Meander Valley Council
Working Together

PLANNING NOTICE

An application has been received for a Permit under s.57 of the Land Use Planning Approvals Act 1993:

APPLICANT:	**RMCG - obo - TasWater - PA\26\0112**
PROPERTY ADDRESS:	**429 Birralee Road & 446 Birralee Road WESTBURY (CTs: 184031/1, 184032/1 & 184033/1)**
DEVELOPMENT:	**Resource development (biosolids spreading) - traffic generation, waterway, attenuated activity.**

The application can be inspected until **Monday, 22 December 2025**, at www.meander.tas.gov.au or at the Council Office, 26 Lyall Street, Westbury (during normal office hours).

Written representations may be made during this time addressed to the General Manager, PO Box 102, Westbury 7303, or by email to planning@mvc.tas.gov.au. Please include a contact phone number. Please note any representations lodged will be available for public viewing.

If you have any questions about this application please do not hesitate to contact Council's Planning Department on 6393 5320.

Dated at Westbury on 6 December 2025.

Jonathan Harmey
GENERAL MANAGER

APPLICATION FORM

PLANNING PERMIT

Land Use Planning and Approvals Act 1993

- Application form & details MUST be completed **IN FULL**.
- Incomplete forms will not be accepted and may delay processing and issue of any Permits.

OFFICE USE ONLY

Property No: _____ **Assessment No:** ____ - ____ - ____

DA _____ **PA** _____ **PC** _____

- Is your application the result of an illegal building work? ☐ Yes ☑ No
- Have you already received a Planning Review for this proposal? ☑ Yes ☐ No
- Is a new vehicle access or crossover required? ☐ Yes ☑ No

Indicate by ✓ box

PROPERTY DETAILS:

Address: Lot 1, 429 and 446 Birralee Rd

Certificate of Title: 184031/1, 184032/1, 184033/1

Suburb: Westbury 7303

Lot No:

Land area: 637.5ha *m² / ha*

Present use of land/building: Agricultural Use *(vacant, residential, rural, industrial, commercial or forestry)*

- Does the application involve Crown Land or Private access via a Crown Access Licence: ☑ Yes ☐ No
- Heritage Listed Property: ☐ Yes ☑ No

DETAILS OF USE OR DEVELOPMENT:

Indicate by ✓ box

☐ Building work ☐ Change of use ☐ Subdivision ☐ Demolition

☐ Forestry ☑ Other

Total cost of development *(inclusive of GST):* $ NA *Includes total cost of building work, landscaping, road works and infrastructure*

Description of work: Application of biosolids to land for beneficial reuse. See Biosolids Management Plan for full details.

Use of building: NA (main use of proposed building – dwelling, garage, farm building, factory, office, shop)

New floor area: NA New building height: NA

Materials: External walls: NA Colour:

Roof cladding: NA Colour:

RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
184031	1
EDITION	DATE OF ISSUE
2	19-Aug-2025

SEARCH DATE : 11-Nov-2025
SEARCH TIME : 12.27 PM

DESCRIPTION OF LAND

Parish of SELBORNE Land District of DEVON
Lot 1 on Plan 184031
Derivation : Part of 2560 Acres Granted to James Fenner
Prior CT 162614/1

SCHEDULE 1

M714857 TRANSFER to EGMONT LAND PTY LTD Registered 19-Aug-2025 at 12.01 PM

SCHEDULE 2

Reservations and conditions in the Crown Grant if any
C282565 PRIVATE TIMBER RESERVE pursuant to Section 15(1) of the Forest Practices Act 1985 over portion of the said land within described Registered 10-Jun-2003 at noon
C956838 ADHESION ORDER under Section 110 of the Local Government (Building and Miscellaneous Provisions) Act 1993 Registered 22-Apr-2010 at noon
E79357 CAVEAT by The Trust Company (Australia) Limited against part of the land as described therein Registered 09-Jul-2018 at noon
N159176 MORTGAGE to Henry William Stuart Greenhill and Virginia Greenhill Registered 19-Aug-2025 at 12.02 PM

UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

OWNER: BRUCE LESLIE ARCHER
KATRINA GRACE ARCHER

FOLIO REFERENCE: 162614/1

GRANTEE:
Part of 2560 acres granted to James Fenner.

PLAN OF TITLE

LOCATION: LAND DISTRICT OF DEVON
PARISH OF SELBORNE

CONVERTED BY PLAN No. P162614

COMPILED BY: M.A.C. Lester of Devonport

NOT TO SCALE LENGTHS IN METRES

REGISTERED NUMBER
P184031

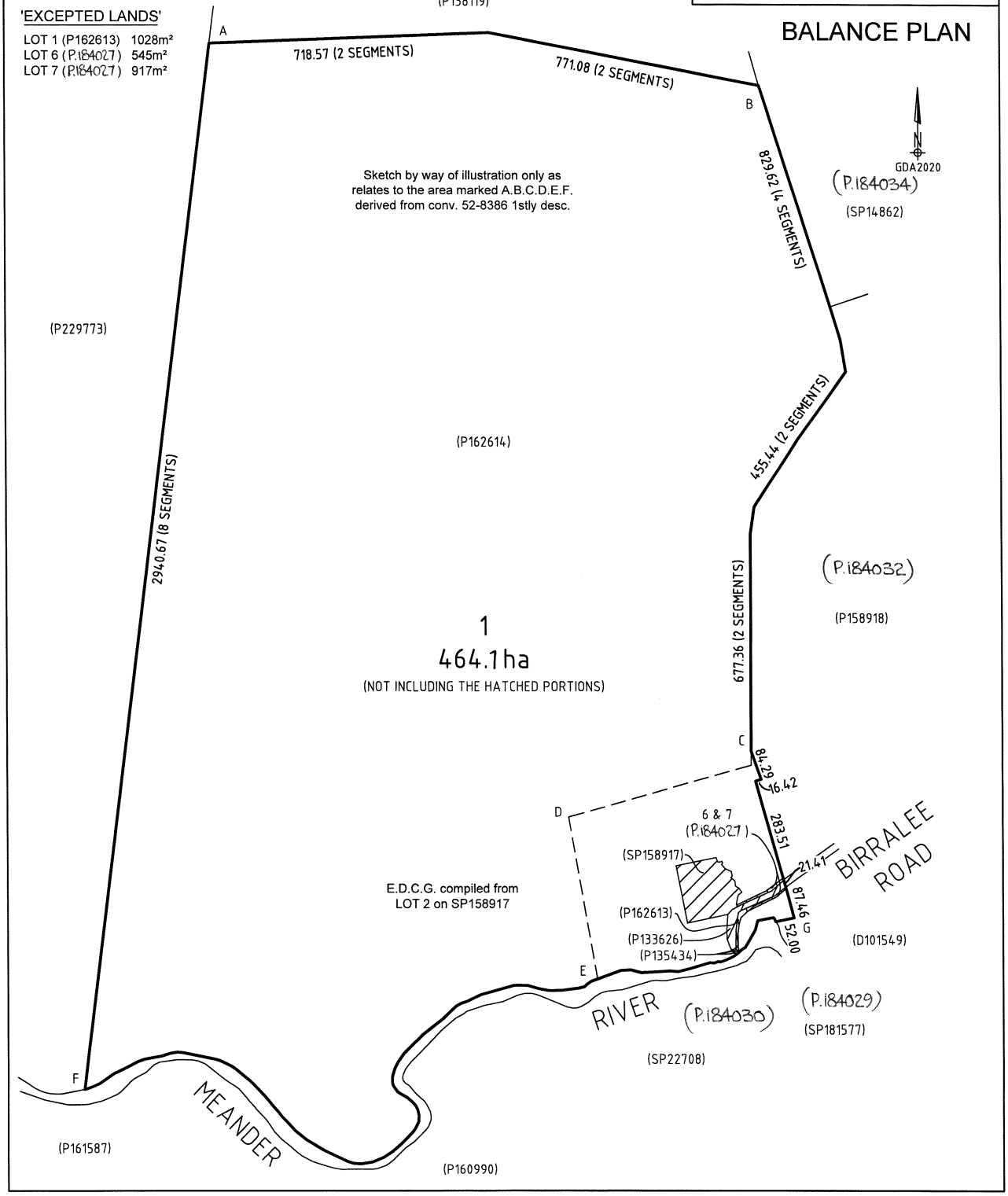
APPROVED 26 JUL 2024
Recorder of Titles

ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN

SKETCH BY WAY OF ILLUSTRATION ONLY

'EXCEPTED LANDS'
LOT 1 (P162613) 1028m²
LOT 6 (P184027) 545m²
LOT 7 (P184027) 917m²

BALANCE PLAN



RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
184032	1
EDITION	DATE OF ISSUE
2	19-Aug-2025

SEARCH DATE : 11-Nov-2025
SEARCH TIME : 12.28 PM

DESCRIPTION OF LAND

Parish of SELBORNE Land District of DEVON
Lot 1 on Plan 184032
Derivation : Part of 2560 Acres Granted to James Fenner
Prior CT 158918/1

SCHEDULE 1

M714857 TRANSFER to EGMONT LAND PTY LTD Registered 19-Aug-2025 at 12.01 PM

SCHEDULE 2

Reservations and conditions in the Crown Grant if any
N159176 MORTGAGE to Henry William Stuart Greenhill and Virginia Greenhill Registered 19-Aug-2025 at 12.02 PM

UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

OWNER: BRUCE LESLIE ARCHER
KATRINA GRACE ARCHER

FOLIO REFERENCE: 158918/1

GRANTEE:
Part of 2560 acres granted to James Fenner.

PLAN OF TITLE

LOCATION: LAND DISTRICT OF DEVON
PARISH OF SELBORNE

FIRST SURVEY PLAN No: 100/22 DO

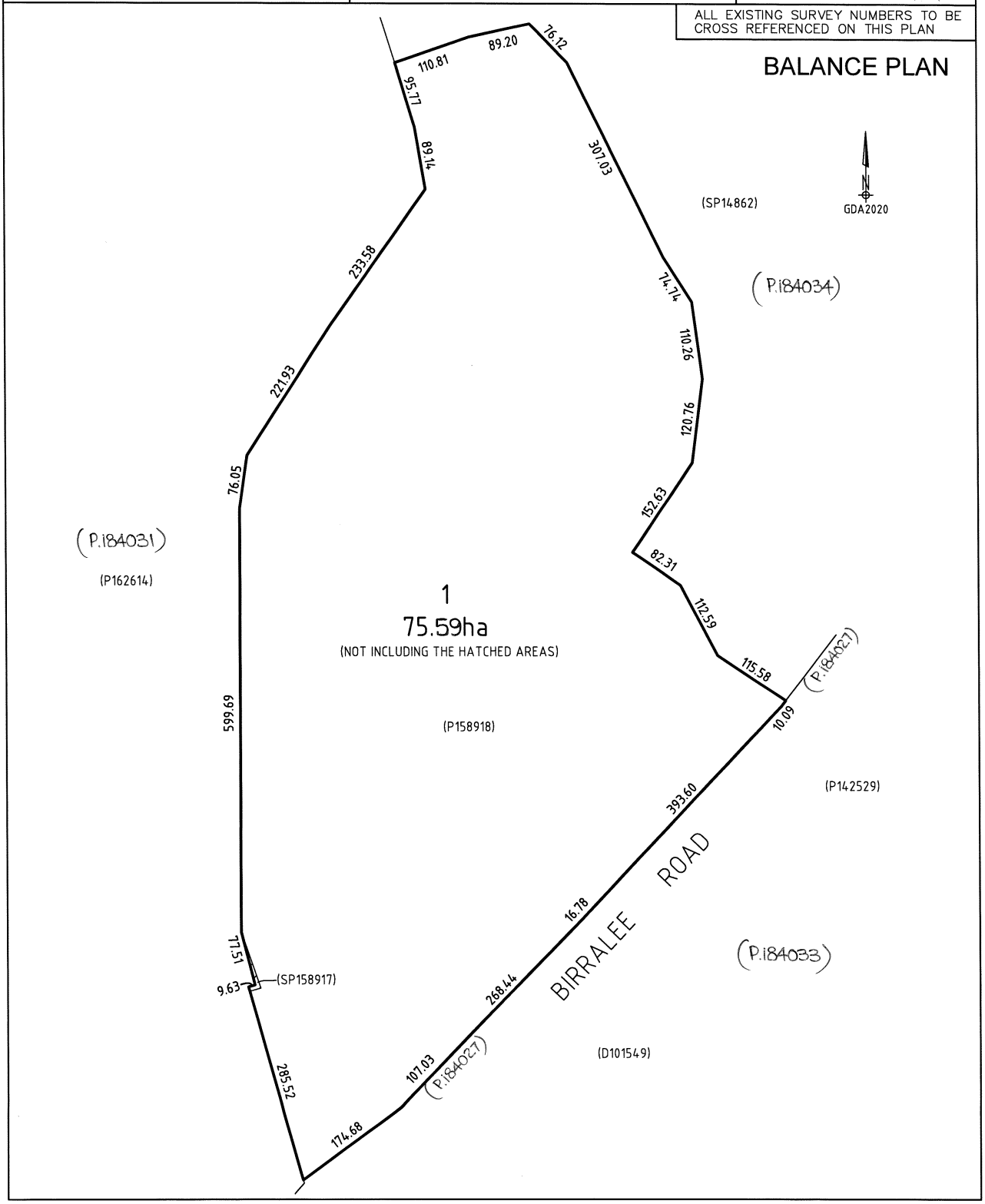
COMPILED BY: M.A.C. Lester of Devonport

SCALE 1:5000 LENGTHS IN METRES

REGISTERED NUMBER
P184032

APPROVED
26 JUL 2024
Recorder of Titles

ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN



RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
184033	1
EDITION	DATE OF ISSUE
1	16-Sep-2024

SEARCH DATE : 11-Nov-2025
SEARCH TIME : 12.28 PM

DESCRIPTION OF LAND

Parish of SELBORNE Land District of DEVON
Lot 1 on Plan 184033
Derivation : Part of 2560 Acres Granted to James Fenner
Prior CT 101549/1

SCHEDULE 1

M302787 TRANSFER to RICHIE JAMES FELLOWS Registered 18-Oct-2010 at 12.01 PM

SCHEDULE 2

Reservations and conditions in the Crown Grant if any

UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

OWNER: RICHIE JAMES FELLOWS

FOLIO REFERENCE: 101549/1

GRANTEE:
Part of 2560 acres granted to James Fenner.

PLAN OF TITLE

LOCATION: LAND DISTRICT OF DEVON
PARISH OF SELBORNE

FIRST SURVEY PLAN No: 100/24 DO

COMPILED BY: M.A.C. Lester of Devonport

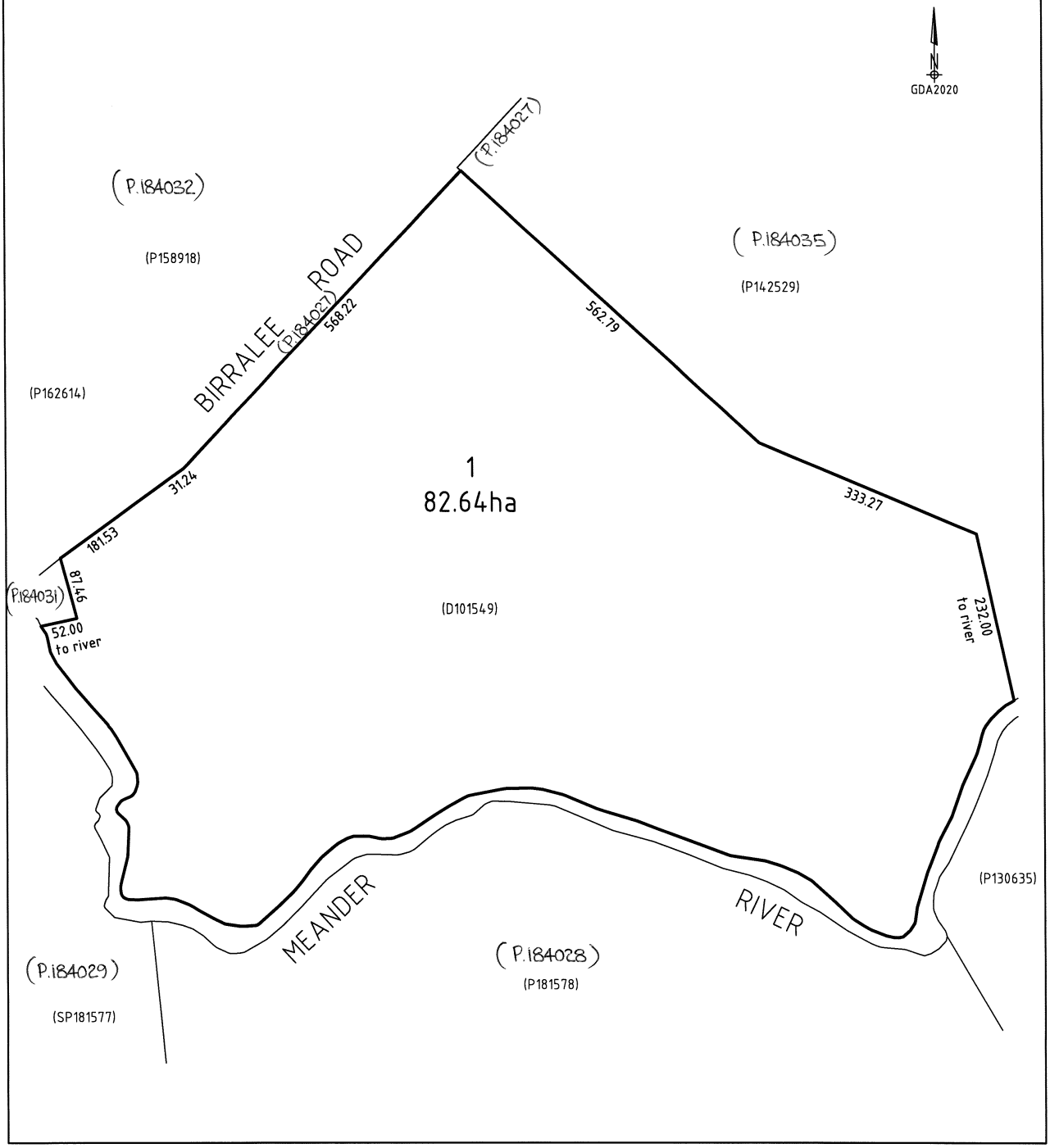
SCALE 1:5000 LENGTHS IN METRES

REGISTERED NUMBER
P184033

APPROVED
26 JUL 2024
Recorder of Titles

ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN

BALANCE PLAN



RMCG

NOVEMBER 2025

Biosolids Management Plan: Egmont

Final Report

Version 1.0

TasWater

Level 2, 102-104 Cameron St, Launceston Tasmania 7250
rmcg.com.au — ABN 73 613 135 247 — RM Consulting Group Pty Ltd
Victoria — Tasmania — NSW — Queensland

Certified B Corporation

Table of Contents

ACKNOWLEDGEMENT OF COUNTRY

Tasmania is Aboriginal land. We acknowledge the palawa and pakana, the Tasmanian Aboriginal people, as the Traditional Owners and continuing custodians of the lands, seas and waterways of lutruwita, Tasmania on which this project has been conducted. We recognise their continuing connection to land, waters and culture and pay our respects to their Elders past and present, and we acknowledge emerging leaders. Moreover, we express gratitude for the knowledge and insight that Traditional Owners and other Aboriginal and Torres Strait Islander people contribute to our shared work in Australia.

We pay respects to all Aboriginal and Torres Strait Islander communities. We recognise that Australia was founded on the genocide and dispossession of First Nations people and acknowledge that sovereignty was not ceded in this country. We embrace the spirit of reconciliation, working towards self-determination, equity of outcomes, and an equal voice for Australia's First People.

Executive summary

RMCG have been engaged by TasWater to assist them with the development of a Biosolids Management Plan (BMP) to support the beneficial reuse of biosolids at 'Egmont', Birralee Rd, Westbury. This BMP assesses and quantifies the biosolids TasWater are proposing to spread on the property. It identifies application rates as well as controls to mitigate potential environmental impacts and impacts on the nearby community. All proposed measures are in line with the requirements of the *Tasmanian Biosolids Reuse Guidelines 2020* (TBRG).

The proposed biosolids are sourced from TasWater's sewage treatment plant (STP) at Westbury, Lagoon 1. Biosolids from the Westbury STP, Lagoon 1, will be spread in a sludge form. This is due to the lack of an available drying area at the STP for these biosolids. Based on surveys conducted by TasWater, there are approximately 8,800 m^3 of biosolids to be removed from Lagoon 1. To determine the appropriate application rates both the Nitrogen Limiting Application Rate (NLAR) and the Contaminant Limiting Application Rate (CLAR) have been calculated as per the TBRG. For the NLAR the identified application rate was calculated at 50% of the identified NLAR.

TasWater have adopted the requirements from the PFAS National Environmental Management Plan (NEMP 3.0) that was released in early 2025. As part of the NEMP 3.0 threshold concentrations for common PFAS chemicals in biosolids and the maximum allowable concentrations in receiving soil have been identified and have been assessed as part of the BMP. Further soils properties (such as phosphorus and salinity) were also considered when determining the application rate for each zone (paddock).

Table ES-1 identifies the zones (paddock) to be utilised for biosolids application, the area available, application rates, total amount of biosolids to be applied and any notes and/or site-specific setbacks. There is sufficient land available to spread all biosolids from Lagoon 1.

Table ES-1: Summary of application rates and available area within identified zones at the property

ZONE	APPLICATION AREA (HA)	APPLICATION RATES (WET T/HA)	TOTAL BIOSOLIDS (T)	NOTES/SETBACKS
Deer	12.6	160	1785	▪ 50 m setback from property boundary ▪ Avoid sloped areas >15%
Fellows	22	100	1080	▪ 50 m setback from road ▪ 50 m setback from property boundary ▪ 20 m setback from small dam ▪ 50 m setback from shed ▪ The southern section can on be spread with biosolids if piles of dirt are removed
Frog Hollows & Camp	16.7	160	1980	▪ 50 m setback from property boundary ▪ Avoid native vegetation ▪ Avoid wet area at northern end of Frog Hollow
Missile	8	160	345	▪ 50 m setback from road ▪ 50 m setback from property boundary ▪ 20 m setback from dams and avoid wet areas near dams

ZONE	APPLICATION AREA (HA)	APPLICATION RATES (WET T/HA)	TOTAL BIOSOLIDS (T)	NOTES/SETBACKS
Plover Hill & Bub	17.8	160	1830	▪ 20 m setback from drainage line to the wet and associated dam ▪ Avoid sloped areas >15% ▪ 10 m setback from drain in northern section ▪ 50 m setback from Brushy Rivulet ▪ 50 m setback from property boundary
Well & Gap	16.3	160	1710	▪ 20 m setback from western drainage line ▪ 10 m setback from eastern drainage line
Total	**93.4**		**13,624**	

Because of the proposed spreading method, i.e. using a liquid with low dry matter, higher application rates than the EPA's Approved Management Method (AMM) for biosolids application are proposed. The higher application rates will not apply a higher rate of nutrients, just more water. Still, a higher rate means the activity will require a Regulation 21 approval from the EPA Tasmania as well as Council approval. The activity is classed as a Level 1 activity under Environmental Management and Pollution Control Act 1994 (EMPCA).

All spreading activities must comply with the management actions identified in Section 7 of this report. Actions have been identified to manage:

- Odour
- Buffer zones and physical restrictions
- Transport and delivery of biosolids
- Biosolids application method
- Biosolids stockpiling and application controls
- Biosecurity measures including withholding periods for livestock.
- Record keeping.

1 Introduction

1.1 OVERVIEW

RMCG have been engaged by TasWater to assist them with the development of a Biosolids Management Plan (BMP) to support the beneficial reuse of biosolids at 'Egmont', Birralee Rd, Westbury. This BMP assesses and quantifies the biosolids TasWater are proposing to spread on the property. It identifies application rates as well as controls to mitigate potential environmental impacts and impacts on the nearby community. All proposed measures are in line with the requirements of the *Tasmanian Biosolids Reuse Guidelines 2020* (TBRG).

The proposed biosolids are sourced from TasWater's sewage treatment plant (STP) at Westbury (Lagoon 1). Biosolids from the Westbury STP, Lagoon 1, will be spread in a sludge form. This is due to a lack of an available drying area at the STP for these biosolids. Based on surveys conducted by TasWater, there is estimated to be approximately 8,800m^3 of biosolids to be removed from Lagoon 1. Because of the proposed spreading method, higher application rates than the EPA's Approved Management Method (AMM) for biosolids application are proposed, this means the activity will require a Regulation 21 approval from the EPA Tasmania.

TasWater have adopted the requirements from the PFAS National Environmental Management Plan (NEMP 3.0) that was released in early 2025. As part of the NEMP 3.0 threshold concentrations for common PFAS chemicals in biosolids and the maximum allowable concentrations in receiving soil have been identified and have been assessed as part of the BMP.

To determine the appropriate application rates both the Nitrogen Limiting Application Rate (NLAR) and the Contaminant Limiting Application Rate (CLAR) have been calculated. For the NLAR, the identified application rate will be 50% of the identified NLAR. Application of biosolids must comply with Sections 10, 11, & 12 of the TBRG. Furthermore, application rates must align with the requirements set out in Support Document 1 of the NEMP 3.0.

2 Property details

2.1 OVERVIEW

Egmont is located to the northwest of Westbury and is comprised of land both owned and leased by Egmont on either side of the Birralee Road.

Egmont has a total area of approximately 638 ha. The property is managed as a grazing enterprise with large areas of native vegetation. Biosolids are only proposed to be spread on selected pasture areas. In total, there are three titles associated with the enterprise, all of which are proposed to potentially receive biosolids. Property title information is provided inTable 2-1. A desktop assessment using LISTmap, in conjunction with a site visit and consultation with the landholder, has identified up to 99.2 ha to qualify for receiving biosolids. The assessment has considered the site's characteristics and the required TBRG buffers (see Section 7.2).

There is no publicly available soil mapping for the property. Published Land Capability[1] maps the areas to potentially receive biosolids as primarily Class 4 land with small areas of Class 5 land. Class 4 land is described as land well suited to grazing, but which is limited to occasional cropping or a very restricted range of crops. Class 5 land is described as land unsuited to cropping and with slight to moderate limitations to pastoral use. There is no mapped 'prime agricultural land' (Class 1-3) on the property. Mean annual rainfall for the area is 939.8 mm[2].

2.2 TITLE INFORMATION AND APPLICATION AREAS

Table 2-1 provides title information for the property. This includes zoning as well as identification of the titles that are proposed to receive biosolids and those that are not. It also identifies which titles have an existing dwelling. Maps showing property titles and proposed application areas are in Appendix 1.

Table 2-1: Title information

PROPERTY	TITLE REFERENCE	ZONING	AREA (ha)	DWELLING ONSITE	DWELLING WITHIN 100 M OF SPREADING SITE	PROPOSED TO RECEIVE BIOSOLIDS
Egmont	184031/1	Agriculture	477.0	Yes	No	Yes
	184032/1	Agriculture	75.9	No	No	Yes
	184033/1 (leased land)	Agriculture	84.6	No	No	Yes

[1] Available on LISTmap

[2] Deloraine (ATHOL), BoM Station number (091000), data from 1884-2024

3 Statutory requirements

This report and associated activities follow The *Tasmanian Biosolids Reuse Guidelines 2020* (TBRG) for biosolids reuse to ensure compliance with the *Environmental Management and Pollution Control Act 1994* (EMPCA). Under EMPCA, environmentally polluting activities, such as spreading of biosolids, are divided into categories and the responsibility for the regulation of activities is split between EPA Tasmania and Local Government. Biosolids reuse activities are either:

- A "permitted use". Under some Local Government Planning Schemes biosolids land application reuse activities may be considered a "permitted use" (agricultural right) and therefore may not require a permit under LUPAA. Local Government has an obligation, even in those cases, which do not require a permit, to ensure pollution does not arise as a consequence of these activities.
- A "Level 1" Activity under EMPCA. That is, an activity which may cause environmental harm and in respect of which a permit under the Land Use Planning and Approvals Act 1993 (LUPAA) is required but does not include a Level 2 or a Level 3 activity. Local Government are the regulatory authority of Level 1 activities. It is the EPA's position, that all spreading of biosolids that are Class 1 or Class 2 biosolids (see Section 4) is considered a Level 1 activity[3].

This plan proposes an application rate of greater than 50 wet tonnes per hectare. As the proposed application rates exceed the 'low rate' method outlined in the *Approved Management Method 2020* (AMM) (up to 50 wet tonnes per hectare), Environmental Approval is required to be obtained from the Director of the EPA under Regulation 21 of the *Waste Management Regulations 2020*, prior to any spreading as well as any approvals potentially required by Council.

3.1 LOCAL GOVERNMENT ROLES & RESPONSIBILITY UNDER THE TBRG

Under the TBRG (Section 5.5), Local Government is responsible for:

- Administering EMPCA in regard to activities that are not Level 2 or Level 3 activities, including the assessment and permitting as necessary and regulation of development proposals under LUPAA
- Responding to any incidents resulting from biosolids activities with the potential to cause environmental nuisance and / or affect public health
- Regulating 'Level 1' wastewater treatment plants
- Providing advice on applying these Guidelines.

The responsible entity (TasWater) for the end use of the Class 2 biosolids must ensure that they have obtained all required approvals before proceeding. This document (BMP) is to be provided to Council and the EPA to assist with the assessment of the activity. The activity shall not proceed until the Director of the EPA and Meander Valley Council provides an approval.

3.1.1 BIOSOLIDS REUSE AND PLANNING SCHEME ZONE

A key requirement of using land for agriculture is the replacement of nutrients removed by biomass removal (grazing, crop harvest) and the maintenance of soil conditions. Hence, the application of biosolids is consistent with the definition of Agricultural Use (Table 3.1 of the Planning Scheme). Agricultural Use is one of many activities that falls into the category of Resource Development (Table 6.2 of the Planning Scheme).

[3] Per comms with EPA Tasmania, dated 18 March 2025.

Resource Development may have a No Permit Required (NPR) qualification depending on the zoning of the land where the Resource Development activity is taking place (see Table 3-1).

Table 3-1: Resource development qualification per zone – examples

ZONE	RESOURCE DEVELOPMENT QUALIFICATION
8.0 General Residential	Prohibited
11.0 Rural Living	No permit required if the Resource Development activity is grazing
18.0 Light Industrial	Prohibited
20.0 Rural	No permit required
21.0 Agriculture	No permit required if the activity does not damage the soil profile or preclude the soil from future use as a growth medium
22.0 Landscape Conservation	Discretionary
30.0 Future Urban Zone	Permitted

3.1.2 BIOSOLIDS REUSE & PLANNING SCHEME CODES

Further to Planning Zone requirements for Resource Development activities, there are also a number of Codes within the Planning Scheme that require consideration. The relevant Codes for the application of biosolids to land are detailed below in Table 3-2, as are mitigation measures to ensure the activity will be compliant with each Code's requirements.

Table 3-2: Planning scheme code compliance

CODE	CODE REQUIREMENT	COMPLIANCE MEASURE
C1 Signage	Biosolids Reuse requires erection of Regulatory Signage (as per definition in Table C1.3 of the Planning Scheme).	Regulatory signs are exempt from specific requirements of the Code, as per Table C1.4. It is noted that areas that will receive biosolids have suitable signage as per Section 11 of the TBRG. Proposed signage is further detailed in Section 7.5.2 of this document.
C3 Road & Railway Assets	For vehicles that are longer than 5.5m movements must not increase on an annual basis by more than: ▪ 10%	350 truck movements one way over a 5-to-6-week period will be required to move all biosolids to the site. Up to 14 truck movements will be required per day. There are three access points, two on the western side of the road and one on the eastern side of the road. The most appropriate access will be used for accessing the relevant paddocks. The project will increase the annual movements by more than 10% on a State Government managed road (Birralee Rd). Hence a permit from State Growth will be sought. It is noted that while the farm typically operates as a grazing enterprise that does not require large levels of vehicle movement, the property has good soils and access to irrigation water. This means that it would not be unrealistic for the land manager to choose to plant a cash crop such as potatoes and/or carrots in any given year. This would be considered part of the resource development and would not require planning approval. A potato or carrot crop can potentially require up to 5 truck movements per hectare during harvest. Hence, if 70 ha was planted out in potatoes and/or carrots, then a similar level of truck movement would be required as to the biosolids application.

CODE	CODE REQUIREMENT	COMPLIANCE MEASURE
C7 Natural Assets	Biosolid reuse must minimise impacts on water quality, native riparian vegetation, river condition, and ecological function of watercourses.	Managed via compliance with the TBRG and additional measures identified in this Biosolids Management Plan (Section 7). It is noted that all titles that are proposed to receive biosolids are zoned Agriculture, hence the Natural Assets Code generally does not apply, except for Waterway and coastal Protection Areas. Biosolids application will generally not occur within the areas mapped as Waterway and Coastal Protections Areas of the Natural Assets Code where there are existing waterways. There is one application zone (Well & Gap) where there are pastured areas mapped by the Code, see Figure 3-1 and Figure 3-2. The site visit showed that the area is managed as pasture. There are two defined drains in this area, which are ephemeral and man-made. Setbacks in line with the Code will be adhered to for these drains. There is no riparian vegetation in the area. The pasture area is utilised as part of normal farming operations including but not limited to; fertiliser application, liming, pasture renovation, pesticide and herbicide spraying, stock movement and general farm vehicle movement.
C9 Attenuation	Biosolids application is listed as an activity likely to cause emissions under Table C9.1 of the Code, which requires a 100m buffer from sensitive uses. Hence, spreading activities must comply with either the Acceptable Solutions or the Performance Criteria of C9.5.1.	Managed via compliance with the TBRG and measures identified in this Biosolids Management Plan (Section 7.2). These include a minimum buffer of 100 m from dwellings There are nearby dwellings on adjacent titles. However, none of these dwellings are within 100 of the proposed application sites. The nearest off-site dwelling is 210 m from the proposed spreading areas (see A1-1). This is two times the recommended setback area from a dwelling as identified in the TBRG.

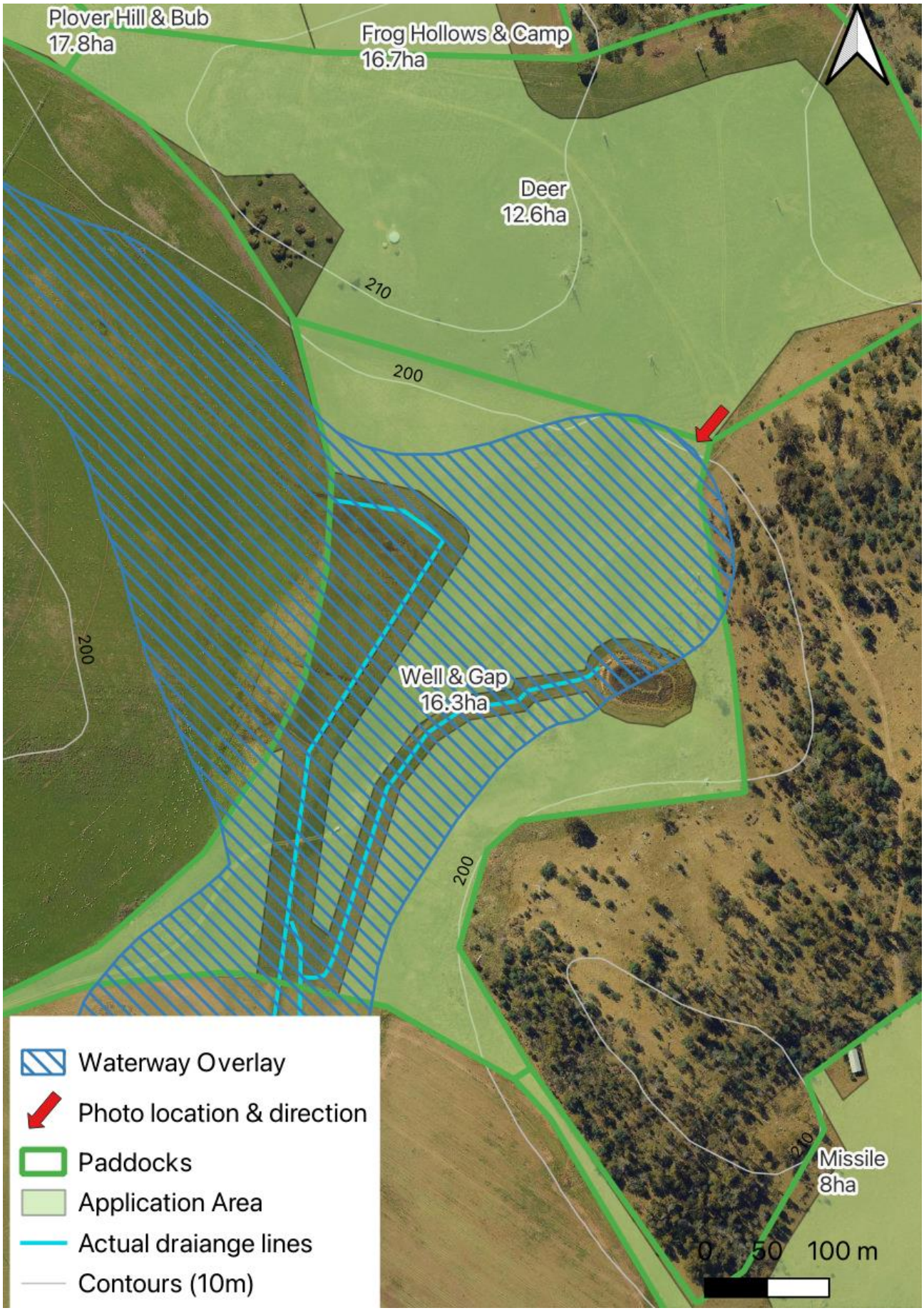


Figure 3-1: Waterway Protection Overlay compared to proposed application areas. Note the photo location and direction

Figure 3-2: Photo taken from northeastern corner of Well & Gap looking south. All land with the Waterway overlay is managed as pasture for grazing.

4 Biosolids sources & quality assessment

4.1 BIOSOLIDS SOURCES

Biosolids to be supplied to the subject property will be sourced from Lagoon 1 of the Westbury STP. Surveyed sludge volumes (Table 4-1) provided by TasWater show that 8,800 wet tonnes (or 2,113 dry tonnes) are to be removed from Lagoon 1 at the Westbury STP. If an average application rate to land of 150 wet tonnes per hectare can be achieved, then approximately 58 ha of land will be required to spread the biosolids.

Table 4-1: Westbury STP Lagoon 1 sludge characteristics

LAGOON	% SOLIDS CONTENT	WET TONNES (M^3)	DRY TONNES
1	25%	8,800	2,113

4.2 BIOSOLIDS DATA

TasWater has supplied RMCG with analytical data for the biosolids from the STP for the purposes of preparing this BMP and demonstrating a sound process of quality classification to allow reuse in accordance with the requirements of the TBRG. The data is from May 2025 and details information on nutrients, contaminants, stabilisation and solids percentages for the biosolids. Sampling of Lagoon 1 involved 16 grab subsamples collected at even points around the lagoon. Subsamples were combined into three samples for analysis.

4.3 BIOSOLIDS QUALITY CLASSIFICATION

All biosolids supplied to the subject land for direct land application must be classified (in accordance with the TBRG) as Class 2 as a minimum. Biosolids quality classification combines an assessment of:

1. Contaminant grade: the level of contamination from heavy metals or other typical biosolid contaminants; and
2. Stabilisation grade: the degree of pathogen reduction, vector attraction, and odour.

For biosolids classification to be Class 2, both stabilisation and contaminant grade must be a minimum of Grade B. Non-Grade B material requires further processing (e.g. composting) prior to application to land. See Table 4-2 for the biosolids classification system and allowable end uses.

Table 4-2: Classification of Biosolids Allowable End Uses (TBRG Table 9.1)

CLASSIFICATION	CONTAMINANT GRADE	STABILISATION GRADE	ALLOWABLE END USE	ADDITIONAL REQUIREMENTS
Class 1 biosolids	A	A	Home garden (retail sale) Urban landscaping	Labelling
Class 2 biosolids	A	B	Site rehabilitation Agriculture Forestry Composting	Demonstrate application is below NLAR. LUPPA permit may be required, contact Local Government.
	B	A		
	B	B		
Sewage sludge	A or B	Unclassified	EPA approval licensed facility (landfill and reprocessing facilities).	Sewage sludge is a Controlled Waste and therefore subject to legislated requirements.
	Unclassified	A or B		
	Unclassified	Unclassified		

4.3.1 CONTAMINANT GRADE ASSESSMENT

TasWater is required to assess biosolids contaminant grades for each STP from which biosolids are proposed to be beneficially reused on agricultural land. The contaminant grade assessment assumes that TasWater have undertaken a recent risk-based assessment and considered the testing of additional analytes. See Table 4-3 for Grade A and Grade B biosolids acceptable contaminants concentration (BACC) thresholds.

Table 4-3: Contaminant acceptance concentration threshold for biosolids (TBRG Table 7.1)

CONTAMINANT	GRADE A (mg/kg DRY WEIGHT)	GRADE B (mg/kg DRY WEIGHT)
Arsenic	20	60
Cadmium	1	20
Chromium (total)	50	300
Copper	100	2,500
Lead	150	420
Mercury	1	15
Nickel	60	270
Zinc	200	2,500

Should any analyte present with a BACC above the Grade B threshold, then biosolids from the STP are unsuitable for reuse in accordance with this BMP until the BACC becomes Grade B compliant. TasWater is required to advise all stakeholders on changes in BACC classification as soon as possible. See Table 4-4 for the BACC grading of the biosolids from Lagoon 1 of the Westbury STP that are proposed to be spread at the subject site.

Table 4-4: Biosolids adjusted contaminant concentration (BACC) in supplied results and associated contaminant grading for Lagoon 1 of Westbury STP

CONTAMINANT*	WESTBURY STP, LAGOON 1
Arsenic	2.9
Cadmium	0.4
Chromium	124.1
Copper	110.5
Lead	18.9
Mercury	0.2
Nickel	45.9
Zinc	302.4
Grade	B

**Green shading indicates the contaminant meets Grade A standard and blue indicates the contaminant meets Grade B standards.*

Biosolids from Lagoon 1 of the Westbury STP meet Grade B requirements as a minimum for BACC.

4.3.2 STABILISATION GRADE ASSESSMENT

To address health and nuisance odour risks, sewage sludge must be treated to an appropriate standard before reuse. Biosolids that have been suitably treated are considered “Stabilised”.

Stabilisation should be achieved via an approved process. In this case, to demonstrate Class B biosolids for lagoon systems, the appropriate process is anaerobic digestion at 15^{o} for >180 days (TBRG Table 8.5). Lagoon 1 has not been desludged in more than 10 years.

Stabilisation requirements fall into three categories, all of which must be met:

1. Biosolids must not exhibit a strong, offensive odour

TasWater is conducting ongoing lagoon desludging works across the state with sludges of varying ages. In no case has odour been an issue and TasWater expect that the Westbury biosolids will be no different.

2. An approved vector attraction reduction requirement must be met (TBRG Table 8.1)

Table 4-5 shows the vector attraction reduction (VAR) option used for these biosolids. TasWater, through working with the EPA, identified that the TBRG did not provide an approved VAR option for lagoon stabilised sludge. As a result, the EPA have approved an alternate testing regime for lagoon stabilised sludge to demonstrate VAR in accordance with Option 9 in Table 8.1 of the TBRG[4]. The alternative testing regime at the time of desludging must demonstrate a Volatile Solids content of not greater than 60% (assuming 90% volatile solids at the inlet) and a sludge age of >4 years to demonstrate that the VAR requirements have been met. At least seven sludge samples must be collected. See Table 4-6 below, which shows an average Volatile Solids content of 18.5%.

Table 4-5: Vector attraction reduction process

OPTION	VECTOR ATTRACTION REDUCTION OPTION	BIOSOLIDS MOST SUITED
9	Other methods demonstrating minimum re-growth potential verified by an approved testing regime	Biosolids which do not satisfy any of the other options above.

Table 4-6: Volatile solids data from Westbury STP Lagoon 1

SAMPLE	VOLATILE TOTAL SOLIDS (%)
Westbury STP Lagoon #1 - 1	12.1
Westbury STP Lagoon #1 - 3	13.2
Westbury STP Lagoon #1 - 5	11.1
Westbury STP Lagoon #1 - 9	36.6
Westbury STP Lagoon #1 - 11	11.7
Westbury STP Lagoon #1 - 13	21.2
Westbury STP Lagoon #1 - 15	23.3
Mean	**18.5**

[4] Letter from EPA to TasWater, dated 29 May 2025, Ref 24/81.007, D25-74794

3. The Pathogen reduction criteria must be achieved for the intended end use

Biosolids intended for reuse as detailed in this plan must meet the Microbiological Criteria for Stabilisation Grade B (Table 4-7). Biosolids that do not meet this criterion shall be sent to an alternative approved facility for further processing. Table 4-8 shows the stabilisation grading of the biosolids from the Westbury STP (Lagoon 1) that will be spread on the subject site.

Table 4-7: Microbial Criterion Stabilisation Grade B (from Table 8.4 of the TBRG)

MICROBIOLOGICAL CRITERIA (BASED ON DRY WEIGHT OF PRODUCT)	MONITORING REQUIREMENTS
<2,000,000 E. coli CFU (or MPN) per gram (geometric mean of at least 7 sample results).	Initial verification process

Table 4-8: Stabilisation grading of biosolids to be delivered to the farm for land application

SITE	SAMPLE TYPE	E. COLI/MPN/G	STABILISATION CLASSIFICATION
Westbury STP Lagoon #1 - 1	Grab	<100	Grade B
Westbury STP Lagoon #1 - 3	Grab	<100	Grade B
Westbury STP Lagoon #1 - 5	Grab	1090	Grade B
Westbury STP Lagoon #1 - 9	Grab	<100	Grade B
Westbury STP Lagoon #1 - 11	Grab	410	Grade B
Westbury STP Lagoon #1 - 13	Grab	750	Grade B
Westbury STP Lagoon #1 - 15	Grab	1870	Grade B
Mean		**348.7**	**Grade B**

Stabilisation grading meets Grade B requirements as per the TBRG.

4.3.3 BIOSOLIDS CLASS

Both the biosolids contamination grade and stabilisation grade of the biosolids destined for the subject site comply with Grade B requirements as a minimum. Hence, all biosolids from Lagoon 1 of the Westbury STP are considered Class 2 biosolids and are suitable for land application.

4.4 PFAS

The NEMP 3.0 sets maximum thresholds for PFAS (PFOS+PFHxS and PFOA) for restricted use biosolids (Class B biosolids). These are shown in Table 4-9. There are three identified margins of safety (MOS), with 1 being the default level used (NEMP 3.0).

Table 4-9: Criteria for PFOS+PFHxS and PFOA

CRITERIA TYPE	MARGIN OF SAFETY	PFOS+PFHXS (µg/kg)	PFOA (µg/kg)
Biosolids threshold restricted use (Class B)	5	6.2	16
	2	15	40
	1	31	81

Table 4-10 shows the tested PFAS levels for the Westbury STP.

Table 4-10: PFOS+PFHxS and PFOA for the Westbury STP, Lagoon 1

PFOS+PFHXS (µg/kg)	PFOA (µg/kg)	MARGIN OF SAFETY
LOR[5] <0.5	LOR <0.5	
<0.5	<0.5	Meets MOS 1, 2, and 5

PFAS levels from Westbury STP Lagoon 1 meet all three MOS levels.

4.5 BIOSOLIDS NITROGEN LEVELS

Nitrogen (N) analyses have been provided for the biosolids to assist with Nitrogen Limiting Application Rates (NLAR) calculations. Sampling was completed on 22 May 2025. The mean N levels for biosolids from Lagoon 1 at the Westbury STP are displayed in Table 4-11.

Table 4-11: Mean biosolids nitrogen levels from Lagoon 1, Westbury STP, 22 May 2025

SITE	AMMONIUM MEASURED AS AMMONIA (NH3)	NITRATE (NO3) + NITRITE (NO2)	TOTAL KJELDAHL NITROGEN (TKN)
Westbury STP, Lagoon 1	378.8	5.3	13,377

[5] Laboratory limit of report (LOR)

5 Soils assessment

5.1 AREA AVAILABILITY

In consultation with the manager of Egmont, land was selected for potential sites for biosolids application. Table 5-1 below shows paddock area and biosolids application (net) areas of the 7 zones (paddocks) that were sampled, Figure A1-2 in Appendix 1 shows the aerial image of the zones. Net biosolids application areas are calculated under consideration of setbacks for public access, waterways, and other buffer zones, as per the TBRG and Section 7.2 of the associated BMP for the property.

Table 5-1: Application zones and areas (ha)

ZONE	PADDOCK AREA (ha)	BIOSOLIDS APPLICATION AREA (ha)
Deer	16.2	12.6
Fellows	35.2	22
Frog Hollows & Camp	26.7	16.7
Missile	14.7	8
Plover Hill & Bub	25.4	17.8
Well & Gap	20.2	16.3
Total	**138.4**	**93.4**

5.2 SOIL SAMPLING PROCEDURES

Samples from the 10 zones (paddocks) listed in Table 5-1 were taken on 12 September 2025.

Samples were taken with a 100 mm tube sampler[6], with cores of approximately 20 mm diameter. Within each area a minimum of 30–40 cores were taken by following a “zig-zag” path over the paddock. All the cores within each paddock zone were bulked and retained to provide a single composite sample for each zone for nutrient analysis and a second composite sample for heavy metal analysis.

PFAS samples have been collected for at least one zone in five across the sample site. This number has been chosen to assess if there are baseline PFAS level indicators at various locations across the site. If PFAS levels are detected at above the NEMP 3.0 MOS 1 levels for soils (see Table 4-9) then further testing would be conducted to assist with determining if the site is suitable to receive the identified biosolids.

Samples were dispatched to Nutrient Advantage Laboratories in Werribee, (NATA Accredited Laboratory 11958) and analysed with standard procedures. Further samples were dispatched to ALS in Scoresby (NATA Accredited Laboratory 992) to assess heavy metals and PFAS in the soils.

5.3 ANALYTICAL RESULTS: RECEIVING SOILS

The following results of soil analyses by zone are classified using a “traffic light” system to highlight where soil fertility levels or soil characteristics require attention when using biosolids; the “red lights” show where either low or high levels occur and may be reducing plant growth / health (Table 5-2). High levels of nutrients are not classified as affecting plant growth negatively unless they are at toxic levels. Where excessive nutrient levels are present and not likely to affect plant growth, but may cause off site impacts or environmental harm, results

[6] Reference: FertSmart “Soil test guidelines for optimum dairy pasture production” by University of Tasmania

are highlighted separately (grey). Comment is made where high nutrient levels and or imbalances may affect the health of livestock.

Table 5-2: Table colour reference

NO ACTIONS	NEEDS MONITORING	MAY BE AFFECTING PLANT GROWTH	NOT AFFECTING PLANT GROWTH BUT MAY HAVE OFF SITE / ENVIRONMENTAL IMPACT

5.3.1 ACIDITY, pH

pH levels have been measured as pH in water and $CaCl_2$.

Table 5-3: pH in 7 zones

PADDOCK	PH (1:5 IN H_20)	PH (1:5 IN $CaCl_2$)	RATING
Deer	6.1	5.3	Slightly acidic
Fellows	6.1	5.2	Slightly acidic
Frog Hollows & Camp	6.0	5.2	Slightly acidic
Missile	5.7	5.0	Slightly acidic
Plover Hill & Bub	6.1	5.3	Slightly acidic
Well & Gap	6.2	5.5	Slightly acidic

pH levels are slightly acidic (Table 5-3). The pH levels are in the allowable range for application of biosolids as defined in Table 11.1 of the *Tasmanian Biosolids Reuse Guidelines*.

5.3.2 ELECTRICAL CONDUCTIVITY (MEASURED IN A 1:5 SOIL: WATER SUSPENSION)

Salinity has been determined via measuring electrical conductivity (EC) as EC 1:5. The EC 1:5 values have been converted to ECse using conversion factors for loam soils and clay loam soils: 12.

Table 5-4: Electrical conductivity (EC) in 7 zones

PADDOCK	EC1:5 (DS/M)	SOIL TEXTURE	CONVERSION FACTOR	ECSE DS/M (CALC)	RATING
LOR	0.01				
Deer	0.10	Loam	12	1.20	Low
Fellows	0.11	Loamy Sand	14	1.54	Moderate
Frog Hollows & Camp	0.14	Loam	12	1.68	Moderate
Missile	0.10	Loam	12	1.20	Low
Plover Hill & Bub	0.10	Silty Loam	12	1.20	Low
Well & Gap	0.12	Silty Loam	12	1.44	Low

Salinity levels are low to moderate (Table 5-4). The organic matter in biosolids may improve soil structure and thus drainage. This could lead to leaching of chloride and reduction of EC. Changes in salinity levels in the identified zones will be monitored.

5.3.3 ORGANIC CARBON (WALKLEY-BLACK)

Table 5-5: Organic carbon in 7 zones

PADDOCK	ORGANIC CARBON %	ORGANIC MATTER %	RATING
LOR	0.20	Calc	
Deer	5.09	8.80	High
Fellows	3.77	6.50	Generally satisfactory
Frog Hollows & Camp	5.38	9.30	High
Missile	5.21	9.00	High
Plover Hill & Bub	4.83	8.30	Generally satisfactory
Well & Gap	4.58	7.90	Generally satisfactory

Organic carbon levels range from generally satisfactory to high (Table 5-5). Soils will generally benefit from the additional organic matter applied via biosolids, even if levels are high.

5.3.4 PHOSPHORUS

Available phosphorus (measured as Colwell P) and Phosphorus Buffer index (PBI) are provided in Table 5-6.

Phosphorus Environmental Risk Index (PERI) is the Ratio of Colwell P / PBI. It is an indicator of risk of possible P leaching into waterways and environmental damage. The PERI should be < 1 to be safe for production and the environment[7]. The calculated PERI for each zone is also shown in Table 5-6.

Table 5-6: Available phosphorus in 7 zones

PADDOCK	AVAILABLE P (mg/kg)	COMMENT	PBI	PBI COMMENT	PERI	RATING
LOR	5.00		Calc		Calc	
Deer	76	High	150	Moderate	0.51	Optimum
Fellows	200	High	110	Moderate	1.82	High
Frog Hollows & Camp	69	Moderate	240	High	0.29	Optimum
Missile	26	Low	240	High	0.11	Optimum
Plover Hill & Bub	75	Moderate	170	Moderate	0.44	Optimum
Well & Gap	72	Moderate	290	Very high	0.25	Optimum

Phosphorus (P) levels in the soils range from low to high and the phosphorus buffer index (PBI) of the soils is moderate to very high (Table 5-6). Leaching, as indicated by the PERI, is generally considered to be low risk except for Fellows where there is a higher risk of leaching. No additional P must be applied after biosolids have been spread.

[7] Reference: https://fertsmart.dairyingfortomorrow.com.au/, Dairy Australia :

5.3.5 NITROGEN

Table 5-7: Nitrogen (N, Total and Available) in 7 zones

PADDOCK	TOTAL NITROGEN (LECO) (mg/kg)	AMMONIUM NITROGEN NH_4 (mg/kg)	NITRATE NO_3 & NITRITE NO_2 (mg/kg)	TOTAL AVAILABLE NITROGEN (mg/kg)
LOR	50		1.0	Calc
Deer	4300	15	15	30
Fellows	3300	16	12	28
Frog Hollows & Camp	4600	19	7	26
Missile	4100	11	11	22
Plover Hill & Bub	4500	18	15	33
Well & Gap	4400	20	13	33

Available N (NH_4 and NO_2) levels are generally low, and the soils will benefit from available N in biosolids.

5.3.6 CLAY CONTENT

Table 5-8: Clay content (Texture) in 7 zones

PADDOCK	CLAY CONTENT %
LOR	0
Deer	12.4
Fellows	10.2
Frog Hollows & Camp	16.1
Missile	12.6
Plover Hill & Bub	17.1
Well & Gap	16.6

Soil clay content is between 10 to 17%.

5.3.7 HEAVY METALS

Table 5-9: Heavy Metals (mg/kg) in 7 zones

PADDOCK	ARSENIC	CADMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
LOR	<5	<0.2	<5	<5	<0.05	<5	<5
Deer	<5	0.3	18	10	<0.05	30	76
Fellows	<5	<0.2	<5	5	<0.05	<5	14
Frog Hollows & Camp	<5	0.2	21	14	<0.05	29	40
Missile	<5	<0.2	14	22	<0.05	19	19
Plover Hill & Bub	<5	0.3	20	10	<0.05	51	70
Well & Gap	<5	0.3	13	14	<0.05	31	72

Heavy metal levels are low in all soils.

5.3.8 PFAS

Table 5-10: PFAS levels (µg/kg)

PADDOCK	PFOS+PFHXS (µg/kg)	PFOA (µg/kg)
LOR	<0.2	<0.2
Fellows	<0.2	<0.2
Well & Gap	<0.2	<0.2

PFAS levels are below the detectable limit of reporting (LOR) levels.

Further soil sample results are provided in Appendix 3. Sample results from both laboratories have been provided to the EPA as separate documents.

6 Biosolids application

6.1 APPLICATION LIMITATIONS

Application rates of Class 2 biosolids to land are limited by the level of metal contaminants, the available nitrogen and PFAS. To demonstrate compliance with the TBRG, two limiting rate calculations are required:

- Contaminant limiting application rate (CLAR)
- Nitrogen limiting application rate (NLAR).

In addition to the above calculations, consideration of potential for PFAS to impact the site is also calculated as per the NEMP 3.0 requirements.

6.2 CONTAMINANT LIMITING APPLICATION RATE

6.2.1 BIOSOLIDS ADJUSTED CONTAMINATION CONCENTRATIONS

Biosolids adjusted contamination concentrations (BACC) have been calculated (as per the methodology described by the TBRG) from data supplied by TasWater and is shown in Section 4.3.1.

6.2.2 MAXIMUM ALLOWABLE SOIL CONTAMINANT CONCENTRATIONS

According to the TBRG, the maximum allowable soil contaminant concentrations (MASCC) for arsenic, lead, mercury, and nickel are fixed. For cadmium, copper, and zinc, the MASCC varies with the soil conditions and can be calculated using Tables D2, D3, D4, and D5 of the TBRG. Table 6-1 shows the MASCC for all contaminates. For cadmium, copper, and zinc, when the MASCC was calculated, the most conversative relevant MASCC calculation was used.

Table 6-1: MASCC for each element

ELEMENT	MASCC (mg/kg)
Arsenic	20
Cadmium	0.82 (Calculated)
Copper	197 (Calculated)
Lead	200
Mercury	1
Nickel	60
Zinc	426 (Calculated)

6.2.3 CALCULATION OF CONTAMINANT LIMITING APPLICATION RATE

The CLAR is the rate (in dry solid tonnes per hectare) that will cause the concentration of the limiting contaminant to reach the maximum allowable soil contamination concentration. The CLAR is derived from the BACC (see Section 4.3.1) and current soil concentration of contaminants (see Table 5-9).

The calculation for the CLBAR is as follows:

CLAR = (MASCC – ASCC) x SM / BACC

Where:

- CLAR = Contaminated Limited Application Rate (dry t/ha)
- MASCC = Maximum Allowable Coil Concentration (mg/kg)
- ASCC = Actual Soil Contaminant Concentration (mg/kg)
- BACC = Biosolids Adjusted Contaminant Concentration (mg/kg)
- SM = Incorporated Soil Mass per hectare (dry t/ha) (soil bulk density (g/cm^3) x incorporation depth (m) x 10,000 m^2) (1.33 x 0.1 x 10000 = 1330 SM t/ha).

CLAR calculations are shown in Table 6-2. Wet t/ha are calculated by dividing the dry tonnes by the biosolids solids percentage (25%). Based on the calculated results, zinc is the limiting contaminant for 5 zones and nickel is for one zone. It noted that application rates required to exceed the CLAR are well above any likely application rate on the site.

Table 6-2: CLAR calculations

	ARSENIC		CADMIUM		COPPER		LEAD		MERCURY		NICKEL		ZINC		LIMITING CONTAMINANT
	Dry t/ha	Wet t/ha	Dry t/ha	Wet t/ha	Dry t/ha	Wet t/ha	Dry t/ha	Wet t/ha	Dry t/ha	Wet t/ha	Dry t/ha	Wet t/ha	Dry t/ha	Wet t/ha	
Deer	2,463	9,852	6,916	27,664	320	1,278	3,646	14,586	903	3,610	1,061	4,245	323	1,293	Zinc
Fellows	2,463	9,852	8,246	32,984	343	1,371	3,742	14,970	903	3,610	1,945	7,782	380	1,522	Zinc
Frog Hollows & Camp	2,463	9,852	8,246	32,984	314	1,257	3,570	14,279	903	3,610	1,097	4,386	356	1,426	Zinc
Missile	2,463	9,852	8,246	32,984	330	1,321	3,646	14,586	903	3,610	1,309	5,235	355	1,418	Zinc
Plover Hill & Bub	2,463	9,852	6,916	27,664	327	1,307	3,416	13,665	903	3,610	1,450	5,801	376	1,503	Zinc
Well & Gap	2,463	9,852	6,916	27,664	316	1,264	3,646	14,586	903	3,610	310	1,240	329	1,315	Nickel

6.3 PFAS LIMITING CONTAMINANT APPLICATION RATE

Application rates may also be impacted by PFAS levels. The suitability and thus application rates are determined using the following flow chart from the NEMP 3.0 Supporting Document 1.

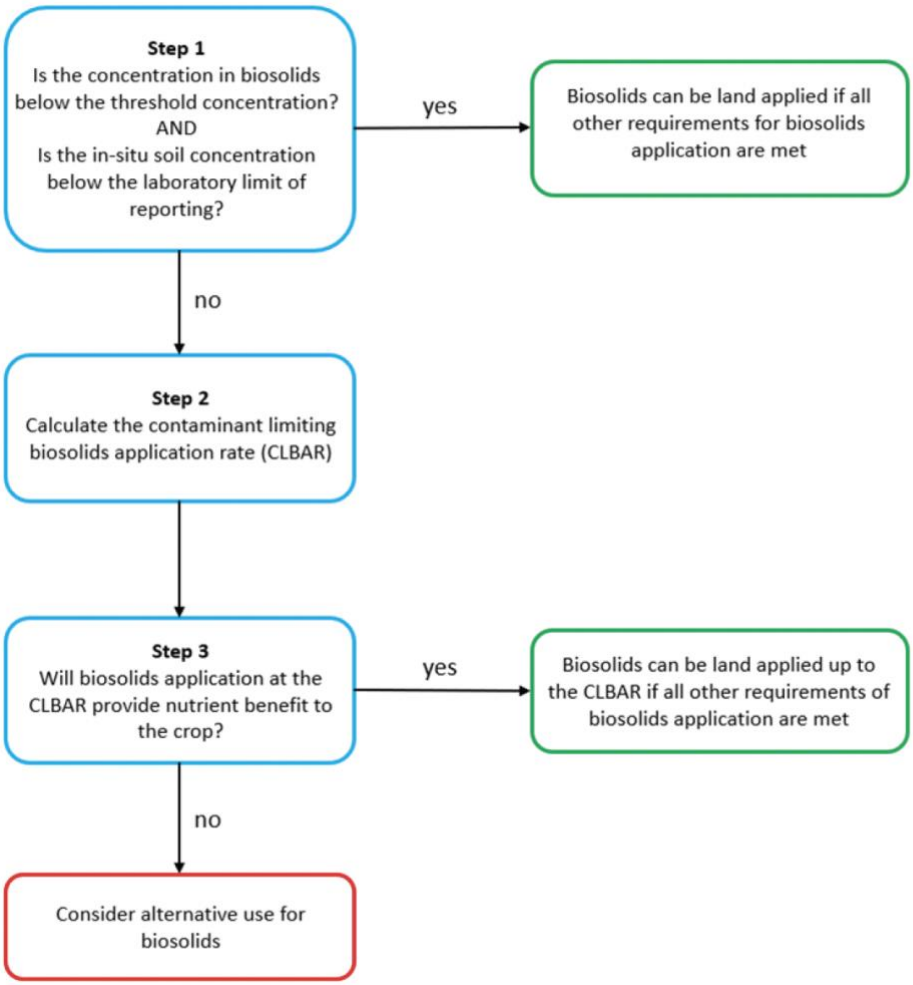


Figure 6-1: Flowchart of framework to assess suitability of Class B biosolids for land application, PFAS (NEMP 3.0)

The CLBAR is calculated via the following formula.

$$CLBAR = \frac{MASCC - MISCC}{C\ bio}\ x\ SM$$

Where:

- MASCC is the maximum allowable soil contaminant concentration (in µg/kg – see Table 6-3)
- MISCC is the measure in-situ soil contaminant concentration (in µg/kg – to be confirmed as part of soil sampling)
- C bio is the biosolids contaminant concentration (in µg/kg)
- SM is the incorporated soil mass per hectare (in dry t/ha – a stand measure of 1.3 t/m^3 will be used).

In this instance the biosolids PFAS concentrations are below all threshold concentrations for all MOS levels (see Table 4.8) and the soils levels a below the laboratory limit of reporting (see Table 5-9). This mean that all measures in Step 1 of the above flow chart are met and so biosolids can be applied to the land without further consideration of PFAS as long as other application requirements are adhered to.

Table 6-3 below shows the maximum allowable soil contaminant concentrations (MASCCs).

Table 6-3: MASCCs for PFAS

CRITERIA TYPE	MARGIN OF SAFETY	PFOS+PFHXS (µg/kg)	PFOA (µg/kg)
Allowable soil contaminant concentrations MASCC	5	0.22	0.6
	2	0.55	1.5
	1	1.1	3

6.4 NITROGEN LIMITING APPLICATION RATE

According to the TBRG, the application rate of N from Biosolids should not exceed the N demand of the crop, known as the Nitrogen Limiting Biosolids Application Rate (NLAR).

6.4.1 AVAILABLE N IN BIOSOLIDS

Available N refers to the mineral N (nitrate, nitrite, and ammonium). Results are determined using the formula provided in the TBRG.

$$\text{ABN (kg/t)} = \frac{(\text{ammonium N (mg/kg)} + \text{oxidised N (mg/kg)} + \text{organic N (mg/kg)}) \times \text{MR \%}/100)}{1{,}000}$$

ABN = available biosolids nitrogen

Where:

- Organic N = TKN – ammonium N
- Oxidised N = N as nitrate & nitrite
- TKN = Total Kjeldahl Nitrogen
- MR = Mineralisation Rate.

This calculation is based on the following inputs, which are the averages from biosolids analysis:

Table 6-4: Biosolids inputs

INPUT	RESULT
Organic N	15123.15 mg/kg
Oxidised N	26.15 mg/kg
TKN	16140 mg/kg
MR	20%
Solids	25%
ABN dry tonne	4.24 kg/t
ABN wet tonne	0.59 kg/t

6.4.2 CROP REQUIREMENT FOR NITROGEN (N)

The next step is to identify the crop requirement. The pasture crop nitrogen requirement for the subject sites is estimated to be at least 240 kg/ha annually. This is based on pasture N removal of 30 kg/t dry matter (DM),

and 8 t/ha DM removal via grazing and fodder removal in the region[8]. Applications of nitrogen to pastures are usually limited to about 30–35 kg/ha per post-grazing application to maximise the efficiency of nitrogen uptake and minimise losses to the air via volatilisation and or denitrification, leaching of nitrates into groundwater, or run-off to surface water.

Total annual N applications via fertilisers to pastures used for grazing in the region are commonly 60 - 300 kg/ha, depending on climate, irrigation availability, and soil/pasture quality, which greatly determines the dry matter production potential. For this case, we have based calculations on a well-managed, productive pasture with no constraints to productivity (8 t DM/ha) so that at least 240 kg N/ha can be utilised by pasture over the main growing season (late spring to mid-autumn).

6.4.3 AVAILABLE N IN SOIL

The soil analysis shows there are between 15.7 mg/kg and 33.0 mg/kg of available N in the zones assessed to 100 mm depth at the property (see Table 5-7).

6.4.4 NITROGEN LIMITED APPLICATION RATE (NLAR) FOR THE BIOSOLIDS

NLAR has been calculated using the formula provided in Appendix D of the TBRG. To ensure that excessive nitrogen is not applied in one event, the actual application rate has been calculated at 50% the NLAR. It is also strongly recommended that the total allowable application to each paddock occurs over two spreading events, to reduce leaching risks, if the soil is near or at field capacity[9]. If the soil is dry, the full rate may be applied. NLAR calculations are shown in Table 6-5.

[8] Based on TIAR Regional Historical Pasture Production (2005/06 to 2017/18). Information for Campbell Town and Tunbridge (two closest sample locations), averaged.

[9] Assessed by a field guide provided to spreading contractors

Table 6-5: NLAR calculations

SITE	ANNUAL CROP REQUIREMENT N (kg/ha)	AVAILABLE N (mg/kg)	N SHORTFALL (mg/kg)	AVAILABLE BIOSOLIDS N (ABN) (kg/dry tonne)	BIOSOLIDS % SOLIDS	ABN (kg/wet tonne)	NLAR wet t/ha	NLAR 50% (wet t/ha)
Deer	240	30.0	210.0	3.06	25	0.31	343	172
Fellows	240	28.0	212.0	3.06	25	0.31	347	174
Frog Hollows & Camp	240	26.0	214.0	3.06	25	0.31	350	175
Missile	240	15.7	224.3	3.06	25	0.31	367	184
Plover Hill & Bub	240	22.0	218.0	3.06	25	0.31	356	178
Well & Gap	240	33.0	207.0	3.06	25	0.31	338	169

6.5 MAXIMUM ALLOWABLE BIOSOLIDS APPLICATION RATE

Biosolid and soil sample analysis results have been used to calculate the maximum application rates based on CLAR, NLAR and PFAS as well as other limiting soils properties such as phosphorus and/or salinity. When considering CLAR, NLAR and PFAS, all application rates are limited by the NLAR and the imposed application rate of no greater than 50% of the NLAR.

Application rate, application area and total number of biosolids to be applied per paddock are shown in Table 6-6. Further notes and/or setback requirements are also provided. Biosolids are to be applied between October and April / early May. To ensure a consistent spreading rate across the site, an application rate of **160 wet tonnes/ha** has been recommended for five areas. For one area (Fellows) a reduced application rate of **100 wet tonnes/ha** has been recommended due to higher soil phosphorus levels. These application rates ensure the NLAR is the limiting factor, and they will also ensure there is more than sufficient land to spread the 8,800 wet tonnes of biosolids that will be removed from the Westbury STP.

Table 6-6: Total biosolids application rates for identified zones on the property

ZONE	APPLICATION AREA (HA)	APPLICATION RATES (WET T/HA)	TOTAL BIOSOLIDS (T)	NOTES/SETBACKS
Deer	12.6	160	1785	▪ 50 m setback from property boundary ▪ Avoid sloped areas >15%
Fellows	22	100	1080	▪ 50 m setback from road ▪ 50 m setback from property boundary ▪ 20 m setback from small dam ▪ 50 m setback from shed ▪ The southern section biosolids can on be spread if piles of dirt are removed
Frog Hollows & Camp	16.7	160	1980	▪ 50 m setback from property boundary ▪ Avoid native vegetation ▪ Avoid wet area at northern end of Frog Hollow
Missile	8	160	345	▪ 50 m setback from road ▪ 50 m setback from property boundary ▪ 20 m setback from dams and avoid wet areas near dams
Plover Hill & Bub	17.8	160	1830	▪ 20 m setback from drainage line to the wet and associated dam ▪ Avoid sloped areas >15% ▪ 10 m setback from drain in northern section ▪ 50 m setback from Brushy Rivulet ▪ 50 m setback from property boundary
Well & Gap	16.3	160	1710	▪ 20 m setback from western drainage line ▪ 10 m setback from eastern drainage line
Total	**93.4**		**13,624**	

7 Biosolids management actions

This section details management actions that will be undertaken as part of the biosolids application program to minimise the risk to nearby sensitive receptors and the environment.

7.1 ODOUR MANAGEMENT

Only Grade A and Grade B biosolids are permitted to be reused at the application site. By definition, Grade A and Grade B biosolids should not exhibit offensive odours. TasWater, as the resource producer, is responsible for producing and classifying biosolids and plays the primary role in preventing offsite odours from biosolid reuse activities.

All treatment plants producing biosolids that will be delivered to the site are required to meet the approved processes for producing stabilisation Grade B product and must also meet multiple process verification requirements (TBRG Section 8). TasWater must be able to provide the following information to regulators to demonstrate that appropriate stabilisation has occurred (TBRG Section 8.4.1):

1. Evidence that the process achieves vector attraction reduction requirements (TBRG Table 8.1);
2. Test results from a suitably accredited laboratory (such as NATA or ASPAC) showing compliance with maximum pathogen levels for Stabilisation Grade A or Stabilisation Grade B (results shown in this BMP in Table 4-5); and
3. Measurements of relevant process criteria (e.g. retention times / reaction times / temperature / pH / moisture / other process controls) to ensure compliance with designated stabilisation process.

With the approved process criteria being met all biosolids delivered to the site can be considered Grade B and therefore all management methods and buffer zones detailed in the TBRG and in this Management Plan will be effective in preventing offsite odours. The TBRG is informed by significant modelling and assessment of the odour generation potential of Grade B biosolids produced in Australia and advises that “adequately stabilised biosolids should not exhibit strong, offensive odour”.

7.2 BUFFER ZONES AND PHYSICAL SITE RESTRICTIONS

As a minimum, buffer and physical site restrictions must consider all elements identified in Table 11.1 of the TBRG. These requirements are detailed below in Table 7-1. In this instance, the nearest dwelling to the proposed spreading area will be at a distance greater than 215 m.

Table 7-1: Buffer zones and physical site restrictions (TBRG Table 11.1)

SITE CHARACTERISTICS	RESTRICTION		ADDITIONAL INFORMATION
Slope	<15% (<1:7 ratio)		To prevent run-off and erosion. Forestry and site rehabilitation are possible exceptions with management controls this can be increased to <25%.
Buffer Distances	Open watercourse downslope	>100m	Buffer zones are used to reduce the likelihood of run-off, dust or odour affecting adjacent land or watercourses.
	Open watercourse flat	>50m	
	Open watercourse upslope	>10m	
	Occupied dwellings	>100m	
	Residential zones	>250m	
	Public roads and adjoining properties	>50m	
	Water bores	>50m (>250m if drinking water bore)	
	Native forests or significant vegetation	>10m	
	Property access roads	>5m	
Soil pH	>4.5		This restriction does not apply to lime amended biosolids.
	<7.5		<7 applies to lime amended biosolids only.
Undesirable Drainage	Waterlogged, flood prone or extremely permeable soils		To prevent run-off or groundwater contamination.
Shallow Groundwater	>1.5m to groundwater		To prevent run-off or groundwater contamination.
	Average Clay % (0-100cm)	Minimum depth to groundwater	
	>35%	1.5m	
	25–35%	2m	
	15–25%	3m	
	10–15%	4m	
	5–10%	5m	
	<5%	8m	
Rocky Ground	Untillable land		Forestry and site rehabilitation are possible exceptions with management controls in place.

7.3 TRANSPORT AND DELIVERY OF BIOSOLIDS

The transport of biosolids to the property will be undertaken by a contractor who is registered to transport K130 categorised controlled wastes. All delivered weights are to be recorded and retained in a suitable database by the contractor. Validation of full-load weights via a weighbridge is recommended for sites without scales and it is recommended that all trucks carting biosolids be equipped with accurate weighing systems. Where weighing equipment is not available the full-load weight must be estimated by an approved weight estimation method[10].

Given liquid spreading will be occurring, it is unlikely that stockpiling of biosolids on the site will occur. However, if it were to occur, the contractor and the property owner shall allocate suitable unloading areas where safe stockpiling can occur. Stockpiling may be undertaken provided that several management controls are put in place:

- Stockpile areas should be located on the minimum slope possible within the application area but away from any area subject to flooding
- Stockpiles are to be located at least 100 m from nearest property boundary
- Stockpiles must not be accessible to livestock
- Stockpiles must not be subject to erosion by wind or rain – if this is found to be occurring biosolids must be applied or the erosion addressed
- Stockpiling is limited to the day of application for biosolids specifically requiring incorporation to meet vector attraction reduction requirements
- Biosolids to be stored on site for more than 24 hours must either be:
  - Retained within a bunded storage area constructed and maintained to contain the first hour of a 1 in 20 rainfall event: or
  - On a site where it can be reasonably demonstrated that surface runoff or contaminants leaching into the groundwater will not be problematic.

Consideration will need to be given to accommodate delivery and unloading during wet weather. Should the roads and unloading areas be unsuitable, deliveries should be postponed.

Provision of washdown equipment for use on trucks and bins must be made available to ensure compliance with the hygiene requirements of the Controlled Waste Transporter permit. Washdown water should be added to either biosolid stockpiles or planned spreading areas and not run off into drains or streams.

7.4 BIOSOLIDS APPLICATION METHOD

The biosolids will be spread within 24 hours of delivery, unless express permission is granted by the landowner to stockpile them for longer and potential run off can be contained. Weather predictions will be considered when making decisions about transport, unloading and spreading.

The trained operator shall calibrate the spreader for the identified application rate. Ongoing calibration checks and adjustments need to be made as required. Records of calibrations, ground speed and overall operations to maintain the target application rates have to be kept. It has to be considered that wetter material may have a larger spread width and as such vehicle speed will need to be reduced. It is the responsibility of the spreading contractor to ensure all operators are adequately trained and follow specific work safety measures when operating spreading machinery. Training records must be kept for each operator.

The spreading equipment cannot operate on steep (slope >15%), waterlogged (saturated) or rocky terrain.

[10] Data Recording & Reporting for Resource Recovery Facilities Guideline, 2022. Available at: https://nre.tas.gov.au/Documents/Guideline%20-%20Data%20Recording%20and%20Reporting%20-%20Resource%20Recovery%20Facilities.pdf

7.5 BIOSOLIDS APPLICATION CONTROLS

Management of biosolids once delivered to site are to be consistent with the requirements of the Biosolid Application Controls detailed in the TBRG (Table 11.2). Relevant sections are reproduced in Table 7-2 below. Where additional controls are to be employed or if further detail is provided in this BMP, this is referenced.

It is noted that the first preference is for biosolids to be stored on a biosolids production or processing site in the first instance, rather than the application site.

Table 7-2: Biosolids application controls (TBRG Table 11.2)

PRACTICE	MANAGEMENT
Signage	Any area used for stockpiling or biosolids application must have adequate signage installed on appropriate gates and fence lines to ensure the public is aware of the risk and prevent public accessing the area. Advice on appropriate signage may be obtained from Public and Environmental Health Services. See Section 7.5.2 for identified signage.
Stockpiling dewatered biosolids on application sites (unlikely to be applicable for liquid spreading)	▪ Stockpile areas should be located on the minimum slope possible within the application area but away from any area subject to flooding ▪ Stockpile must be located at least 100 m from the nearest property boundary ▪ Stockpiling and/or unloading areas shall not be located within 250 m of an off-farm residence ▪ Stockpile must not be accessible to livestock ▪ Stockpile must not be subject to erosion by wind or rain – if this is found to be occurring biosolids must be applied or erosion addressed – Stockpiling is limited to the day of application for biosolids specifically requiring incorporation to meet vector attraction reduction requirements (TRBG Table 8.1) ▪ Biosolids to be stored on-site for more than 24 hours must either be: – Retained within a bunded storage area constructed and maintained to contain the first hour in a 1 in 20-year rainfall event; or – On a site where it can be reasonably demonstrated that surface run-off or groundwater will not be problematic ▪ To ensure excessive quantities of biosolids do not accumulate on an application site, biosolids should not be stored for more than 90 days. An exception may be made during winter months on the proviso that the biosolids are stored within a bund and those biosolids must be used in the upcoming growing season ▪ For bunded storage areas: – Surface water diversion is required to prevent the entry of overland flow into the bunded area, and – A drainage collection point should be located within the bund, but separated from the stored biosolids, and collected drainages should be applied to the application site.
Incorporation of biosolids	Biosolids should be incorporated wherever possible (e.g. applied to land about to be cultivated or direct injected as a liquid). However, many forms of biosolids (e.g. dried, lime amended) are suited to surface application without incorporation, and management practices (e.g. biosolids treatment, withholding periods, buffer zones) can be used to minimise the risk of off-site impacts and vector attraction. In all cases, reasonable judgement should be exercised with respect to the appropriate application and incorporation requirements for the biosolids and site in question.
Repeat application and soil pH adjustment	Following application, soil pH should be maintained above pH 5.5 to minimise migration of nutrients and contaminants into groundwater. Prior to repeat biosolids application soil sampling must be completed to verify soil pH.
Weather patterns and seasonality	All biosolids application should be scheduled to preceding, present and forecast weather conditions, with particular emphasis on avoiding likely rainfall events. Consideration should be given to whether wind conditions will increase the likelihood of dust and odour being carried beyond buffer zones. Winter application of biosolids should be avoided where possible due to low nutrient uptake.

7.5.1 WIND STRENGTHS AND DIRECTION

Wind has the potential to move odours offsite. The spreading contractor, in conjunction with the property owner/manager, shall consider meteorological data of prevailing winds with local knowledge of terrain effects to exclude spread areas from certain areas of the property and increase the buffer zones in Table 7-1 where required.

Prevailing wind is from the northeast, see Figure 7-1.

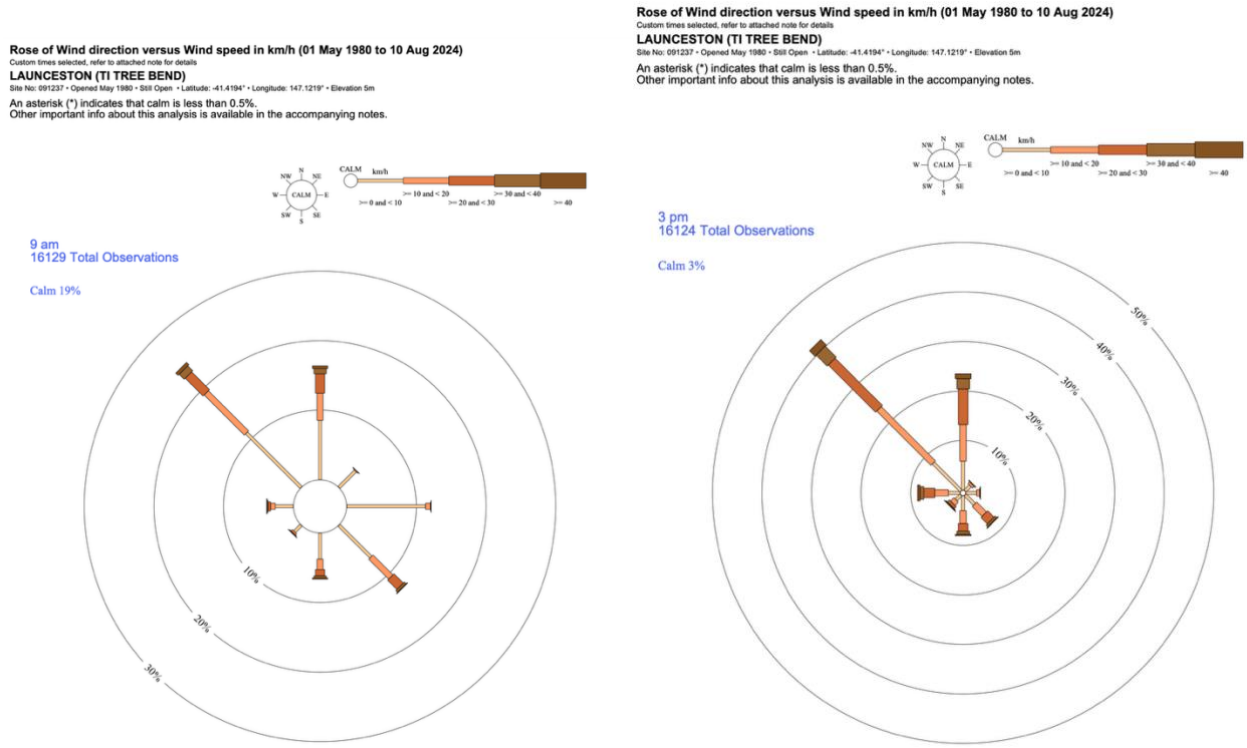


Figure 7-1: Annual mean 9am and 3pm wind rose for Ti Tree Bend[11] (BoM site number 091237), 1980 to 2024.

7.5.2 SIGNAGE

Appendix 2 provides a visual of the signage that will be used on site. Signage is in line with regulatory requirements.

7.5.3 OCCUPATIONAL HEALTH AND SAFETY

Biosolids can contain pathogens. Personnel involved with reuse activities shall be trained and:

- Always wash hands before eating, drinking, or smoking
- Cover cuts and abrasions with waterproof dressings. If an infection occurs, then see a doctor immediately
- Do not eat or drink while working with biosolids
- Protective clothing, including eye and dust protection (masks where appropriate) must be worn when working with biosolids
- Promptly clean body areas that become in contact with biosolids.

[11] Nearest BoM site with wind direction data.

All site visitors and contractors are to be informed of the above and have access to appropriate safety equipment and washing facilities.

Signage shall be used to inform the public on the risks of entry (see Section 7.5.2).

7.5.4 COMPLAINTS

All complaints by the public are to be investigated immediately by TasWater and recorded in both TasWater and the spreading contractor's incident recording system. All investigations shall address the following questions at a minimum:

- What is the nature of the complaint
  - Odour, noise, environmental, visual?
- What are the times and duration of the activity causing concern
  - Is it a one off or has it been constant?
- Have there been environmental or weather conditions that may be contributing?
  - Hot/cold weather, wind direction, rainfall
- Are there any non-compliance events that may be contributing?
  - Have buffer zones been observed?
  - Are all biosolids delivered to site verified as Grade B?
  - Is stock being excluded from spread areas?
  - Are delivery vehicles being operated safely?
- Is the complaint potentially vexatious or are there vested interests at play?
- Has the complainant been consulted previously?
  - Do they understand the activity, the duration, location, management measures?
- Are others affected?
  - If so, what is their experience?
- What mitigation measures can be employed?
  - Cultivation of spread areas
  - Cease spreading in a particular area
  - Dust suppression on access roads
- What corrective actions were performed?
- Have the corrective actions been effective?
  - Is the original complainant satisfied with the outcomes?
  - Have internal inspections and audits indicated the situation is resolved?
- Do management methods need changing to prevent a recurrence and what should be changed?

7.5.5 WITHHOLDING PERIODS FOR BIOSOLIDS APPLICATION

Table 7-3 details the minimum crop withholding periods for biosolids as per the TBRG.

Table 7-3: Minimum crop restrictions for Class 2 biosolids application (TBRG Table 10.1)

PRACTICE	MANAGEMENT
Human food crop	For crops which may be eaten raw, and where harvested parts are close to the soil surface (e.g. lettuce, beetroot, cauliflower, cabbage), planting must be delayed for 18 months after biosolids application.

PRACTICE	MANAGEMENT
	For crops which may be eaten raw, and where harvested parts are below the soil surface (e.g. carrots, potatoes), planting must be delayed for 5 years after biosolids application. In all other cases (i.e. food crops where the harvested product is not in contact with the ground such as apples and wheat), the crop must not be harvested for 30 days after biosolids application. Windfalls (e.g. orchards) must not be collected for 12 months after the biosolids application, unless further processing involving pasteurisation (e.g. canned fruit) occurs.
Animal feed and fibre crops	Must not harvest for 30 days after biosolids application.
Pasture and fodder crops	Animals must not have access to stockpiles of biosolids. Animals must not have access to or be grazed on the site for at least 30 days after biosolids application. Poultry, pigs and other rooting livestock must not be grazed on biosolids application or storage areas as feeding habits of these animals can result in high levels of soil ingestion. Exclusion is preferable but a withholding period of 3 years applies. The Producer must maintain a register of all properties which receive biosolids to grazing land or produce animal fodder for cattle or pigs and make this register available to the Chief Veterinary Officer on request.
Turf	Turf grown on land to which biosolids has been applied must not be harvested for 12 months after biosolids application.

For any additions to the above, it is the landowner's responsibility to ensure that where biosolids are utilised ahead of saleable crops being grown, this practice is acceptable to the purchaser of the crop and adheres to Food Safety Standards.

Livestock Withholding

Table 7-3 details restrictions for animals grazing on pasture. The restrictions are consistent with other requirements for managing pathogen risks to livestock such as Bovine Spongiform Encephalopathy (BSE) and scrapie. *The Australian Ruminant Feed Ban guidelines* (2018) give additional guidance on acceptable measures to minimise the risk of ruminant ingestion of RAM material. In practice, this generally means that there shall be no visible biosolids remaining in the grazing area prior to re-entry of stock; in extended dry periods or low-growth periods, this may exceed the minimum 30-day duration shown in Table 7-3.

Biosolids may remain visible on the surface (and accessible to stock) for longer than 30 days after application in circumstances such as the following:

- Spreading equipment or physical characteristics of the biosolids have led to uneven distribution of material during spreading (e.g. biosolids are in 'clumps');
- Cold and/or dry weather has reduced the growth of pasture; and
- Dry conditions have prevented weathering and infiltration of the biosolids into the soil.

Before stock are allowed entry into a paddock where biosolids have been spread a visual inspection must be carried out to ensure no clumps or streaks of biosolids remain and the field appears uniform and clean.

Visual check method:

- Divide the paddock into a grid
- Take photos after spreading has occurred and then photos when doing the visual inspection to document the change
- Walk or drive paddock slowly before the end of the withholding period and visually inspect for any remining biosolids residue inspecting each section of the grid systematically
- If incorporated, check biosolids were incorporated into the soil within 48 hours.

In circumstances where there is still residual biosolids, a longer re-entry period would be required until no biosolids are visible on the pasture's surface. TasWater is the responsibility entity for the biosolids, it therefore is their responsibility to ensure the landholder is aware of their requirements around withholding periods after biosolids application to limit the risk of livestock being exposed to RAM.

Cysticercosis (Beef Measles)

Cysticercosis can occur in cattle due to infection from the *Taenia saginata* parasite.

There is currently an unquantified link associated with cattle grazing on land spread with biosolids and the transmission of Cysticercosis. Whilst the risk is believed to be low, the Tasmanian Chief Veterinary Officer (CVO) has been considering the reporting requirements for cattle grazed on land that has had biosolids applied. This assessment has been occurring for several years. Should any formal advice be provided by the Tasmanian Chief Veterinary Officer, consideration would have to be given to changes in biosolid applications in response to this advice.

7.5.6 GENERAL BIOSECURITY DUTY

Biosecurity is a set of measures designed to protect a property, the health of crops (including forestry), animals and their environment from the entry and spread of pests, diseases, pathogens, and weeds, as well as harmful contaminants. Biosecurity is the landholder's responsibility, and that of every person visiting or working on a property.

Tasmania has a comprehensive biosecurity protection system, underpinned by the *Biosecurity Act 2019*. This Act introduces in Tasmania a legal obligation known as the **General Biosecurity Duty** – or GBD. The underlying principle with the new GBD is that it is relatively easy to prove a breach of duty. For example, if a contractor doesn't wash down their vehicle prior to entering a property (or there is no record of actions) and weeds turn up in that location, then the contractor can be shown to have breached their duty. The GBD provides a legal framework to ensure that companies and individuals are reducing the biosecurity risks with the activities they are undertaking.

Breaches of biosecurity and the subsequent introduction or spread of weeds, pests, diseases, or contaminants can have significant economic impact on individual farmers and on yields, produce quality and marketability (at a regional, State, and national scale). Some farms which already have endemic biosecurity risks will have containment and management responsibilities, to prevent spread across their own farm, or onto others.

If the farm has a biosecurity plan in place, all persons involved in the biosolids spreading activity coming onto site must follow the biosecurity plan. If there is no official plan in place, then general biosecurity practices as identified on the Biosecurity Tasmania website must be followed.

7.6 RECORD KEEPING

TasWater, the spreading contractor and the landowner/manager are required to maintain accurate records that capture:

- Origin and quantities of biosolids and dates delivered and spread
- Land areas where the biosolids were applied, including evidence that buffer distances have been adhered to
- Application rates
- All information necessary to verify application rates and compliance with approvals
- Details of any incidents
- Details of any complaints and corrective action undertaken.

All records are to be kept for a minimum of 5 years.

References

Commonwealth of Australia (2025). PFAS National Environmental Management Plan (NEMP) 3.0. Australian Government, Canberra, Australian Capital Territory

Environment Protection Authority (2020) Tasmanian Biosolids Reuse Guidelines, Environment Protection Authority, Hobart, Tasmania.

Environment Protection Authority (2020) Approved Management Method for the Reuse of Biosolids, Environment Protection Authority, Hobart, Tasmania.

Appendix 1: Maps

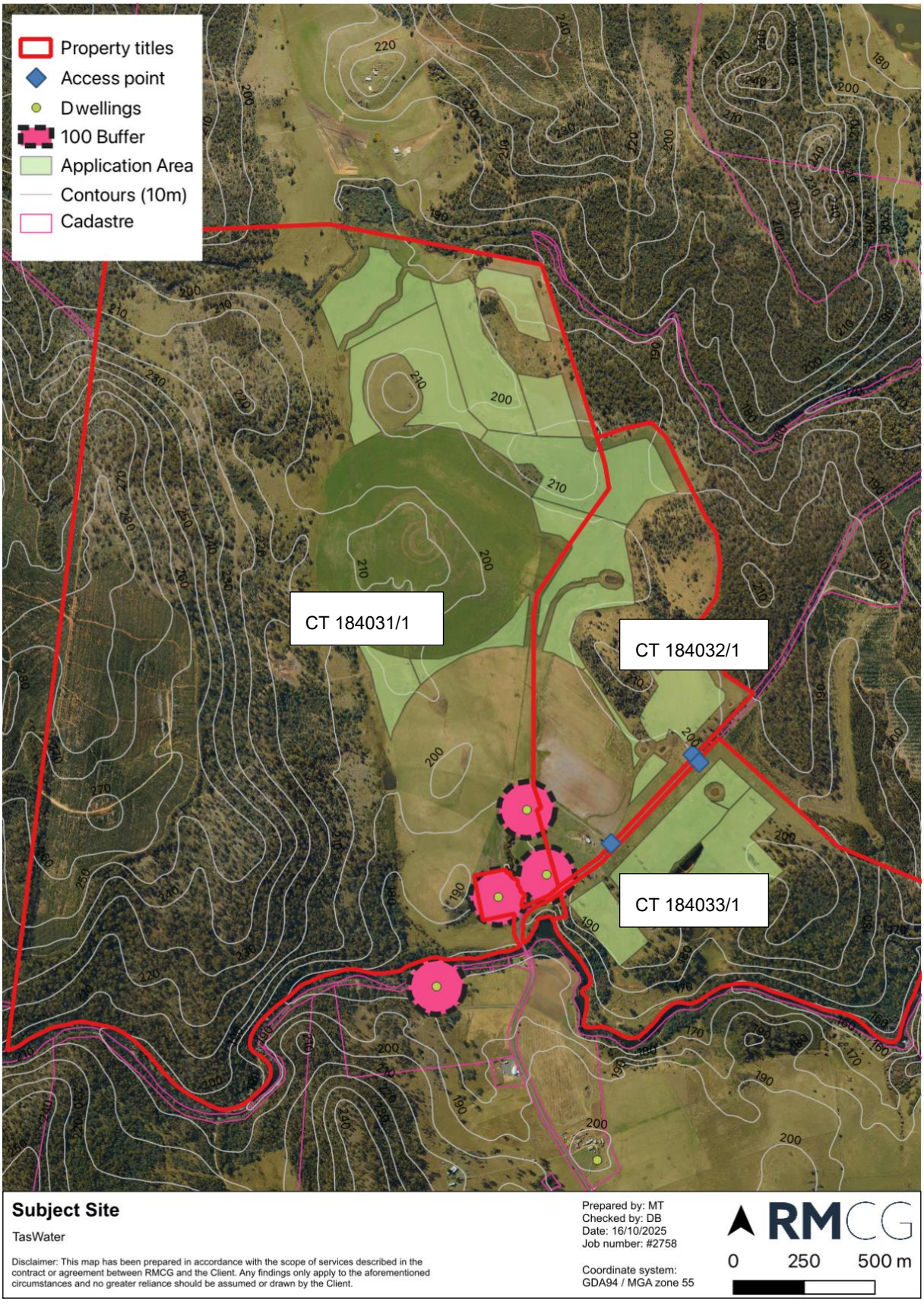


Figure A1-1: Subject site with application areas and surrounding dwellings

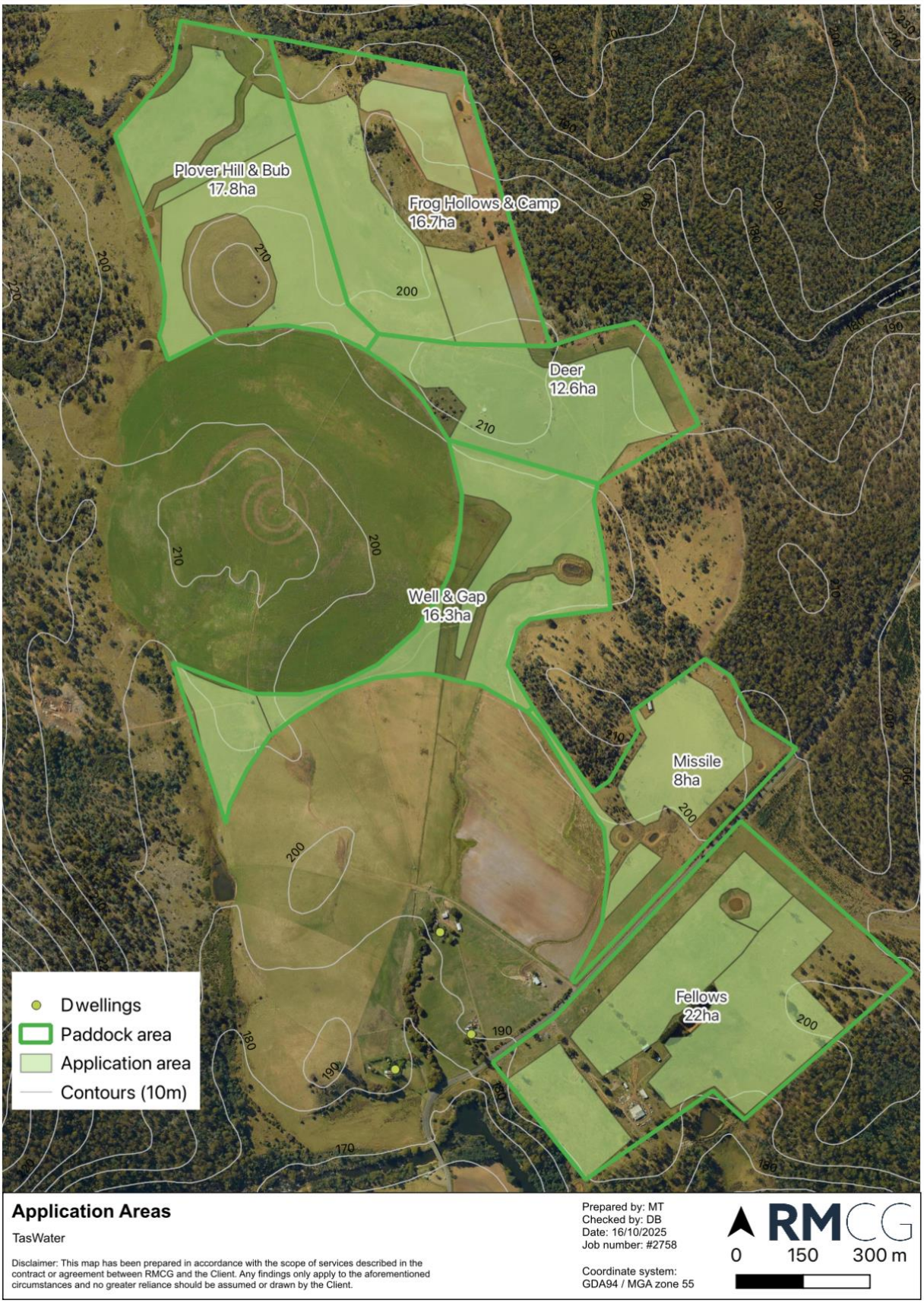


Figure A1-2: Application areas

Appendix 2: Biosolids application signage

Figure A2-1: A4 Biosolids signage example

Figure A2-2: A3 Biosolids signage example

Appendix 3: Further soil results

Table A3-1: Potassium (Available)

ZONE	AVAILABLE K (mg/kg)	RATING
LOR	10	
Deer	330	Very high
Fellows	280	High
Frog Hollows & Camp	220	Optimum
Missile	210	Optimum
Plover Hill & Bub	320	Very high
Well & Gap	420	Very high

Table A3-2: Potassium (Exchangeable)

ZONE	EXCHANGEABLE K (CMOL/kg)	RATING
LOR	0	
Deer	0.93	High
Fellows	0.74	High
Frog Hollows & Camp	0.57	Moderate
Missile	0.64	Moderate
Plover Hill & Bub	0.80	High
Well & Gap	1.00	High

Table A3-3: Calcium (Exchangeable)

ZONE	EXCHANGEABLE Ca (CMOL/kg)	RATING
LOR	0	
Deer	11	High
Fellows	6.6	Moderate
Frog Hollows & Camp	10	High
Missile	7.7	Moderate
Plover Hill & Bub	15	High
Well & Gap	13	High

Table A3-4: Magnesium (Exchangeable)

ZONE	EXCHANGEABLE Mg (CMOL/kg)	RATING
LOR	0	
Deer	2.2	Moderate
Fellows	1.8	Moderate
Frog Hollows & Camp	2.9	Moderate
Missile	1.4	Moderate
Plover Hill & Bub	4.5	High
Well & Gap	2.4	Moderate

Table A3-5: Sodium (Exchangeable)

ZONE	EXCHANGEABLE Na (CMOL/kg)	RATING
LOR	0	
Deer	0.12	Low
Fellows	0.06	Very low
Frog Hollows & Camp	0.24	Low
Missile	0.11	Low
Plover Hill & Bub	0.17	Low
Well & Gap	0.18	Low

Table A3-6: Exchangeable potassium & calcium (%)

ZONE	POTASSIUM (%)	RATING	CALCIUM (%)	RATING
LOR	0		0	
Deer	6.6	Not Ideal	77	Ideal
Fellows	8.1	Not Ideal	72	Ideal
Frog Hollows & Camp	4.1	Ideal	74	Ideal
Missile	6.4	Not Ideal	77	Ideal
Plover Hill & Bub	4.0	Ideal	73	Ideal
Well & Gap	6.1	Not Ideal	79	Ideal

Table A3-7: Exchangeable magnesium & sodium (%)

ZONE	MAGNESIUM %	RATING	SODIUM %	RATING
LOR	0		0	
Deer	16	Not Ideal	0.84	Ideal
Fellows	19	Not Ideal	0.69	Ideal
Frog Hollows & Camp	20	Not Ideal	1.70	Not Ideal
Missile	14	Ideal	1.10	Not Ideal
Plover Hill & Bub	22	Not Ideal	0.86	Ideal
Well & Gap	14	Ideal	1.10	Not Ideal

Table A3-8: Exchangeable cations (Cations Exchange Capacity, CECe)

ZONE	CECe (CMOL/kg)	RATING
LOR	0	
Deer	14.1	Moderate
Fellows	9.15	Low
Frog Hollows & Camp	14	Moderate
Missile	10	Low
Plover Hill & Bub	20.1	Moderate
Well & Gap	16.6	Moderate

Table A3-9: Ca/Mg ratio

ZONE	CA/MG (CMOL/kg)	RATING
LOR	0	
Deer	5.0	Balanced
Fellows	3.7	Ca Low
Frog Hollows & Camp	3.4	Ca Low
Missile	5.5	Balanced
Plover Hill & Bub	3.3	Ca Low
Well & Gap	5.4	Balanced

Table A3-10: K/Mg ratio

ZONE	K/MG (CMOL/kg)	RATING
LOR	0	
Deer	0.42	Ideal
Fellows	0.41	Ideal
Frog Hollows & Camp	0.20	Ideal
Missile	0.46	Ideal
Plover Hill & Bub	0.18	Ideal
Well & Gap	0.42	Ideal

Table A3-11: Extractable trace metals (DTPA)

ZONE	EXTRACTABLE COPPER (mg/kg)	EXTRACTABLE ZINC (mg/kg)	EXTRACTABLE MANGANESE (mg/kg)	EXTRACTABLE IRON (mg/kg)
LOR	0.2	0.2	1.0	1.0
Deer	0.74	3.2	99	170
Fellows	0.67	3.8	32	300
Frog Hollows & Camp	1.40	3.4	90	270
Missile	2.80	3.1	110	160
Plover Hill & Bub	0.83	2.2	74	180
Well & Gap	1.70	3.9	220	200

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1.0	Final	20/10/2025	M. Tempest	D. Blaesing	E. Kelly	D. Blaesing	TasWater
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