alarm panel detail to be fitted in kitchen areas of BOTH residential buildings.



10 x 8m² @ 2.24mm/day **174m² @ 2.24mm/day = 389L**

2 x 47m² @ 2.24mm/day **186m² @ 4.48mm/day = 833L**

6 x 31m² @ 4.48mm/day

(above) Areas of circle segments formed by overlap of 5m radius spray head and variations of DIR within irrigation area spray patterns.

DBC Engineering Trust
A | 11 Lieber Grove, Carrum Downs, 3201
PA | PO Box 8503, Carrum Downs, 3201
T | 03 9775 0094 M | 0419 992 939

Certificate of Compliance

This certificate of compliance certifies that the Netco range of underground waste water Pump Well have been analysed using Finite Element Analysis and found to conform to the requirements of AS1546.1:2008 On-Site Domestic Wastewater Treatment Units: Clause 2.4.11 Loading of tanks.

Detail

Lateral Loads

AS1546.1:2008 requires an Ultimate State Load Factor of 1.5 under an external pressure loading of 11 kPa per metre depth.

The 1600 litre tank with wall thickness 10 mm and external solid rib features 50 mm deep at 200 mm spacing complies with AS1546.1:2008.

The 1220 litre tank with wall thickness 9 mm and external solid rib features 50 mm deep at 200 mm spacing complies with AS1546.1:2008.

The 832 litre tank with wall thickness 7.50 mm and external solid rib features 50 mm deep at 200 mm spacing complies with AS1546.1:2008.

Hydrostatic Uplift

A calculation of the Bouyant Upward Displacement force for each tank, together with the displaced soil arising from the tank lower collar has determined there is adequate soil above the collar to hold the tank in the ground without further hold down structure.

The complete analysis calculation is included in the engineering report "FEA-Netco-UG Tank-02MAR2018.pdf".

21FEB2020	Des Berry Dip Mech Eng RMIT MIEA

(above) Netco pumpwell – certification to AS/NZS1546.1, demonstrating compliance with NCC Vol 3 TAS A5G4 (9)

SIM TECH Outlet Filter

A VERSATILE AND EFFECTIVE SEPTIC TANK OUTLET FILTER

WHY USE AN OUTLET FILTER?

An outlet filter fitted to, in place of, or immediately downstream of the outlet tee on a septic tank retains total suspended solids (TSS) in the tank, preventing their carryover into the land-application area (AS/NZS 1547:2012, Standards Australia /Standards New Zealand).

Outlet filters can reduce BOD_5 by 28%, TSS by 38% and oil and grease by 40% (Crites and Tchobanoglous, 1998).

The retention of solids and oil and grease in the septic tank by use of an outlet filter is the simplest and most cost effective way to improve the performance of a standard septic tank system. Fitting an outlet filter reduces the likelihood of clogging of trenches or beds and prolongs the life of the land application area.

An outlet filter can be installed in a new septic tank or retro-fitted to an older tank.

It is recommended that outlet filters are inspected and cleaned at least every three months.

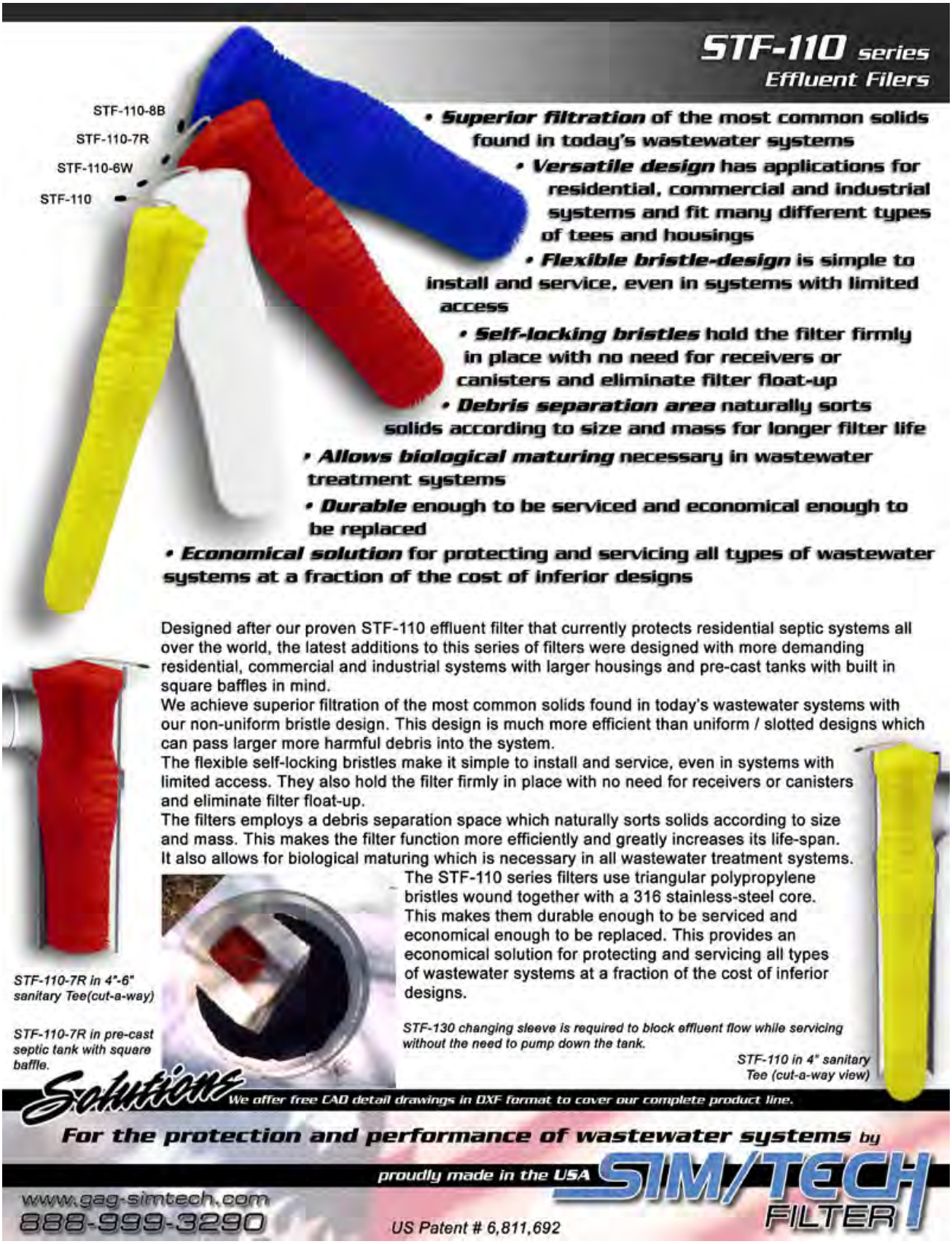
BENEFITS OF THE SIM/TECH BRISTLE FILTER

- Easily installed in all septic tanks. The flexibility of the SIM/TECH bristle filter makes for easy installation in poorly aligned or less accessible outlet tees;
- Constructed like an oversized bottlebrush, the filaments of the filter are held in a twisted wire spine in a spiral pattern;
- The individual filaments are rough and angular in cross section, providing a large surface area for biofilm development;
- Excellent filtration and retention of solids, organic matter and oils and greases;
- Bristles self-lock into place to prevent filter uplift;
- The filter is profiled to ensure it is firmly held in the outlet tee while at the same time ensuring an open structure at the outlet;
- Filter shape ensures long filter life because debris is sorted by size;
- Accumulated solids slough off filter back into septic tank;
- Durable, easily cleaned and economical enough to be disposable;
- Suitable for use in residential, commercial and other applications;
- Available in 100 mm and 150mm sizes.

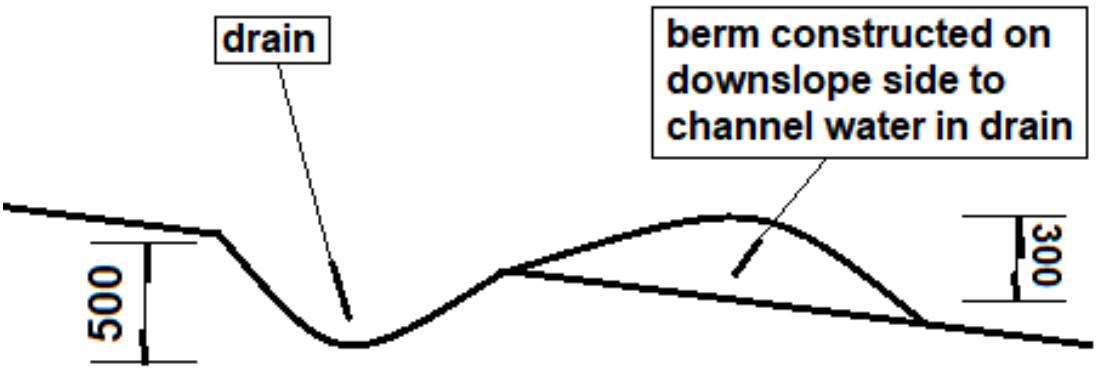
Available in Australia from:

Whitehead & Associates
197 Main Road
Cardiff NSW 2285
Telephone 02 4954 4996
mail@whiteheadenvironmental.com.au

(above) Simtech Outlet filter – to be fitted in 4500L septic tank outlet (detail 1)



(above) Simtech Outlet filter – to be fitted in 4500L septic tank outlet (detail 2)

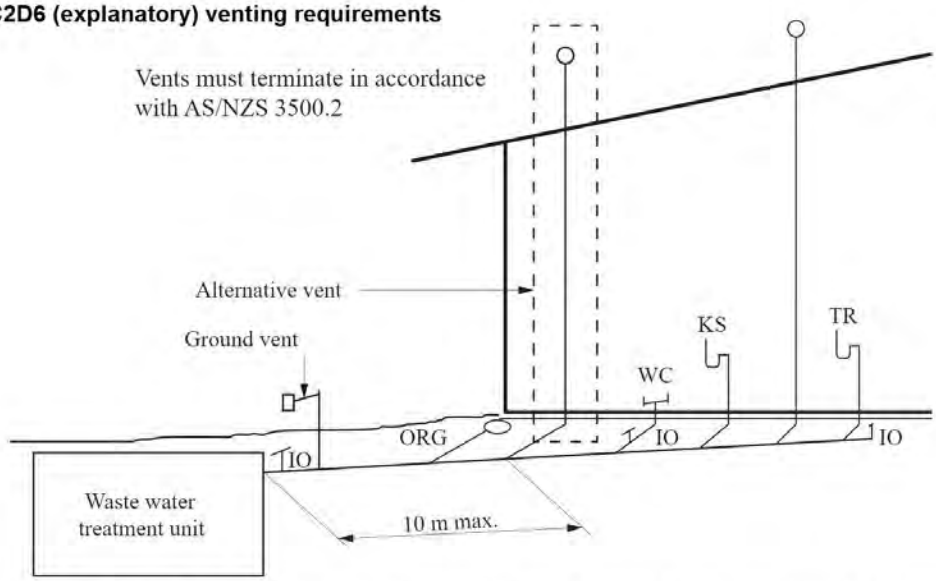


Upslope stormwater run-off diversion drain and berm

(above) Detail of cut-off drain to be excavated around surface irrigation area.

Note: Installation and venting to be in accordance with NCC 2022 Vol 3 TAS C2D6 Venting requirements.

Tas Figure C2D6 (explanatory) venting requirements



Please note: A septic tank ground level vent must not be installed in a gravity charged AES system

Venting requirements for septic tank and pumpwell.

Install ground-vent to pumpwell.

<u>Do not</u> install ground vent to septic tank

Appendix 5 – Design specifications.

Installation

The AES system is to be installed by a plumber who has been accredited by Chankar Environmental Proprietary Limited to install Advanced Enviro Septic systems and who has experience with the installation of subsurface irrigation systems. It is strongly recommended that the developer engages Ben Harris Plumbing who has a high level of experience with both AES systems and irrigation area installation, to ensure that the system is installed in compliance with the design specifications.

Wastewater treatment

1. 4500L Bloo septic tank to be installed.

2. The septic tank is to discharge to an Advanced Enviro Septic AES-38-SPD; this is a lined sand-filter, constructed in accordance with the construction drawings in Appendix 4 above and the relevant sections of the AES Design & Installation Manual.

6. The IO downstream of the AES-SPD bed is to be fitted with Norweco LF1000 tablet chlorinator dispenser,. According to the manufacturer, this is rated to treat effluent flows of up to 5600L/day (1500 US gallons). This unit is adjustable to ensure optimal exposure of Calcium hypochlorite disinfection tablets to effluent flow, consistent with achieving desired residual chlorine levels.

7. Tube chlorinator is to be always stocked with Calcium hypochlorite disinfection tablets and topped up as required during routine maintenance.

8. The AES-38-SPD is to discharge by gravity to a Netco/Zenox 1200L capacity pumpwell, fitted with Zenox ZHS-040 or ZHS-075 pump. Pumpwell etc specifications are provided below.

Pump etc specifications:

9. **Pumpwell:** Netco NPE-Series Single-Pump Polyethylene Packaged Sewage Pumping Station model NPE-1200-S/S (1200L) with Class B trafficable rated anti-skid lockable aluminium lid.

10. **Pump:** Single-phase, automatic submersible Davey D42 A/B , automatic installed in free-standing configuration in the chamber.

11. **Pipework:** 32mm PN12 lilac PVC pipe with solvent-welded joints, terminating in a single 50mm BSP connection on the side of the chamber wall.

12. **Valves:** Heavy-duty 50mm PVC Flo-Control combination ball/swing check valve c/w dismantling unions to be incorporated as part of the discharge pipework.

13. **Alarm:** A Zenox ZLA-240-FM indoor-mounting visual and audible high-level alarm to be supplied c/w **50m** cable and level-sensing float switch. The float switch is to be mounted in the pump chamber, secured to a fabricated stainless-steel mounting bracket with the alarm operational level factory pre-set.

    Alarm panels to be located in kitchen or bathroom, not laundry of both residential buildings, to ensure maximum visibility.

14. **Lifting chain:** Heavy-duty 8mm galvanised pump lifting chain to be fitted to pump, complete with Grade 316 Stainless steel lifting shackles. Chain to be fixed to a fabricated stainless-steel mounting bracket in the pump chamber.

15. **Access cover:** Light-duty, lockable Class A aluminium access cover suitable for pedestrian traffic loading to be supplied and bolted to the top of the chamber to facilitate access to the pump station for maintenance purposes.

16. **Circuit/pump protection:** It is strongly recommended that an Overload Protector can be mounted near the power source for the pump, should the pump block, the power will trip, therefore protecting the pump from burning out.

Installation:

17. **Location:** Close to AES bed etc to ensure that the pumpwell inlet is at lower elevation than the AES-38-SPD outlet.

18. **Pumpwell:** Base of excavation and lower sides and base of pumpwell to be set in concrete ballast in accordance with the installation manual recommendations.

19. **Cover slab:** A concrete surround cover slab is to be poured around the access cover. This will seal and secure the unit and provide a neat, serviceable finished surface level.

20. **Pressure/supply pipe:** 32mm ID lilac LDPE pipe laid in trench with 200mm surface cover.

Venting:

21. Pumpwell to be externally vented in accordance with NCC 2022 Vol 3, Tas C2D6. ie fit a ground vent to the pumpwell.

22. Septic tank to be externally vented in accordance with NCC 2022 Vol 3, Tas C2D6. Please note that a ground vent must not be fitted to the septic tank where an AES system is installed; the septic tank is to be vented via an 80mm diameter “alternative vent” located as per NCC 2022 Vol 3, Tas C2D6.

23. Septic tank “alternative vent” also meets the requirement for a high-level vent to the AES bed.

Commissioning of pump system

24. Pumpwell to be filled with clean water to depth exceeding trigger level for pump float switch and high-level alarm float switch.

25. Turn on power.

26. Check that high-level alarm panel is functioning.

27. Check that pump starts.

28. Observe irrigation area and adjust wobbler-riser valves as necessary to ensure even effluent distribution throughout the irrigation area.

Irrigation area

29. Pipework from the pumpwell to the irrigation area is to comprise 32mm lilac LDPE pipe with minimum top cover of 200mm, with “Recycled/Reclaimed Water” tape laid 100-200mm in trench above pipe.

30. Irrigation heads to comprise non-aerosol Senninger Mini- Wobblers (#6 – gold – 2.38mm nozzle, 216L/hr) to wet a 5m radius, each producing a 78.5m^2 wetted area, at 5m spacings to provide a minimum wetted area of 472m^2.

31. Wobblers to be fixed on 500mm galvanised risers, to provide protection from possible ground-fires and interference of spray pattern by vegetation growth).

32. Each wobbler head/riser to be fitted with gate valve to enable fine-tuning/adjustment of flow rate and wetted radius.

33. Wetted area to be enclosed by lightweight wire fence, 1.2m high, carrying warning signs stating “Wastewater Irrigation Area – No Unauthorised Entry”, or words to similar effect hung from the top strand at 10m spacings. If livestock are to be kept in this paddock, the fence should be of suitable standard to ensure their exclusion.

34. Maintain the irrigation area so that all understorey vegetation is, as far as possible, under 450mm high to minimise interference with sprinkler head spray patterns.

35. AES-SPD unit, chlorinator, pumpwell and irrigation system to be commissioned and reported in accordance with Clauses M11, M12, M13 & M14 of AS/NZS1547.2012

36. Condition and performance of on-site wastewater management system to be monitored and reported during routine 6-monthly maintenance inspections.

Exclusion of surface/stormwater

37. Cut-off drains to protect irrigation area and AES-38-SPD bed to be excavated and installed as per details in Appendix 4.

Maintenance of irrigation system.

38. Maintenance is to be undertaken at maximum of 6-monthly intervals.

39. Check operation of pump and high-level float alarm.

40. Clean pumpwell of any extraneous matter such as silt/sediment.

41. Replace Calcium hypochlorite tablets in chlorinator dosing tube, as required.

Materials.

42. Required materials and components are listed in Appendix 5.

43. The AES pipe is laid in a bed of approved “system sand”; this is a coarse sand meeting the specifications as detailed below:

AES system sand specifications:

Percentage Restrictions
35% **or less** of the total sand may be gravel.
40%-90% of the total sand is to be coarse and very coarse sand.

Gravel Quality Restrictions
No gravel is to exceed 9mm in diameter.
No gravel is smaller than 2mm in diameter.

Coarse Sand Quality Restrictions
No coarse sand is smaller than 0.5mmin diameter.

Fines Quality Restrictions
No more than 2% of the total sand may pass through a 75µm sieve.

Soil moisture conditions

Attention is drawn to AS/NZS1547.2012 On-site domestic wastewater management, Part L7 Construction techniques which states the following:

L7 CONSTRUCTION TECHNIQUES

L7.1 Good construction technique
The following excavation techniques shall be observed so as to minimise the risk of damage to the soil:

(a) Plan to excavate only when the weather is fine;

(b) Avoid excavation when the soil has a moisture content above the plastic limit. This can be tested by seeing if the soil forms a ‘wire’ when rolled between the palms;

(c) During wet seasons or when construction cannot be delayed until the weather becomes fine,
smeared soil surfaces may be raked to reinstate a more natural soil surface, taking care to use
fine tines and only at the surface;

(d) When excavating by machine, fit the bucket with ‘raker teeth’ if possible, and excavate in small
‘bites’ to minimise compaction; and

(e) Avoid compaction by keeping people off the finished trench or bed floor.

In particular for trenches and beds:

(f) If rain is forecast then cover any open trenches, to protect them from rain damage;

(g) Excavate perpendicular to the line of fall or parallel to the contour of sloping ground; and

(h) Ensure that the inverts are horizontal.

CL7.1
Damage can be done by:
(a) Smearing, where the soil surface is smoothed, filling cracks and pores;

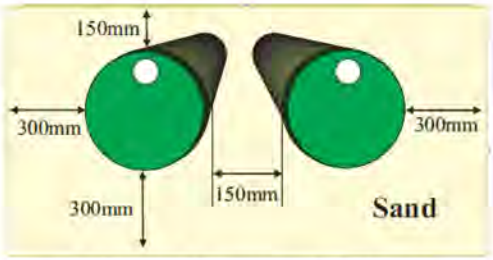
(b) Compacting, where the soil porosity is reduced; and

(c) Puddling, where washed clay settles on the base of the trench to form a relatively impermeable layer.

In particular, cohesive soils, or soils containing a significant quantity of clay, are susceptible to damage by excavation equipment during construction.

1. SET OUT

i. Set out should be in accordance with the design approved by Council.
ii. The length of each run of AES System pipe must be horizontal
iii. AES calculator footprint dimensions are based upon the DLR of the receiving soil and are the minimum foot print area.
iv. Any system extension must be to the down slope side unless the infiltration footprint is level.



AES Sand Coverage Minimums

2. EXCAVATION – (track machinery causes less compaction of the soil.)

i. Excavate as required leaving the base of excavation loose to aid infiltration. Strip and separate top soil for covering installation as per AS 1547:2012.
DO NOT damage infiltration area by driving equipment or walking on excavation prior to placement of sand layer. Refer to Appendix L Sec L7 of AS1547: 2012. Construction Techniques. Rip or scarify the infiltration area to a depth of 150 to 200mm minimum parallel to the AES pipe on all systems especially systems in Cat 4,5,6 soil with high clay content. (Refer to the design and report for this onsite installation)

"L7.1 Good construction technique AS 1547:2010
The following excavation techniques shall be observed so as to minimise the risk of damage to the soil:
(a) Plan to excavate only when the weather is fine;
(b) Avoid excavation when the soil has a moisture content above the plastic limit. This can be tested by seeing if the soil forms a 'wire' when rolled between the palms;
(c) During wet seasons or when construction cannot be delayed until the weather becomes fine, smeared soil surfaces may be raked to reinstate a more natural soil surface, taking care to use fine tines and only at the surface;
(d) When excavating by machine, fit the bucket with 'raker teeth' if possible, and excavate in small 'bites' to minimise compaction; and
(e) Avoid compaction by keeping people off the finished trench or bed floor.
In particular for trenches and beds:
(f) If rain is forecast then cover any open trenches, to protect them from rain damage;
(g) Excavate perpendicular to the line of fall or parallel to the contour of sloping ground; and
(h) Ensure that the inverts are horizontal.

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Damage can be done by:
(a) Smearing, where the soil surface is smoothed, filling cracks and pores;
(b) Compacting, where the soil porosity is reduced; and
(c) Puddling, where washed clay settles on the base of the trench to form a relatively impermeable layer.
In particular, cohesive soils, or soils containing a significant quantity of clay, are susceptible to damage by excavation equipment during construction.

ii. If using a raised bed configuration ensure you have sufficient soil to cover entire mound or bring in enough sand to fill out batters prior to covering with topsoil etc. as per AS 1547:2012.

/2

3. SYSTEM SAND – Course washed sand with less than 2mm silt (ASTM C-33)

i. Place minimum150mm system sand to extension area and minimum 300mm under AES pipe footprint area.

ii. Place runs of AES System pipe roughly in position (THE FABRIC SEAM MUST BE AT THE TOP AND THE WHITE BIO-ACCELERATOR AT THE BOTTOM.) With 300mm minimum clearance to all footprint edges. Join lengths of AES with AES connectors. To do this slide fabric and fibre back on the 2 pipe ends to be joined and clip AES connector in place. Slide fabric back over connector.

iii. Place offset adaptors on each run with the 100mm hole at the top.

iv. Ensure minimum 150mm between AES system pipes. This can be done with pegs, short pieces of 150mm pvc or reusable AES Spacer Plates. One side provides the 300m spacing required for minimum system sand. The opposite side must have a minimum of 300mm of system sand beyond the edge of the AES System pipe.

v. Place system sand around AES pipes ensuring they stay level and in position. Remove and progressively position spacer plates or PVC pipe until all system pipes are surrounded by system sand to the top. **Walk sand between rows to aid compaction.**

vi. EXTENSION SAND depth is a minimum of 150mm.

4. CONNECTING ROWS

i. Connect rows with 100mm pipe as required with a maximum 100mm extending into the AES system pipe. (Raised connection – After placing raised connection pipes the top of the PVC pipe must be level with the top of the AES pipe. Lift and pack with sand.) This ensures airflow is not restricted and buffer capacity is maximised.

5. VENTING

i. Ensure the system has a High Vent and a low vent. As per design. Low vent is a minimum 150mm above ground. Vents can be located any distance from the system provide they have no water traps that can block oxygen flow through the system. The High Vent must be 3 meters higher than the low vent.

ii. Pressurised or steep gravity systems will require a **Velosity Diffuser**

6. BACK FILLING

i. Ensure a minimum of150mm System sand covers the AES pipes and PVC pipe work.

ii. Refer to the Onsite design and Council approval and ensure that all diversions drains or site specific requirements are correctly installed.

iii. Back fill with natural soil and compact. System extensions may require compaction in a couple of layers depending on the depth.

iv. On mounds and down slopes strip vegetation and place fill evenly and level to all sides to avoid breakout from low points during high seasonal loadings.

v. Cover excavation area with topsoil creating a finished surface level 50 to 100mm higher than the natural surface level ensuring that water sheds off the land application area and does not pond, compact lightly and seed or grass when completed.

For Installation support phone 0754744055

Appendix 6 - AES Design Calculation.

(Using AES design calculator supplied and digitally signed by Chankar Environmental)

ADVANCED ENVIRO-SEPTIC™ "Always The First Option"

AES-SPD (Single Point Discharge) Design Calculator V2.0 ©

AES The World Leader in Passive Solutions ©

Site Address	2 Old Coach Rd Cambridge		State TAS	Post Code	7170
Client Name	Dean Smith			Date Site Visit	21/5/2025
Designers Name	S. Dennis & R. Mason On-site Assessments Tas	Designers Ph Number	0418 589 309	Designer Lic (e.gQBCC)	CC6157 T (Tas)
Lic Plumber	TBA	Plumber Ph Number		Plumb / Drainer Lic Number	
Council Area	Clarence	Designers AES Cert Number	481	Date	31/5/2025

This Calculator is a guide only, receiving soil classification, surface water, water tables and all other site constraints addressed by the qualified designer.

AES design loading calculations and Single Point Discharge AES system pipe configuration		IMPORTANT NOTES
Enter AES L/m loading rate "30" Advanced Secondary or "38" Secondary	44	>> This design is for a SECONDARY SPECIAL system 44 L/
Is this a new installation Y or N	Y	>> Minimum single vent size is 80mm or 2 x 50mm house vents
Number of persons	10.33	a septic tank outlet filter is NOT RECOMMENDED
Daily Design Flow Allowance Litre/Person/Day	150	
Number of rows required to suit site constrants	6	>> Longer AES runs are better than multiplule short runs.
Is this design a gravity system with no outlet filter? Y or N	Y	>> A House Vent & LOW VENT required on this system

PLEASE CHECK YOU HAVE FALL FROM SEPTIC TANK TO AES SYSTEM PIPES

COMMENTS :- " The outcome must be important to everyone. "

AES Loading Calculator Outcomes		
Total System load - litres / day (Q).	1549.5	l/d
Min Length of AES pipe rows to treat loading	5.87	lm
Number of FULL AES Pipe lengths per row	2	lths
Total Capacity of AES System pipe in Litres	2544	ltr.

AES SPD dimensions	AES System	System Extension
Length:(L)	6.60 m	6.60 m
Width:(W)	3.15 m	0.00 m
Sand Depth :	0.75 m	0.15 m
Area m2	20.8 m^2	0.0 m^2

USE CUT LENGTHS PIPE FOR THIS DESIGN? (ENTER Y)

AES-SPD FOOT PRINT AREA is based upon the length and configuration of AES pipes required to treat the daily load generated from the site as calculated by the qualified Designer.	Length		Width		Minimum AES foot print required
	6.60 m	x	3.15 m	=	20.8 m2 total

AES pipes are best centered in the trench parallel to the site slope

Code	AES System Bill of Materials.		
AES-PIPE	AES 3 metre Lengths required	12	lths
AESC	AES Couplings required	6	ea
AESO	AES Offset adaptors	12	ea
AESODV	AES Oxygen demand vent	1	ea
AES-IPB	AES 100mm Inspection point base	2	ea
T Dis 7H	7 Hole distribution box + Riser + Seals + Plugs		ea
T Dis 4H	4 Hole distribution box + Riser + Seals + Plugs		ea
Chlor D	Chlorine 1000 Tablet Dispenser	1	ea
VS43-4	Sweet Air Filter		ea
Provided as a guide only	Length of 90mm Slotted collection pipe required min.	22.0	m
	Estimated qty of 10/20mm aggregate/screenings	2.1	
	TOTAL SYSTEM SAND REQUIRED (Guide Only)	19	m3

Please email your AES Calculator (EXCEL FORMAT), Site Layout & AES Design to

designreview@enviro-septic.com.au

Chankar Environmental Use Only

Steve Dennis

Digitally signed by Steve Dennis
Date: 2025.06.02 10:23:49 +09'30'

designreview@enviro-septic.com.au

> The AES SPD Calc is a design aid for checking of AES componental/configuration & is a guide only. AES-SPD footprint does not form any part of the land disposal area.

> The land application area is calculated & designed independent of this calculator by referencing AS 1547 standard for calculation of a disposal area suitable for the land application soil type. The LAA must be calculated and designed by a Qualified Designer.

> Chankar Environmental has no responsibility for the soil evaluation, loading calculations or DLR used for the LAA

> AES pipes can be cut to length on site. They are supplied in 3 metre lengths only.

AES-SPD-Design-Calculator V2.0 © Copy Right - Chankar Environmental Pty Ltd 20/1/2022

Appendix 7 – Advice to Project manager and installer

Important notes for Project Manager.

It is vitally important to the future of the on-site wastewater management system to avoid damage to soil structure on the site, which would reduce soil permeability, leading to possible early failure of the effluent absorption area.

Actions that may damage soil structure include:

- **Compaction, which reduces soil porosity;**
- **Smearing, where soil surfaces are smoothed, filling pores and cracks; and,**

Project Manager Responsibilities.

The Project Manager must ensure that:

1. Before project construction work commences, the Effluent Absorption Area is properly identified on site and barricaded, fenced, roped or taped to prevent unauthorised access. This action should be documented both on the site plan and with the local Council.

2. Vehicles, earth-moving plant etc must not park or manoeuvre on the Effluent Absorption Area.

3. The Effluent Absorption Area is not used for the stockpiling of construction materials, excavated fill or other materials.

4. All water runoff resulting from driveways, cut & fill and other excavations is directed to discharge well away from and downslope of the Effluent Absorption Area.

5. Observe good construction technique:

   L7 CONSTRUCTION TECHNIQUES

   L7.1 Good construction technique
   The following excavation techniques shall be observed so as to minimise the risk of damage to the soil:

   (c) Plan to excavate only when the weather is fine;

   (d) Avoid excavation when the soil has a moisture content above the plastic limit. This can be tested by seeing if the soil forms a ‘wire’ when rolled between the palms;

   (c) During wet seasons or when construction cannot be delayed until the weather becomes fine,
   smeared soil surfaces may be raked to reinstate a more natural soil surface, taking care to use
   fine tines and only at the surface;

(d) When excavating by machine, fit the bucket with ‘raker teeth’ if possible, and excavate in small
‘bites’ to minimise compaction; and

(e) Avoid compaction by keeping people off the finished trench or bed floor.

In particular for trenches and beds:

(f) If rain is forecast then cover any open trenches, to protect them from rain damage;

(g) Excavate perpendicular to the line of fall or parallel to the contour of sloping ground; and

(h) Ensure that the inverts are horizontal.

CL7.1
Damage can be done by:
(c) Smearing, where the soil surface is smoothed, filling cracks and pores;

(d) Compacting, where the soil porosity is reduced; and

(c) Puddling, where washed clay settles on the base of the trench to form a relatively impermeable layer.

In particular, cohesive soils, or soils containing a significant quantity of clay, are susceptible to damage by excavation equipment during construction.

Appendix 8 – Loading certificate and Operation & Maintenance requirements

A copy of the Advanced Enviro Septic (AES) Home Owners Manual is provided in electronic form with this report; the home owner is advised to print two hard copies of this publication, one of which should be submitted to the Council in support of the Special Plumbing Permit Application, it is also available for down load at http://www.enviro-septic.com.au/wp-content/uploads/2012/08/AES-Owners-Manual.pdf.

The second copy should be retained and read for familiarisation purposes and the recommendations therein carefully followed in order to ensure optimal, nuisance free operation of the system with minimal environmental health impacts.

This loading certificate is provided in accordance with Clause 7.4.2(d) of AS/NZS 1547.2012.

Loading Certificate for Advanced Enviro Septic Installation at 2 Old Coach Road, Cambridge

i. **System capacity** (medium-long term) – 8 persons/1200 litres per day + 350L (restaurant toilets) every 14 days

ii. **Design criteria summary**:

- Effluent quality – secondary
- Soil category - 1-2; adopted DIR 4mm/day
- Land application system - Absorption bed (see Appendix L of AS/NZS1547.2012)

iii. Reserve area.

There is adequate land available on this site for provision for use as an alternate land application area in the event of a system failure which cannot be addressed by the measures outlined in the Home Owners Manual.

iv. Water efficient fittings etc

Design assumes use of water efficient fixtures and fittings, eg 3L/6L flush toilets, 9L/min (max) showerheads, aerator fittings on taps and clothes washing machines/dishwashers with WELSS star ratings of 4.5 stars or above. (See http://www.waterrating.gov.au/)

v. Variation from design flows etc.

The system should successfully manage additional peak loadings which may result from occasional social gatherings provided that this does not exceed use by more 40 persons in a 12-hour period or more than two temporarily resident visitors (ie up to 9 persons total) for a period not exceeding 14 days, no more frequently than once every 8 weeks, preferably during the dryer summer months. Visitors should be advised of the requirement to minimise time spent in showers; avoid running taps whilst cleaning teeth and other commonsense water conservation measures.

vi. **Consequences of changing wastewater characteristics.**

The home owner should avoid disposing of wastes which would be additional to those normally disposed in a household sewerage system; in particular increases, in organic loadings such as from the use of sink-waste disposal units are to be avoided.

Use of household disinfectants or bactericides in anything more than small amounts and at recommended rates of dilution should also be avoided, as should the disposal of solvents and other chemicals (such as antibiotics/antimicrobial pharmaceuticals) which may kill bacteria and other microorganisms required for effective wastewater treatment. See AES Home Owners Manual for more information.

vii. **Consequences of overloading the system.**

Long term use by more than eight residents and fortnightly business use, as outlined etc or equivalent may result in overloading of the system, surfacing of effluent, public and environmental health nuisances, pollution of surface waters etc. Overloading may result from such uses as residential childcare, home-catering and other home-based businesses etc.

viii. **Consequences of underloading the system.**

Nil.

ix. **Consequences of lack of operation, maintenance and monitoring attention.**

The AES requires minimal intervention by the home owner, however it is not a zero-maintenance system; the home owner's operational maintenance requirements are detailed in the AES Home Owners Manual.

Consequences of failure to observe these requirements may include any of the following:

- Spread of infectious diseases to your family and neighbours.
- Breeding of mosquitos and attraction of flies and rodents.
- Nuisance and unpleasant odours.
- Pollution of waterways, streams, beaches and shellfish beds.
- Contamination of bores, wells and groundwater.
- Excessive and unsightly weed growth.
- Alteration of local ecology

x. **Operation & Maintenance Requirements.**

- Make sure that you have the septic tank desludged by an authorised contractor at three-yearly intervals. Failure to do this at the required frequency may result in carry-over of solids into the AES system, causing failure of the land application area, which may then require expensive reconstruction works.
- Discourage access by visitors or pets to the land application area.
- Livestock should not be allowed on or near the AES bed; if such animals are kept, the land application area should be fenced off to prevent system damage and/or soil compaction.
- Do not allow vehicles on or near the land application area.

- Keep the surface and sub-surface cut-off drain above the land application area open and clear of debris to prevent rainwater flowing into the effluent absorption area.

  Problems can occur with systems which have not been properly maintained and where absorption areas have become blocked or clogged. The warning signs are obvious and include:

- Effluent absorption area is wet or soggy with wastewater ponding on the surface of the ground.
- “Sewage” smells near the AES or irrigation area.

  See AES Home Owner’s Manual for more information.

Are you purchasing a new aerated waste water treatment system?

This guide will help you to choose the best system and contractor to suit your needs. Read on for handy tips and information designed to help you make an informed investment choice.

PROCESS IN BRIEF

Property requires an aerated waste water treatment system solution.

↓

Property owner engages an accredited designer to design a system to suit the owners land.

↓

Owner decides what brand of aerated waste water treatment system they wish to have.

↓

Design completed and submitted to council for approval.

↓

If system design is approved a plumbing permit will be issued to the owner by council.

↓

A licensed plumbing contractor is engaged by the owner to install the system.

↓

System is installed as per the approved plumbing permit or design.

↓

Installation is inspected by the designer upon completion and a completion certificate is sent to council to confirm the installation meets with the design requirements.

↓

Owner must enter into a maintenance contract with a service contractor and notify the council of such. The owner must also provide council with a copy of the maintenance contract.

↓

Quarterly servicing begins.

Department of Justice
Consumer, Building and Occupational Services
PO Box 56, Rosny TAS 7018
P: 1300 65 44 99
E: cbosinfo@justice.tas.gov.au
W: www.justice.tas.gov.au

This guide is a resource and reference document and is for general information only. Published April 2016

CBOS
Consumer Building and Occupational Services

A GUIDE TO PURCHASING, INSTALLING & MAINTAINING

AERATED WASTE WATER TREATMENT SYSTEMS

Department of Justice
Consumer, Building and Occupational Services

Tasmanian Government

OWNERSHIP

- Purchasing, installing and maintaining a waste water treatment system can be a significant up-front investment, and will have ongoing maintenance costs. We recommend that you choose a system and maintenance contractor which best suits your needs.
- An aerated waste water treatment system accepts normal domestic household waste from toilets, basins, showers, baths and kitchen sinks. It is designed to treat the waste and then distribute treated waste water on site to the garden area.
- It is important to understand that this treated water is not suitable for vegetable gardens or fruit trees or any other produce producing plants
- Even after treatment of the waste water, bare skin contact and contact by pets and livestock should be avoided.

WARNINGS

- Waste water treatment systems that are not working or are working incorrectly can be a serious health hazard.
- Ponding of water and leaking waste water distribution systems should be rectified immediately.
- Keep pets and children clear of waste water distribution areas.

RESPONSIBILITIES

- You, as the owner, will be responsible for the overall operation and monitoring of your system and for making sure the scheduled maintenance is carried out at regular intervals, such as quarterly.
- Your local council will issue a plumbing permit – with permit conditions attached – for your new installation. As long as you own the property you will be responsible for making sure these conditions are met.
- We recommend that you choose a suitable maintenance contractor to work with you to ensure you meet the permit conditions. Perhaps ask other owners who services their system.

INSTALLATION

- Before your system can be installed, an accredited designer will need to complete a design for the waste water system including the irrigation area. The design will require approval from your local authority (council).
- A licensed plumber must be used to install your waste water management system.

CHOOSING YOUR SYSTEM

- There are various waste water systems on the market for you to choose from. Ask your local council, accredited designer or plumbing contractor for some advice on a suitable system.

MAINTENANCE

- Aerated waste water treatment systems require regular maintenance, usually 4 services per year.
- Servicing needs to be carried out by a qualified person (ask your local council for a list of suitable maintenance contractors).
- You will need to enter into a formal maintenance contract with the maintenance contractor.
- You will need to agree on the service costs with the maintenance contractor. This amount should be contained within a Maintenance Service Contract.
- The local council will require a copy of the formal contract once it's been agreed to and signed by both parties.
- The local council will require a 'receipt of servicing' from your contractor after every service.
- You, as the owner, will also receive a copy of this service receipt.
- Generally a service of a typical aerated waste water treatment system takes between 0.5-1.0 hour to complete correctly.

MAINTENANCE CONTRACTORS AND CONTRACTS

- Seek good advice and be prepared to speak with more than one maintenance contractor.
- Maintenance contractors differ when it comes to terms and conditions within a contract, and these terms and conditions are often negotiable.
- You may wish to change contractors or your circumstances may change, which could require you to terminate the contract. Be aware that contractors offer varying exit options from the contract, and make sure you compare the contract exit options when deciding on a contractor.
- Contractors offer varying lengths of time for which the contract is active. You should compare contract lengths to ensure you are entering a contract with a timeframe appropriate for you.
- Make sure you understand all of the terms and conditions prior to signing the contract.
- Ensure that your contract contains all the basic terms including price, services to be provided and service intervals.

Clockwise from above: Example of an aerated waste water system being delivered. Example of a typical installation. Example of regular maintenance.

Appendix 9 – Form 55 (R Mason)

CERTIFICATE OF QUALIFIED PERSON – ASSESSABLE ITEM — **Section 321**

Form **55**

To: Dean Smith (Owner /Agent)
2 Old Coach Road (Address)
Cambridge 7170 (Suburb/postcod)

Qualified person details:

Qualified person: Richard Mason
Address: 20 Adelong Drive — Phone No: 0418 589309
Kingston 7050 — Fax No:
Licence No: CC6157T — Email address: richardmason@iprimus.com.au

Qualifications and Insurance details: BSc Environmental Sciences (Salford).

Arch Insurance Policy No. P0021114PI2022AU0

(description from Column 3 of the Director of Building Control's Determination)

Speciality area of expertise: Site and soil evaluation and land application system design.

(description from Column 4 of the Director of Building Control's Determination)

Details of work:

Address: 2 Old Coach Road
Cambridge 7170 — Certificate of title No: 180867/2

The assessable item related to this certificate: Onsite wastewater management – Site and soil evaluation for onsite wastewater management capability.

(description of the assessable item being certified)

Certificate details:

Certificate type: On-site wastewater management - Site and soil evaluation

(description from Column 1 of Schedule 1 of the Director of Building Control's Determination)

This certificate is in relation to the above assessable item, at any stage, as part of - *(tick one)*

building work, plumbing work or plumbing installation or demolition work: [ ]

or

a building, temporary structure or plumbing installation: [x]

In issuing this certificate the following matters are relevant –

Documents: AS/NZS 1547. 2012: On-site domestic-wastewater management.

Director of Building Control – Date Approved 1 January 2017 — *Building Act 2016* - Approved Form No. 55

Relevant calculations:

References: AS/NZS 1547.2012: Onsite Domestic Wastewater Management.

Directors Guidelines for on-site wastewater management systems

Substance of Certificate: (what it is that is being certified)

Site & soil evaluation and design report – Improvements to on-site wastewater management system at 2 Old Coach Road, Cambridge, TAS 7170, by Richard Mason, Onsite Assessments Tas, dated 31/05/2025.

Scope and/or Limitations

I certify the matters described in this certificate.

Qualified person:

Signed:	*Certificate No:*	*Date:*
	n/a	31/05/2025

Appendix 10 – Form 35 (R Mason)

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

Form **35**

To: Dean Smith (Owner name)
2 Old Coach Road (Address)
Cambridge 7170 (Suburb/postcode)

Designer details:

Name: Richard Mason
Category: Hydraulic Restricted
Business name: Onsite Assessments Tas
Phone No: 0416 589 309
Business address: 20 Adelong Drive
Kingston 7050
Fax No:
Licence No: CC6057T
Email address: richardmason@iprimus.com.au

Details of the proposed work:

Owner/Applicant: Dean Smith
Designer's project reference No.: n/a
Address: 2 Old Coach Road
C/T No: 123192/1
Cambridge 7170

Type of work: Building work ☐ Plumbing work ☒ *(X all applicable)*

Description of work:

On site wastewater management system

Description of the Design Work (Scope, limitations or exclusions): *(X all applicable certificates)*

Certificate Type:	Certificate	Responsible Practitioner
	✓ Hydraulic design	Building Services Designer

Deemed-to-Satisfy: ✓ Performance Solution: ☐ *(X the appropriate box)*

Other details:

Septic tanks, pumpwell and land application area sizing and location.

Combined deemed to satisfy and performance solution as per NCC 2022 Vol 3 A2 4

Performance solution for AES-38-SPD independently certified by S. Dennis, Civil Engineer

Design documents provided:

Director of Building Control - date approved: 2 August 2017 — *Building Act 2016* - Approved Form No 35

The following documents are provided with this Certificate –

Document description:

Drawing numbers: Appendix 4	Prepared by: Richard Mason	Date: 31/05/2025
Schedules:	Prepared by:	Date:
Specifications: Appendix 5	Prepared by: Richard Mason	Date: 31/05/2025
Computations: Page 5-7	Prepared by: Richard Mason	Date: 31/05/2025
Performance solution proposals:	Prepared by:	Date:
Test reports:	Prepared by:	Date:

Standards, codes or guidelines relied on in design process:

AS/NZS1547.2012 On site domestic waste water management

National Construction Code 2022 Vol 3

Director's Guidelines for On-site Wastewater Management Systems, Director of Building Control (Tasmania), 2017.

Any other relevant documentation:

Advanced Enviro Septic Design & Installation Manual, Advanced Enviro-Septic Installation Instructions and Home Owner's Manual; all by Chankar Environmental Pty Ltd, 62 Rene Street, Noosaville QLD 4566

CBOS Certificate of accreditation: DOC/24/92888 – AES-38-SPD

Site & soil evaluation and design report – Improvements to on-site wastewater management system at 2 Old Coach Road, Cambridge, TAS 7170, by Richard Mason, Onsite Assessments Tas, dated 31/05/2025.

Form 55, dated 31/05/2025, for Site & Soil Evaluation etc Report

Attribution as designer:

I, **Richard Mason** am responsible for the design of that part of the work as described in this certificate.

The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the *Building Act 2016* and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act;

This certificate confirms compliance and is evidence of suitability of this design with the requirements of the National Construction Code.

	Name: (print)	*Signed*	*Date*
Designer:	Richard Mason		30/05/2025
Licence No:	CC6157T		

Assessment of Certifiable Works: (TasWater)

Note: single residential dwellings and outbuildings on a lot with an existing sewer connection are not considered to increase demand and are not certifiable.

If you cannot check ALL of these boxes, LEAVE THIS SECTION BLANK.

TasWater must then be contacted to determine if the proposed works are Certifiable Works.

I confirm that the proposed works are not Certifiable Works, in accordance with the Guidelines for TasWater CCW Assessments, by virtue that all of the following are satisfied:

- [x] The works will not increase the demand for water supplied by TasWater
- [x] The works will not increase or decrease the amount of sewage or toxins that is to be removed by, or discharged into, TasWater's sewerage infrastructure
- [x] The works will not require a new connection, or a modification to an existing connection, to be made to TasWater's infrastructure
- [x] The works will not damage or interfere with TasWater's works
- [x] The works will not adversely affect TasWater's operations
- [x] The work are not within 2m of TasWater's infrastructure and are outside any TasWater easement
- [x] I have checked the LISTMap to confirm the location of TasWater infrastructure
- [ ] If the property is connected to TasWater's water system, a water meter is in place, or has been applied for to TasWater.

Certification:

I .....Richard Mason..... being responsible for the proposed work, am satisfied that the works described above are not Certifiable Works, as defined within the *Water and Sewerage Industry Act 2008*, that I have answered the above questions with all due diligence and have read and understood the Guidelines for TasWater CCW Assessments.

Note: the Guidelines for TasWater Certification of Certifiable Works Assessments are available at: www.taswater.com.au

	Name: (print)	*Signed*	*Date*
Designer:	Richard Mason		30/05/2025

Appendix 11 - Form 35 (Steve Dennis)

CERTIFICATE OF THE RESPONSIBLE DESIGNER

Section 94
Section 106
Section 129
Section 155

Form **35**

To: Dean Smith (Owner name)
2 Old Coach Road (Address)
Cambridge 7170 (Suburb/postcode)

Designer details:

Name: Stephen John Dennis
Category: Civil Engineer
Business name:
Phone No: 07 5474 4055
Business address: 4/100 Rene Street
Noosaville 4566
Fax No:
Licence No: 373083211
Email address: steve@enviro-septic.com.au

Details of the proposed work:

Owner/Applicant: Dean Smith
Designer's project reference No.:
Address: 2 Old Coach Road
Lot No: 123192/1
Cambridge 7170

Type of work: Building work ☐ Plumbing work ☒ (X all applicable)

Description of work:

Onsite wastewater management system

Description of the Design Work (Scope, limitations or exclusions): (X all applicable certificates)

Certificate Type:	Certificate	Responsible Practitioner
	✓ Hydraulic design	Civil Engineer
	☐ Other (specify)	

Deemed-to-Satisfy: ☐ Performance Solution: ✓ (X the appropriate box)

Other details:
Performance solution, consistent with NCC 2022 Vol 3 A2G2.

Amendment to configuration and sizing of standard 1200L/day AES-38-SPD to 1225L/day average loading, 1555L/day (fortnightly) peak loading.

Director of Building Control - date approved: 2 August 2017 — *Building Act 2016* - Approved Form No 35

Design documents provided:

The following documents are provided with this Certificate –

Document description:

Drawing numbers: Appendix 4	Prepared by: Richard Mason	Date: 31/05/2025
Schedules:	Prepared by: Richard Mason	Date:
Specifications: Appendix 5	Prepared by: Richard Mason	Date: 31/05/2025
Computations: pages 5-7 & 41	Prepared by: Richard Mason	Date: 31/05/2025
Performance solution proposals: "AES TASMANIA NCC PERFORMANCE SOLUTION"	Prepared by: Stephen Dennis	Date: 16/12/2024
Test reports:	Prepared by:	Date:

Standards, codes or guidelines relied on in design process:

AS/NZS 1547.2012 - Onsite domestic wastewater management

Director's Guidelines for Onsite Wastewater Management

Any other relevant documentation:

Advanced Enviro Septic Design & Installation Manual, Advanced Enviro-Septic Installation Instructions and Home Owner's Manual; all by Chankar Environmental Pty Ltd, 62 Rene Street, Noosaville QLD 4566

CBOS Certificate of accreditation: DOC/24/92888 – AES-38-SPD

Site & soil evaluation and design report – Improvements to on-site wastewater management system at 2 Old Coach Road, Cambridge, TAS 7170, by Richard Mason, Onsite Assessments Tas, dated 31/05/2025.

Form 55, dated 31/05/2025, for Site & Soil Evaluation etc Report

Attribution as designer:

I Stephen Dennis am responsible for the design of that part of the work as described in this certificate;

The documentation relating to the design includes sufficient information for the assessment of the work in accordance with the *Building Act 2016* and sufficient detail for the builder or plumber to carry out the work in accordance with the documents and the Act;

This certificate confirms compliance and is evidence of suitability of this design with the requirements of the National Construction Code.

	Name: (print)	*Signed*	*Date*
Designer:	Stephen Dennis	Steve Dennis Digitally signed by Steve Dennis Date: 2025.06.02 10:23:07 +09'30'	31/05/2025
Licence No:	373083211		

Assessment of Certifiable Works: (TasWater)

Note: single residential dwellings and outbuildings on a lot with an existing sewer connection are not considered to increase demand and are not certifiable.

If you cannot check ALL of these boxes, LEAVE THIS SECTION BLANK.

TasWater must then be contacted to determine if the proposed works are Certifiable Works.

I confirm that the proposed works are not Certifiable Works, in accordance with the Guidelines for TasWater CCW Assessments, by virtue that all of the following are satisfied:

- [x] The works will not increase the demand for water supplied by TasWater
- [x] The works will not increase or decrease the amount of sewage or toxins that is to be removed by, or discharged into, TasWater's sewerage infrastructure
- [x] The works will not require a new connection, or a modification to an existing connection, to be made to TasWater's infrastructure
- [x] The works will not damage or interfere with TasWater's works
- [x] The works will not adversely affect TasWater's operations
- [x] The work are not within 2m of TasWater's infrastructure and are outside any TasWater easement
- [x] I have checked the LISTmap to confirm the location of TasWater infrastructure
- [ ] If the property is connected to TasWater's water system, a water meter is in place, or has been applied for to TasWater.

Certification:

I .....Stephen Dennis..... being responsible for the proposed work, am satisfied that the works described above are not Certifiable Works, as defined within the *Water and Sewerage Industry Act 2008,* that I have answered the above questions with all due diligence and have read and understood the Guidelines for TasWater CCW Assessments.

Note: the Guidelines for TasWater Certification of Certifiable Works Assessments are available at: www.taswater.com.au

	Name: (print)	*Signed*	*Date*
Designer:	Stephen Dennis	Steve Dennis Digitally signed by Steve Dennis Date: 2025.06.02 10:23:24 +09'30'	31/05/2025